



WELCOME

KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

HISTORY

King-Fisher was founded as **Carl J. King and Company** in 1967 by Carl J. King. When Emerson B. Fisher became a partner in 1970, the company was renamed **King-Fisher Company**. Both Carl and Emerson had previous experience within the radio, fire and security communications, personnel alerting systems (PAS), fire protection and alarm detection equipment industry prior to their involvement with **King-Fisher**. Since the early 1970's, the company has been involved in developing radio alarm systems, including customized panels, detection equipment and control panel systems. Keeping abreast of new technological developments, the Company continually updates its systems and components.

In 1981, the Company relocated to a newly constructed a state of the art manufacturing facility in Wheeling, Illinois. Shortly thereafter, **King-Fisher** developed a line of emergency dispatching and fire management software programs. Development of the computer-aided dispatch (**CAD**) and computer fire management and dispatch (**CAD 2000**) software products began in 1983. The software products have served to enhance **King-Fisher's** product line and broaden **King-Fisher's** position in the market.

PRODUCTS / SERVICES

King-Fisher designs, develops and manufactures state-of-the-art emergency communication and fire detection and protection systems. The Company sells complete systems as well as components for existing systems. It also provides installation services for customers. Components of a typical system sold by the Company might include one or more receivers/processors, radio call boxes, interfaces, evacuation devices, (PAS) antennas, battery chargers and rechargeable batteries.



King-Fisher's leading edge communications systems are based upon radio transmission technology. Radio-based systems tend to be more economical than traditional hard-wired systems. In addition, radio alarm transmitting facilitates rapid transmission of signals, saving critical seconds during emergency situations. Existing radio systems can also be easily expanded due to the absence of hard-wired connections. The receiving station has an AM (or FM-FSK) receiver which is specially designed for radio call box applications. Transmitted signals from up to 25 miles (line of site) away can be received and decoded by the receiver and processor, without the need of a repeater. King-Fisher Company manufactures a complete line of Repeaters, which, can extend the range to any required distance, or may be used in severe terrain locations.

In the event of an emergency, signals are sent either manually by a remote hand-held unit, or automatically. Call box push buttons (designated for **Fire, Security, etc.**) may be pushed manually. Central control detection panels, which monitor heat, smoke, other approved detectors or special functions (i.e. **Medical, Security, etc.**), will automatically transmit signals to the receiving base station. Received signals are then decoded and indicated with an audio signal and visual display, along with a written message which is printed and displayed by the base station.

BASE RADIO RECEIVING STATIONS

King-Fisher's KFRA-C Base Radio Receiving Station is one of the latest state-of-the-art emergency radio receiver and signal processors on the market. The unit detects and processes radio transmissions from FCC-approved emergency radio call box transmitters. The KFRA-C is designed to interface with numerous detection and alerting devices as well as many computer-aided dispatch management systems. Units are powered by 12 volt DC, 50 ampere-per-hour batteries for 24 hours of standby power (48, 60 and 90 hours also available). Memory units in the KFRA-C enable the station to store up to 500 address identity numbers (26,000 zones) of radio call box transmitters used with the system. The unit audio and visually displays emergency messages, and produces a permanent record of received signals is printed by a digital impact printer. The unit is available in a variety of configurations.

ADDRESSABLE TRANSMITTER

The King-Fisher KFAPT panel provides the most reliable and efficient means of transmitting radio coded alarm and trouble signals to an Emergency Service Dispatch Center having a KFRA-C radio fire alarm receiver(s) up to 25 miles away (line of site).

When connected to various array of addressable panels the KFAPT panel can transmit instantaneously up to 1008 addressable devices. Individual coded alarm and trouble signals include smoke detectors, heat detectors, manual pull stations, sprinkler flow, tamper, and much more. In fact all alarm and trouble signals received by the addressable fire alarm panel are duplicated by the KFAPT panel.

RADIO TRANSMITTERS (BOXES)

CALL boxes are capable of transmitting emergency messages, including **FIRE, SECURITY, HAZMAT EVACUATION**, and **MEDICAL AID**. The boxes have the capacity for 10 different messages, including a test and tamper message. Messages are transmitted either by push button or automatically through the **King-Fisher** radio master box circuitry, which is configured to transmit any pre-programmed message. **King-Fisher** manufactures a variety of different call box models, and can adapt the transmitters for automatic or manual tripping.

COMBINATION RADIO/FIRE ALARM KFRTI-20/52 CONTROL PANEL

The KFRTI-20/52 Radio Fire Alarm Control panel detects the operation of any approved signal-initiating device; indicates by annunciator lamps the area of the alarm condition; and operates all alarms, auxiliary and approved releasing devices. The KFRTI-20/52 control panel has a capacity of up to 52 alarm signaling zones.

The KFRTI-20/52 Radio Fire Alarm Control panel can also serve as a Security panel and a Fire Protection Releasing Device panel. Transmitter modules are also integrated into the KFRTI-20/52 panel.

PERSONNEL ALERTING SYSTEM (PAS)

Radio Indoor Personnel Alerting Systems (RIPAS); Radio Outdoor Personnel Alerting Systems (ROPAS), are available to protect a single building, or an entire base. Various models are available with a variety of sound decibel (80dB to 130dB) warning tones. These Systems have worldwide applicability.

The King-Fisher Fire/Security or Evacuation System is capable of alerting (military and civilian) personnel of a pending or specific danger. We offer both automatic, manual and combination tripping configurations. The PAS can be operated with six (6) warning tones and up to sixteen (16) pre-recorded messages. The System also has the capability for real time public address for specific instruction or up-dated transmissions as the incident evolves. PAS has worldwide applicability to include desert, tropical and urban environments and is adaptable to any building, structure or tent city that military or civilian personnel may occupy. The RIPAS/ROPAS Systems are deployment ready.

EMERGENCY SERVICE SOFTWARE

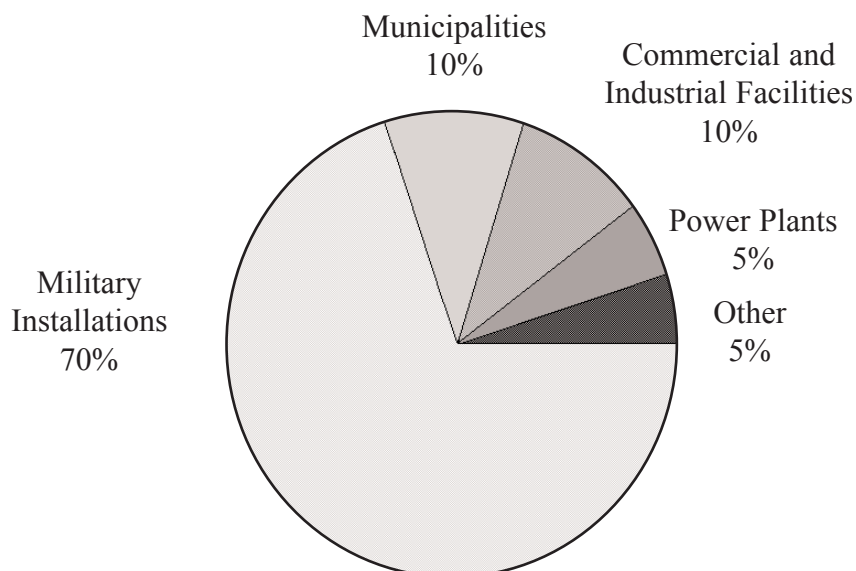
Software is also an important part of **King-Fisher's** product line. **King-Fisher** has developed and published a wide variety of emergency service dispatch and management programs. Dispatch and management programs offered by the company are described below:

- * **Fire Dispatch** — Facilitates the dispatching of personnel during emergency situations
- * **PrePlan** — Displays information to the dispatcher regarding, for example, location of hydrant, area hazards, temporary construction projects, etc.
- * **HazMat** — Provides instant access to emergency response information for over 2,500 hazardous materials
- * **Security Dispatch** — Facilitates the dispatching of personnel during emergency situations
- * **Equipment Status** — Provides current status of all available emergency equipment
- * **Automatic Alarm Interconnect** — Integrates **King-Fisher's CAD/CAD 2000** system into present radio or wire alarm systems

MARKETS

King-Fisher sells to a diversified customer base, which includes military installations, municipalities, power plants, and commercial and industrial facilities. Due to the nature of the industry and market, the composition of the Company's market base varies from year to year depending upon the current needs of the customer base. The following graph illustrates the general market segments which are served by the Company, as well as their current contribution to total Company sales.

MARKET SEGMENTS BY CONTRIBUTION TO REVENUE: 2000



As illustrated in this graph, a large portion of total sales is currently to military customers. Military sales are made independently to a large number of military bases and facilities within all branches of the Armed Forces. Overall, the Company has numerous active accounts. Organizations currently served by **King-Fisher** include Yokosuka Naval Base Japan, Sasebo Japan, Diego Garcia, Pearl Harbor, Guam, Adak Alaska, Saudi Arabia, Antarctica Fort Belvoir, Aberdeen Proving Grounds, the Defense Logistics Agency, Charleston Naval Weapons Center, the Village of Rockville Center, the Belmont Race Track and Grand Forks Air Force Base. A complete list is available upon request.

APPROVALS

King-Fisher Company has numerous approvals from agencies such as the **FCC** (type acceptance), **Underwriters Laboratories**, **California State Fire Marshal** and/or **Factory Mutual Research**. These listings are on many of its products. These approvals are important in the marketing of the radio and detection systems, as they are often a requirement.

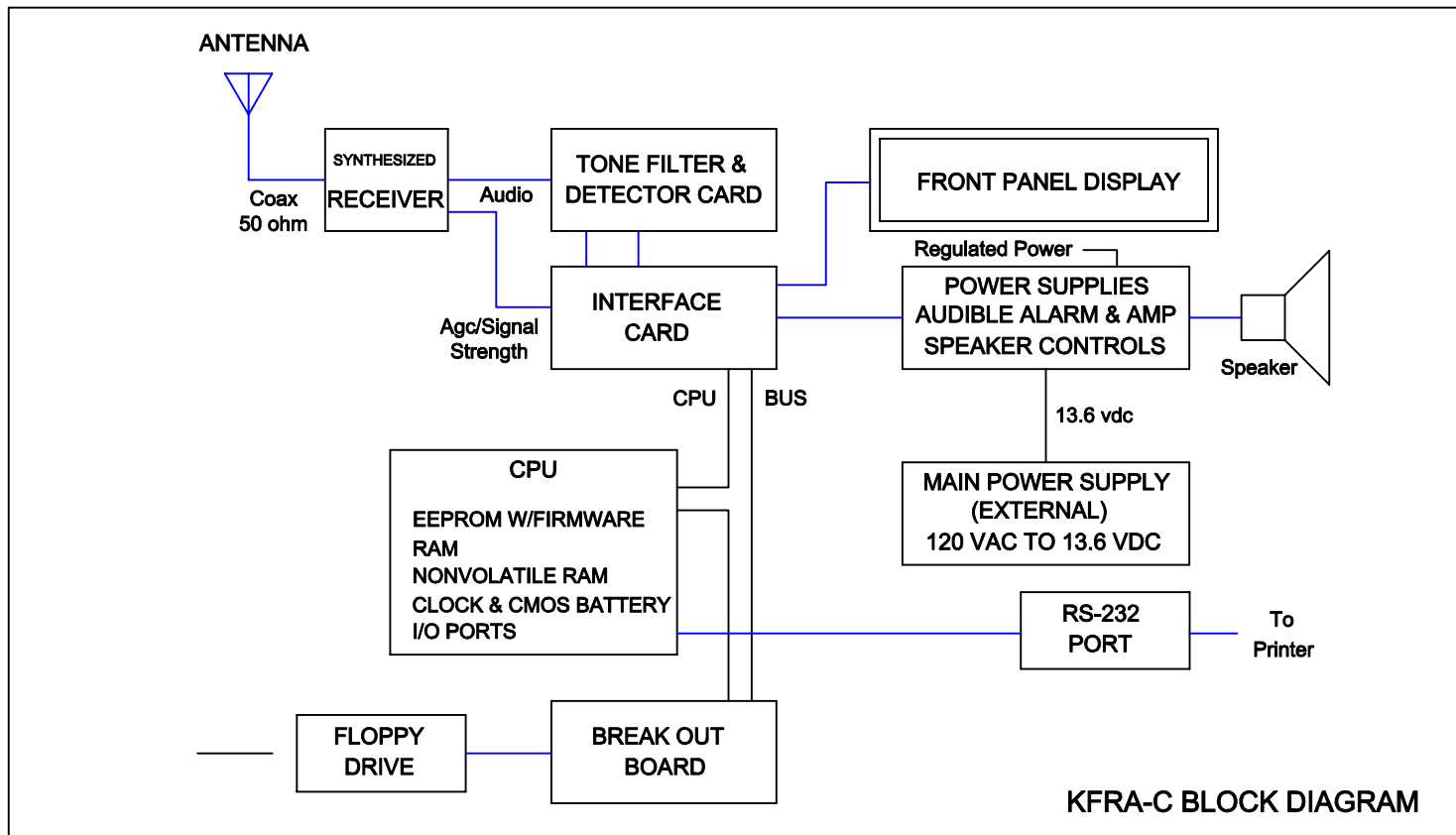
In addition to the above, **King-Fisher Company** is listed in the **Underwriters Laboratories approval guide** as an approved **Fire Alarm installer**.

King-Fisher Company's Personnel Alerting Systems (PAS) are **J-34 tested** and **accepted** for military use.

STRENGTHS / NICHE

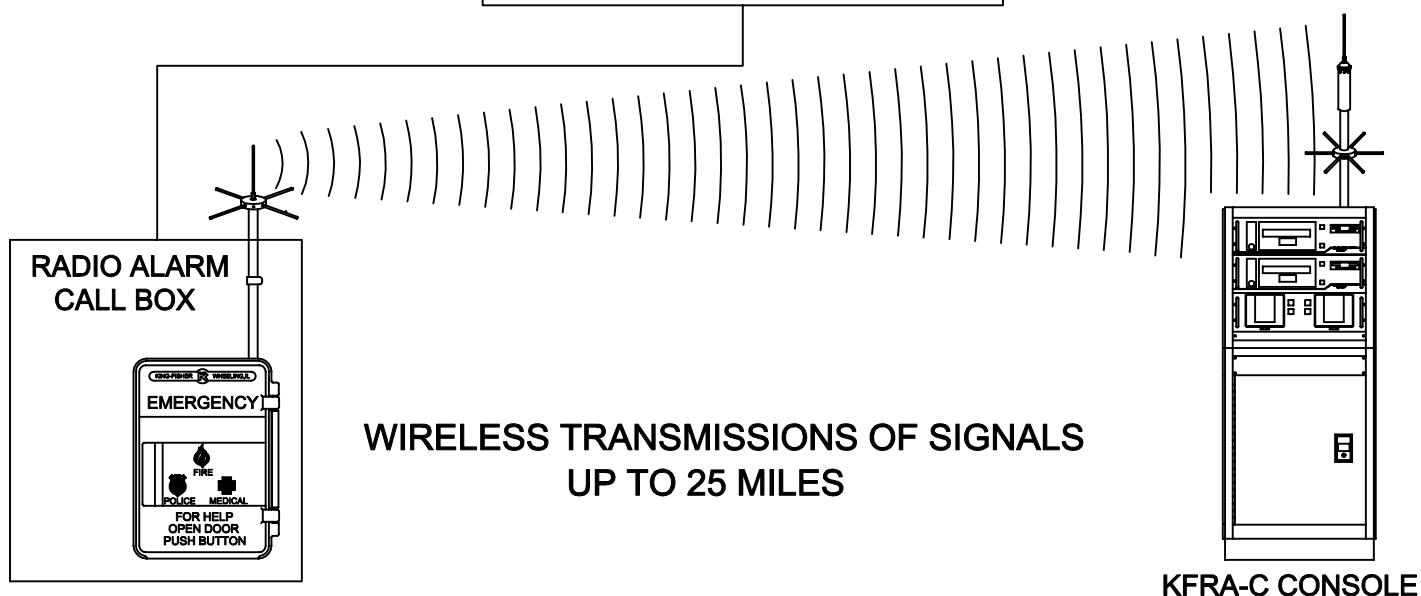
King-Fisher is considered a leader in the radio-dispatched emergency communications systems and the fire detection industry. Several factors have enabled the Company to attain this leadership position.

- * An outstanding reputation for reliable, quality products acquired through over 33 years of doing business (founded in 1967)
- * Extensive experience of management within the fire detection and suppression and emergency communications systems industry
- * The Company's long-standing relationships with many of its customers
- * Large and diversified existing customer base
- * Modern, well-maintained and spacious facilities
- * Positioning of the Company within a high-growth segment of vertical markets
- * Reputation for providing high-quality, advanced state-of-the-art products



PROTECTED PROPERTY

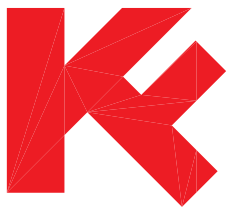
- AUTOMATIC SPRINKLERS
- FIRE ALARM SYSTEMS
- EMERGENCY MEDICAL AID
- SECURITY
- SUPERVISORY FUNCTIONS



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2350 FOSTER AVENUE
WHEELING, ILLINOIS 60090

(847) 398-7100 FAX: (847) 255-1507 E-MAIL: SALES@KFCO.COM



KFRA-C EMERGENCY ALARM RECEIVER



MODEL KFRA-C



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GENERAL

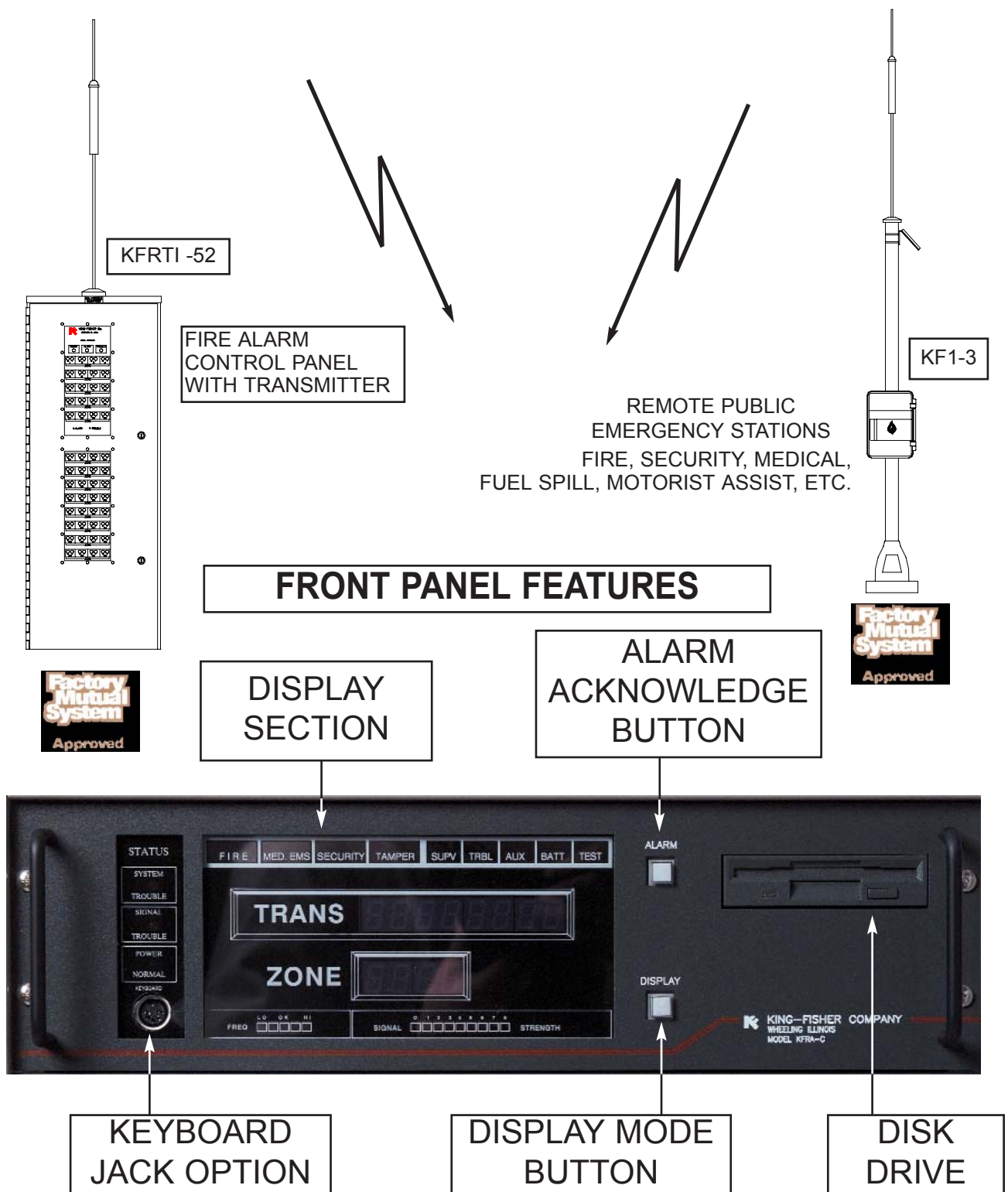
The KFRA-C Alarm Receiver is designed for monitoring and annunciation of virtually any type of remote alarm transmitter or device. At least one signal transmission must be recorded no less than every 60 minutes by NFPA 72. An integral radio receiver can be installed for multi-point wireless communication at distances up to 25 miles (greater distances can be covered by using low-cost repeaters). Hard-wired alarms can be interfaced to the receiver and many different alarm types can be decoded and annunciated. Fire alarm, security, medical, waterflow, smoke or heat detectors, manual station, pump, temperature, level and auxiliary devices can be monitored.

The annunciation section consists of high brightness displays, distinctive audible alarms, remote horn and optional dry contact outputs. An optional logging printer is also available for permanent record storage. Several enclosure options are available; King-Fisher Company's sloped front (KF40530), vertical (KF40534) and desktop (KF40525) enclosures.

SPECIFICATIONS

- **ALARM FORMAT:** King-Fisher format std. (FSK, FM, Other Tone, Two-way, Digital, Telegraphic, Hard-wired Loop or Multiplex are Optional)
- **ALARM SITES:** UP TO 999,999 Remote Alarm Sites with 9,999 Zones per Site.
- **DISPLAY:** High Brightness, Large Solid State LED Display. Designed for "Across the Room" annunciation. Separate Transmitter Number, Zone, Message, Signal Strength, Low Battery and Trouble displays.
- **AUDIBLE ALARM:** Distinctive Synthesized Audible Alarm Signals. Separate signals are provided for Fire, Security, Med-Ems, Tamper, Supervisory and Trouble messages. Volume Level is adjustable to meet environmental requirements. Remote unsupervised horn output is provided for expanded area coverage (outdoor, garage bay, etc.)
- **ERROR CHECKING:** All received signals are checked for proper format, alarm site match and errors. Highly resistant to false alarm incidence due to noise, static or storm activity.
- **CONSTRUCTION:** All solid-state construction using modular plug-in cards designed for fast service and maintenance.
- **TEMPERATURE:** 0 to +49 deg. C. Operational. -20 to +50 deg. C. Storage.
- **DIMENSIONS:** Standard 19-inch rack mountable (width) x 5.25 inches x 17.0 inches. Other configurations are available. Weight 26 lbs.

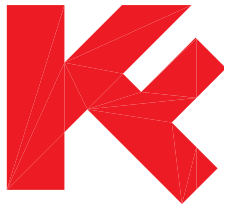
The KFRA-C Alarm Receiver is capable of processing several different kinds of remote alarms including Fire, Security, Medical, Tamper, Supervisory, Waterflow, Smoke, Heat, Manual Station, Pump Control, Water Level, Liftstation, Temperature, and Auxiliary Contact devices.



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KFRA-C DUAL UNIT

INSTALLATION MANUAL



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RECEIPT OF EQUIPMENT

1) Inspect shipment for apparent physical damage and report any damage to shipper. Typical shipment shall consist of:

SKID # 1 KFRA-C

(Mounted to skid)

SKID # 2 Boxes 1 through 5

BOX # 1 KFRA-C # 1

BOX # 2 KFRA-C # 2

BOX # 3 KFPTR

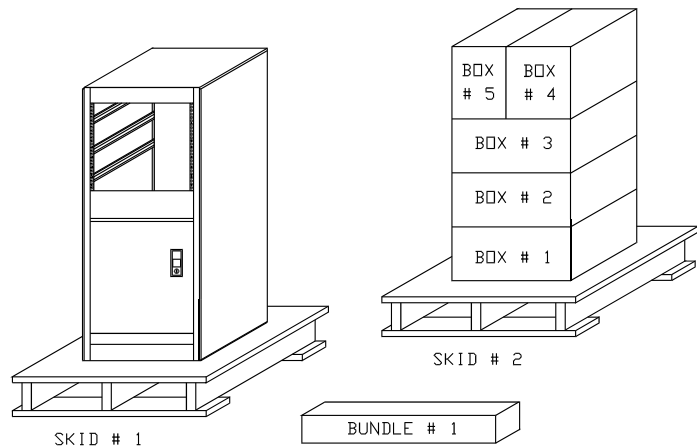
BOX # 4 Battery Packs

BOX # 5 ACCESSORIES

Interconnection Cables

Printer Paper

BUNDLE # 1 Antenna



LOCATE RECEIVING CONSOLE ENCLOSURE

2) Console enclosure shall be located as directed by the Authority Having Jurisdiction.

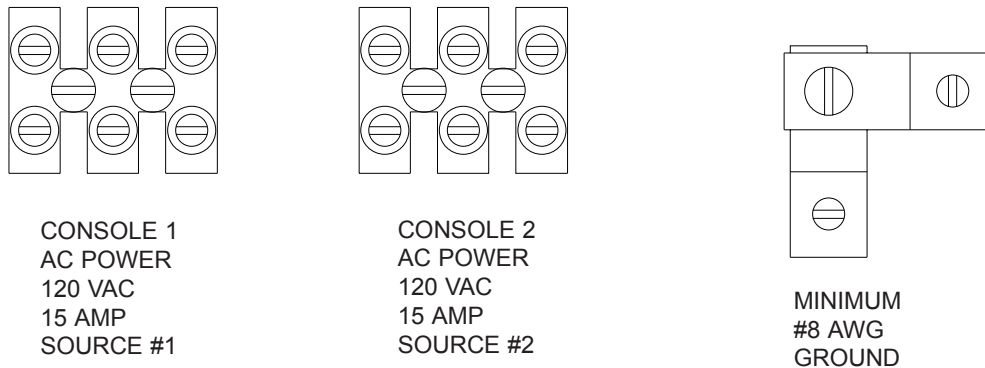
INSTALL RECEIVING ANTENNAS

3) Antenna's shall be located as recommended by King-Fisher Co. and installed in accordance with King-Fisher Co. Drawing # 76597. Ground rods shall be installed in accordance with N.E.C.

INSTALL LOCAL POWER and RACEWAYS

- 4) Install raceways from A.C. sources; ground rods; and antennas to receiving console enclosure. Locate raceways in bottom of enclosure. Pull all required wires and cables.
- 4a) Terminate A.C. wires as shown in figure # 2

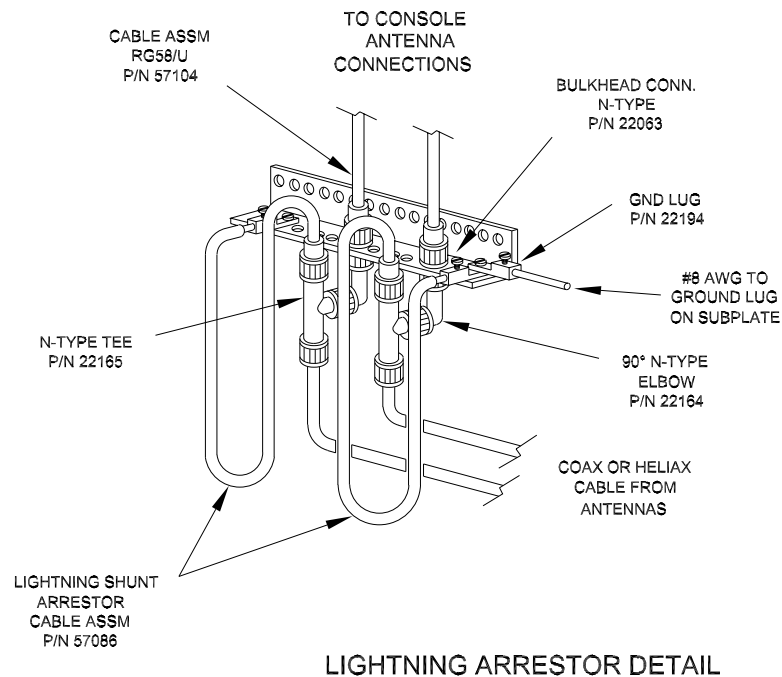
FIG. #2



1. Local power for each console shall be in accordance with NFPA 72, section 1-5.2.5 and 4-6.7.
2. Operating voltage range is 90 to 120 VAC; 15Amps.

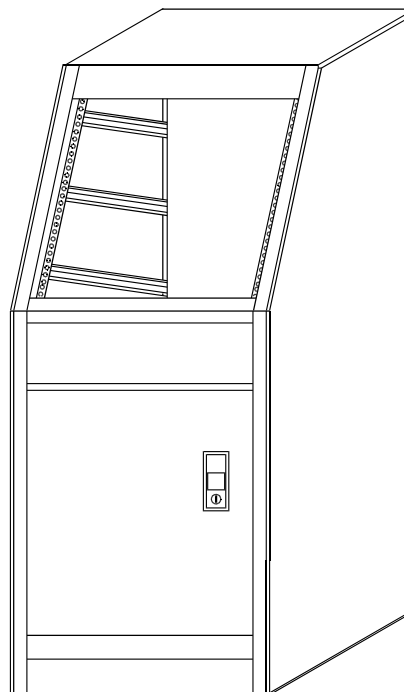
- 4b) Terminate ground wires as shown in figure # 3
- 4c) Connect antenna cables as shown in figure # 3

FIG. #3



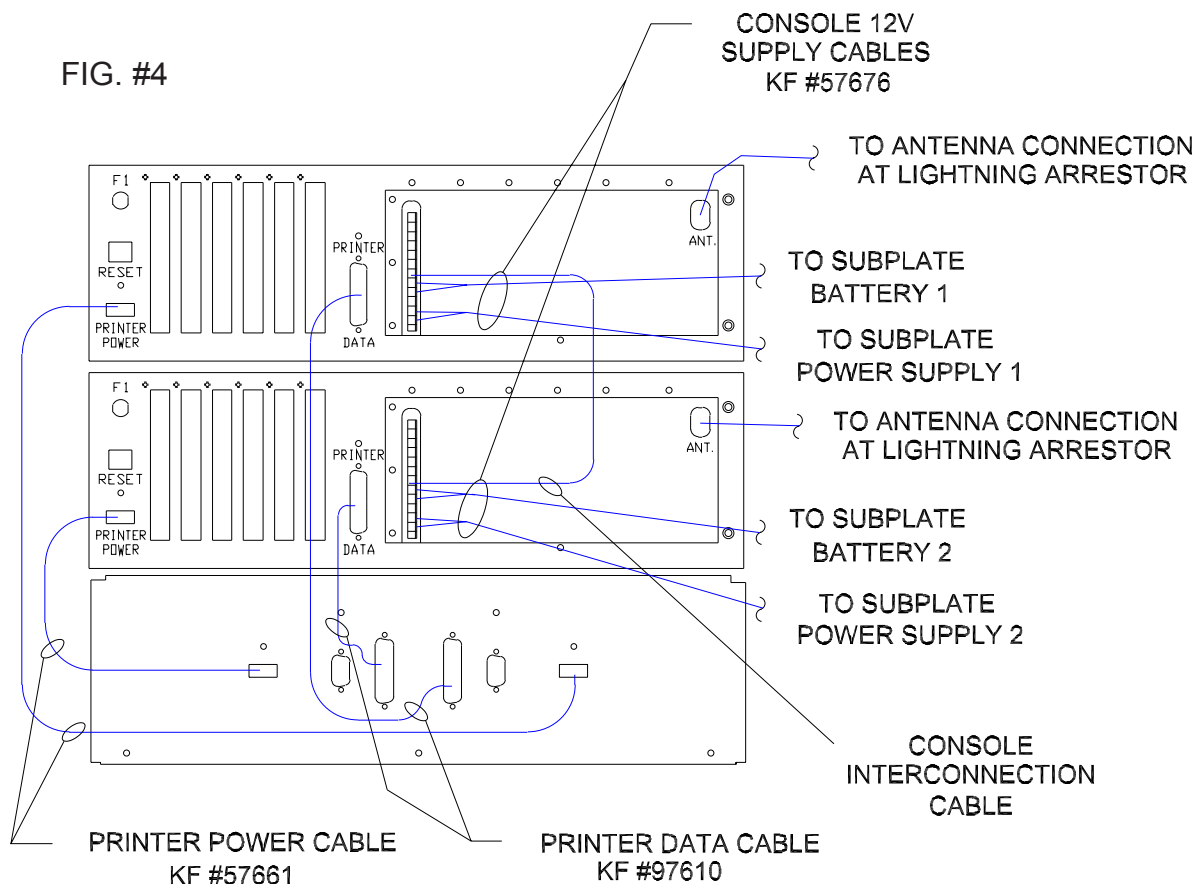
INSTALL CONSOLES AND PRINTER

- 5a) Slide console # 1 into top slide rails.
- 5b) Slide console # 2 into middle slide rails.
- 5c) Slide printer into bottom slide rails



INTERCONNECTION WIRING

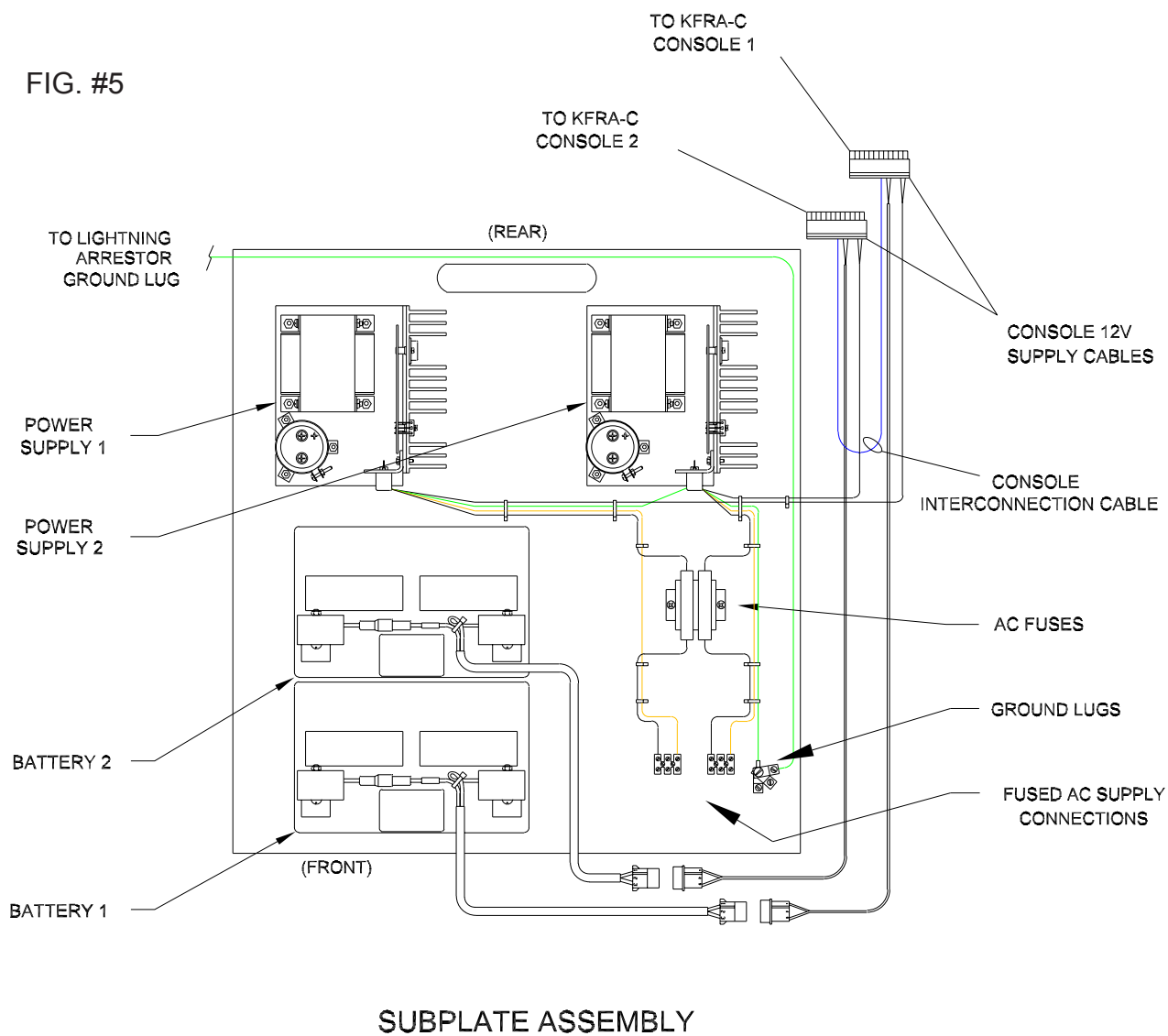
- 6) Connect cables between Power Supply Subplate and consoles, between consoles and printers; and console to console.



BATTERY BACK-UP

7) Plug batteries in to the polarized plugs as shown in figure # 5

FIG. #5



ADDITIONAL REFERENCES:

#75859-2 KFRA-C OPERATION MANUAL

#75858-1 KFRA-C PROGRAMMING MANUAL

#75860-3 KFRA-C TROUBLE SHOOTING MANUAL

#75861-1 KFPTR MANUAL



KFRA-C EMERGENCY ALARM RECEIVER

OPERATIONAL MANUAL



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GENERAL

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The annunciation section consists of high brightness displays, distinctive audible alarms, remote horn and optional dry contact outputs. An optional logging printer is also available for permanent record storage. Several enclosure options are available; King-Fisher Company's sloped front (KF40530), vertical (KF40534) and desktop (KF40525) enclosures.

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- **DIMENSIONS:** Standard 19-inch rack mountable (width) x 5.25 inches x 17.0 inches. Other configurations are available. Weight 26 lbs.

PRECAUTIONS

- READ ALL INSTRUCTIONS AND MANUALS BEFORE OPERATING.
- RISK OF ELECTRICAL SHOCK!! DISCONNECT POWER AT CIRCUIT BREAKER/FUSE. DISCONNECT PANEL BEFORE INSTALLING OR SERVICING.
- DO NOT REMOVE OR INSTALL CIRCUIT CARDS OR MODULES WHILE ANY POWER IS LIVE (APPLIED).
- DO NOT EXPOSE THE UNIT TO MOISTURE, STATIC, DUST, DIRT OR CHEMICAL CLEANERS. USE PLASTIC LENS CLEANING SUPPLIES TO REMOVE SMUDGES FROM FRONT PANEL.
- THE CONTENTS OF THIS MANUAL ARE SUBJECT TO CHANGE AT ANY TIME. PERIODICALLY CONTACT FACTORY FOR CURRENT VERSION.



OPERATION

This manual provides a detailed explanation of the operation of the **KFRA-C** Receiver. For your convenience a Condensed Operation Guide is included in the appendix.

The major operating sections of the Receiver are the: **Display Switches, Control Switches, Audible Alarms,** and the **Rear Panel**. In NFPA (National Fire Protection Association) compliant systems, a printer shall also be connected and in service. Additional information on printers is provided in Manual 75861.

The **Display** section includes high-brightness LED indicators to annunciate alarm and status information. It has been designed for “across the room” viewing and ease of use. A quick glance at the display provides alarm site or transmitter information, zone number and type of alarm. Additional readouts indicate signal strength, power normal, or trouble conditions.

The **Controls** section includes buttons (switches) which are operated either during an alarm event or during routine functions. To simplify operation, only one button is typically used during an alarm.

The **Audible Alarms** produce distinctive sounds for different type of alarms. The sound used for “FIRE” alarms is the most distinctive and recognizable (fast warble). Each alarm type produces a different sound. After some training, the dispatcher/operator will become familiar with each type.

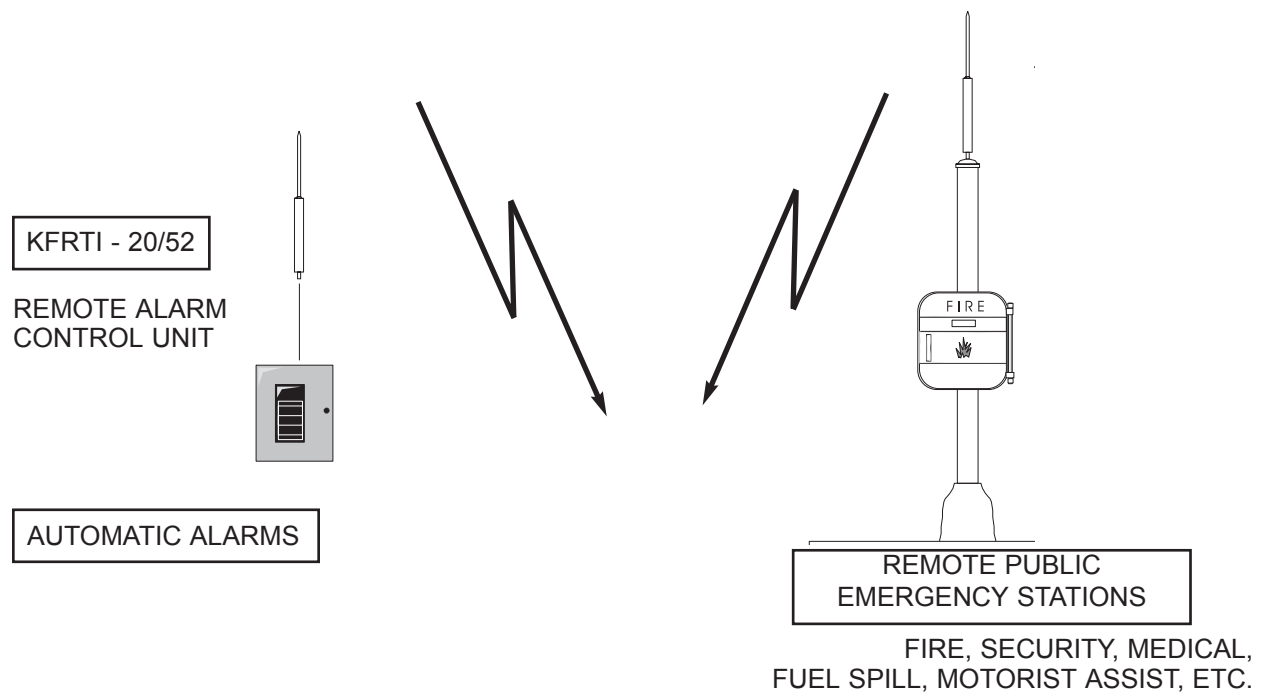
The **Rear Panel** is not normally used during typical operations. A short discussion is included in this manual to cover “abnormal” events and simple emergency procedures which involve functions on the rear panel.

King-Fisher Company

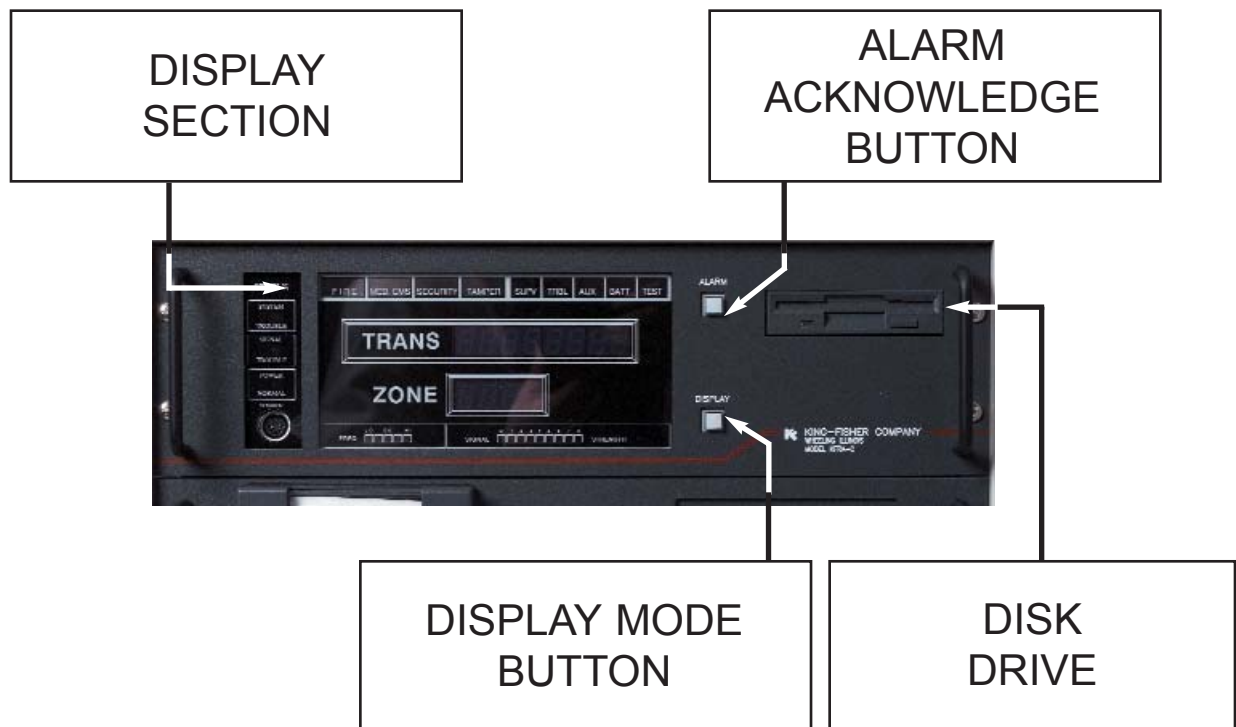
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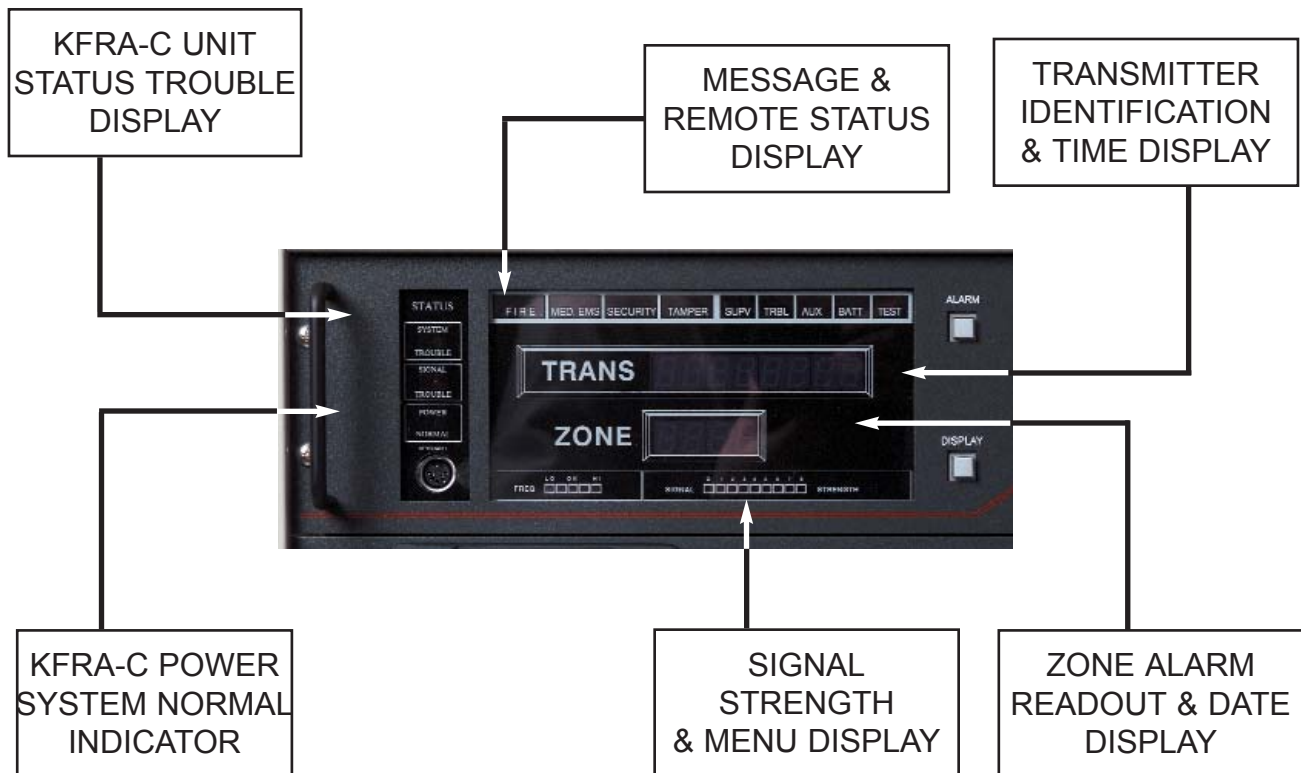


FRONT PANEL FEATURES



DISPLAY

The Display produces all information received from a remote unit during a test or alarm transmission as well as local status information about the Receiver itself. It also uses variable light intensity to communicate the nature of the message. Higher priority messages use the highest intensity as well as a “flash” mode to attract attention. High-priority alarms also “lock-in” on the display and will remain until acknowledged by the operator or until another high-priority alarm is received. Low priority messages such as test use low intensity, no flash, and very brief display time (3 to 4 seconds).

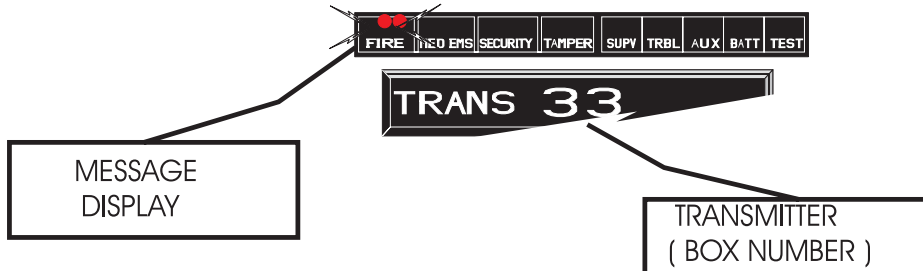


When any signal is received, the first portion appears as a Transmitter Identification Number. This is entered on the display just right of the word TRANS in the center. This number will be the unique code number of the remote unit in the range of 1 to 999,999. Most systems limit this number to 3, 4 or 5 digits. In some systems, the number has a relationship to building numbers, sector/grid numbers or other real property definitions. In other systems, the numbers follow a simple sequence such as 1 thru 499. On priority alarms, this number will be displayed in a high-intensity flashing mode. On supervisory, trouble, and auxiliary signals, the number will be high-intensity but not flashing. On test signals the number will be low intensity non-flashing. After an alarm signal is acknowledged and cleared, the display may be set to show the time in the TRANS display. To do this, simply press the “DISPLAY” button briefly and the clock will start. The clock will be displayed in the low-intensity mode and will have a space between the hours and minutes, with another space between the minutes and seconds. The seconds display should be changing constantly in the clock mode. These characteristics make the clock distinctive compared to remote signal displays.

DISPLAY

MESSAGE DISPLAY:

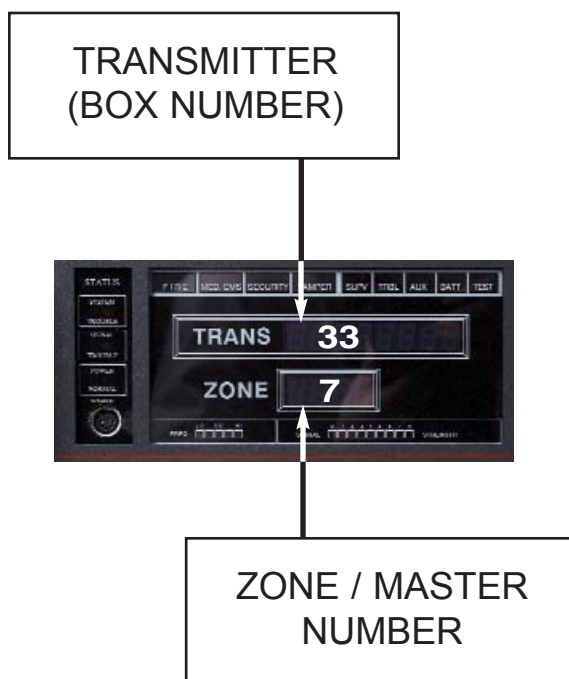
Once a transmission is received, the message “type” is displayed on the top line of the display.



The higher priority messages are located on the left half of the display. These include: FIRE; MEDS-EMS; SECURITY; and TAMPER. In most cases, these messages will receive a high level dispatch. The five displays on the right side include: SUPV (SUPER-

VISORY); TRBL (TROUBLE); AUX (AUXILIARY); BATT (BATTERY TROUBLE); AND TEST. SUPV means a portion of the alarm, or suppression system has been shut down or isolated. A sprinkler valve would be one typical example. TRBL means that the remote panel has sensed an electrical problem such as a wiring fault, a power problem or an abnormal condition which the panel automatically detects. AUX is a category for alarms which require dispatch of other personnel such as: road service; water alarms; etc. BATT indicates the transmitter has a low battery condition and may need service immediately. BATT can be reported in conjunction with any other message. TEST is the normal indication for the “daily” test transmission.

TRANSMITTER NUMBER & ZONE DISPLAY:

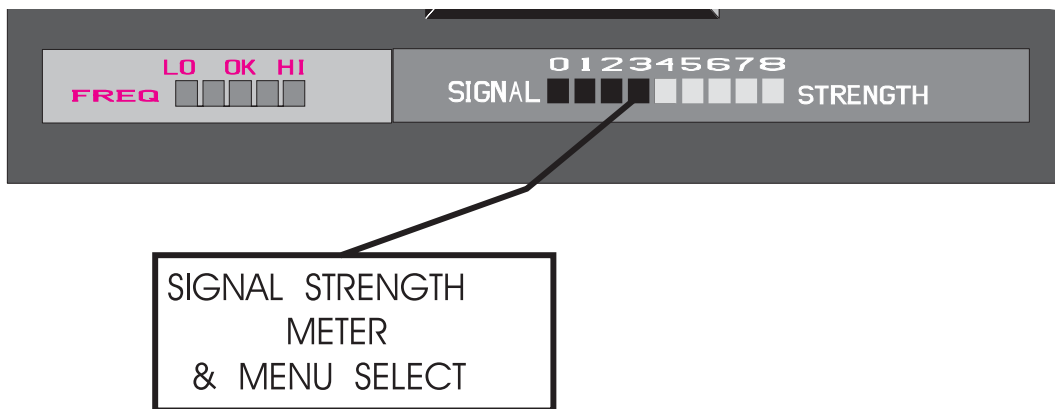


The Transmitter display shows an alarm which was received from remote unit 33 while the Zone display shows the alarm originated from Zone 7. The large digit size and high intensity allows this critical information to be read from a sizeable distance. Some messages include a Transmitter Number display but do not include a Zone (Master) display. These could include the FIRE, MEDICAL, POLICE, or ROAD SERVICE buttons on a street box transmitter. In these cases, the proper message light will be included in the message display area.

DISPLAY

SIGNAL STRENGTH DISPLAY:

The Signal Strength Display is located directly below the zone section. This display consists of a “bar-graph” readout which is similar to the electronic displays on automotive tachometers and stereo cassette units. The signal strength display continuously monitors the communications channel and indicates the relative amount of signal on the channel. The display is calibrated with levels which go from 0 to 8. The higher number means greater signal strength (8 is maximum). When a transmitter sends any signal, the bar graph should move to the right indicating greater signal. For added convenience, the signal strength from each transmitter is also logged to the printer during test signals. When no transmitters are active, the display will show the level of background noise on the channel.



Noise is usually a combination of natural noises (atmospheric) and man-made noise such as power lines, motors or vehicles and other radio transmitters.

The Signal Strength feature is a key tool in diagnosing transmitter problems. Once the system has been established and reliable operation has been recorded, the signal strength reading from each transmitter should be permanently logged and filed. Periodically, signal strengths should be compared against these previous logged numbers to detect any changes in transmitter/receiver performance. For example; If a transmitter suddenly starts to periodically miss its daily test, check its previously logged signal strength. You may find that the previous good signal strength was logged as 6 and now the unit produces a signal strength of 1. If all other units produce current strengths which are similar to their previous readings, you can assume something has changed at the individual transmitter site. If a transmitter produces a signal strength which is extremely high or extremely low, or if the communications channel is overly noisy, system performance will be degraded. For best performance results, noise levels should be 1 or less while transmitter signal strengths should be in the range of 2 to 7.

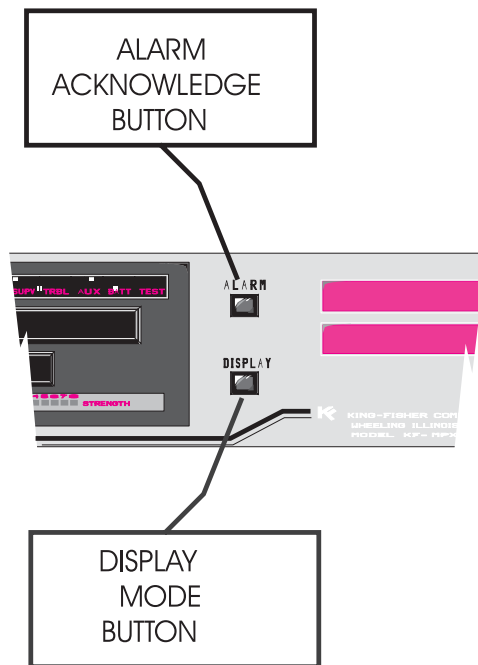
The Signal Strength Display also serves as a MENU SELECTOR which is discussed in the CONTROLS section of this manual.

CONTROLS

ALARM ACKNOWLEDGE BUTTON:

The KFRA-C Alarm Receiver was designed for simple operation during critical emergency alarm processing. To facilitate this goal, only two primary controls are provided for normal alarm response. These include: 1. ALARM (Acknowledge) and 2. DISPLAY (Mode Control).

The ALARM (Acknowledge) button is the first button pressed after the alarm is received. The ALARM



(Acknowledge) performs several important tasks. First, it silences the audible portion of the alarm. Second, it logs the acknowledge function to the printer along with the time and date of the acknowledgement. Third, it changes the display from flashing mode to steady on priority alarms. For operator/dispatcher convenience, once a particular alarm is acknowledged, additional repetitive signals (rounds) will pulse the audible briefly, but will not require pressing the button to silence the audible signals. If multiple receivers are present, they can be wired in an unsupervised manner which allows any acknowledge button to silence all receivers. Once the alarm has been dispatched, the acknowledge

button may be pressed again to “fade” the alarm. The display will dim the information, and after a few seconds, the information will be cleared and the display will return to its previous state. If the operator desires to display the last alarm, the button can be pressed and the last alarm will be restored to the display in the “fade” mode. System Trouble and Signal Trouble also create audible alarms and require acknowledgement. Notify maintenance and supervisory personnel if this should occur.

DISPLAY MODE BUTTON:

The DISPLAY mode button is used to control the display during normal (no alarm) periods. If the display is initially blank, the button is used to toggle the block mode “on”. The time will appear in the TRANS window and the date will appear in the ZONE window. After a few seconds, the date will fade away leaving just the clock. It is recommended that the clock mode be left in the “on” state during normal operation. If a System Trouble is detected, the clock mode will be toggled to the “off” state to conserve power and a periodic reminder chime will occur until the condition is corrected.

The other function of the DISPLAY button is access to the operator MENU.

CONTROLS

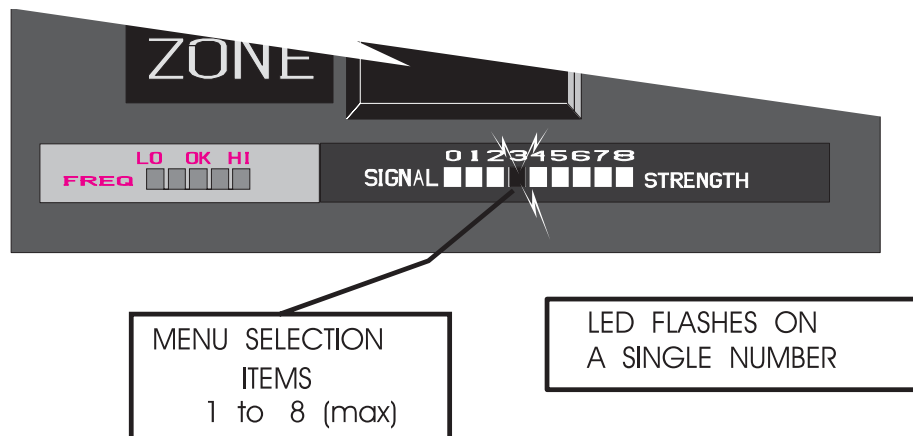
OPERATOR'S MENU:

The MENU contains a few features which are not commonly required by the dispatcher/operator, but may be occasionally necessary. The features are:

MENU NUMBERS:

1. Audible Alarm/Siren Test
2. Memory Read
3. Speaker Monitor ON/OFF
4. Clock Time Set
5. Date Set

The MENU is easy to access, but is protected from normal operation by the following access technique. To access the MENU, press down and hold the DISPLAY button "in" for at least 4 seconds until the number 1 digit on the Signal Strength Meter begins to flash. Note that unlike normal signal strength indications, the menu flash only lights one number at a time. Now press and release the DISPLAY button quickly and watch the MENU number sequence from left to right: 1, 2, 3, 4, 5 then start over at 1, etc. To select a MENU feature, simply press the DISPLAY button until the correct MENU number is flashing. Now press the ALARM (Acknowledge) button (Acknowledge that the selection is correct). You will now be in the MENU mode selected.



MENU ITEM 1. AUDIBLE ALARM TEST

1. First press and hold the DISPLAY button for 4 seconds.

The LED for MENU Selection 1 should be blinking. Release the DISPLAY button.

2. Press the ALARM (Acknowledge) button to activate the blinking function. The Audible should sound.

Press the ALARM (Acknowledge) button once to silence.

CONTROLS

OPERATOR'S MENU:

MENU ITEM 2. MEMORY READ - FULL TRANSMITTER REPORT

This report requires the use of the printer. If you do not have a printer attached, the report will not be generated.

1. First press and hold the DISPLAY button for 4 seconds.

The LED for MENU Selection 1 should be blinking. Release the button.

2. Press the DISPLAY button 1 time until the number 2 is flashing.
3. Press the ALARM (Acknowledge) button.

The printer will now generate the report, listing any transmitters with potential problems.

4. The report should look something like this:

1124	A	MB
1167	A	S
1288	B	LB
1451	B	LS
1879	F	MB

The Transmitter numbers are located in the left column as: 1124, 1167, etc. Transmitter “type” codes are located in the center column as: A, B, F, etc. The problem description is located along the right side as: MB, S, LB, etc.

These abbreviations are defined as follows:

- MB** = MISSING BOX, FAIL TO REPORT
(Transmitter has failed to self-test or be processed)
- S** = SUPERVISORY/TROUBLE CONDITION
(Remote system is not normal)
- LB** = TRANSMITTER LOW BATTERY
(Transmitter Battery is low and may fail soon)
- LS** = COMBINATION OF LOW BATTERY AND
SUPERVISORY/TROUBLE

CONTROLS

OPERATOR'S MENU:

MENU ITEM 3. SPEAKER MONITOR ON/OFF

This allows the communications channel to be monitored for proper signal reception or for channel noise to be analyzed. Operators should be trained to listen for correct channel communication during transmitter testing.

1. First press and hold the DISPLAY button for 4 seconds.

The LED for MENU Selection 1 should be blinking. Release the button.

2. Press the DISPLAY button 2 times until the number 3 is flashing.
3. Press the ALARM (Acknowledge) button and watch the ZONE display.

If the ZONE shows a 1, then the speaker is turned on.

If the ZONE shows a 0, then the speaker is turned off.

4. Repeat the same procedure to reverse the state of the speaker from off-to-on or on-to-off as required.
5. If the speaker is on, a “” will blink periodically in the ZONE display.

MENU ITEM 4. CLOCK TIME SETTING

1. First press and hold the DISPLAY button for 4 seconds.

The LED for MENU Selection 1 should be blinking. Release the button.

2. Press the DISPLAY button 3 times until the number 4 is flashing.
3. Press the ALARM (Acknowledge) once.

The previous time should now be displayed with the first digit blinking.

4. Now press the DISPLAY button until the readout produces the correct first digit. This is a 24 hour clock, so if you are trying to set 11:25:00 p.m. you must enter 23:25:00. The first digit will always be 0, 1, or 2 on the display.

5. When the digit appears correct, press the ALARM (Acknowledge) button once.

The display will then advance and begin flashing the next digit.

6. Use the DISPLAY button to advance this digit until it appears correct.

Press the ALARM (Acknowledge) button when this digit is correct.

7. Now continue until all the digits are correct. When you press the ALARM (Acknowledge) button on the last digit, the time will then be set to the exact time as it appears on the display.
Hint: Set the display a few seconds ahead and hold off on the last digit until the exact second is synchronized with the display, then press the ALARM (Acknowledge) button to sync the clocks.

TRANS

23 25 00

Clock Set Display

CONTROLS

OPERATOR'S MENU:

MENU ITEM 5. DATE SETTING

1. First press and hold the DISPLAY button for 4 seconds.

The LED for MENU Selection 1 should be blinking. Release the button.

2. Press the DISPLAY button 4 times until the number 5 is flashing.

3. Press the ALARM (Acknowledge) button once.

The previous date should now be displayed with the first digit blinking.

4. Now press the DISPLAY button until the readout produces the correct first digit. This is a 12 month date. The first digit will always be 0 or 1 on the display.

5. When the digit appears correct, press the ALARM (Acknowledge) button once.

The display will then advance and begin flashing the next digit.

6. Use the DISPLAY button to advance this digit until it appears correct.

Press the ALARM (Acknowledge) button when this digit is correct.

7. Now continue until all the digits are correct. When you press the ALARM (Acknowledge) button on the last digit, the date will then be set as it appears on the display. To check the full date including year, perform a MEMORY READ function (refer to Page 10 - Menu Item #2).

8. Changing the year can only be done by advancing one year or reversing one year. To advance set display to 00 01; to reverse, set display to 00 00.

ZONE **02 12** Date Set Display

SYSTEM RESET / REBOOT:

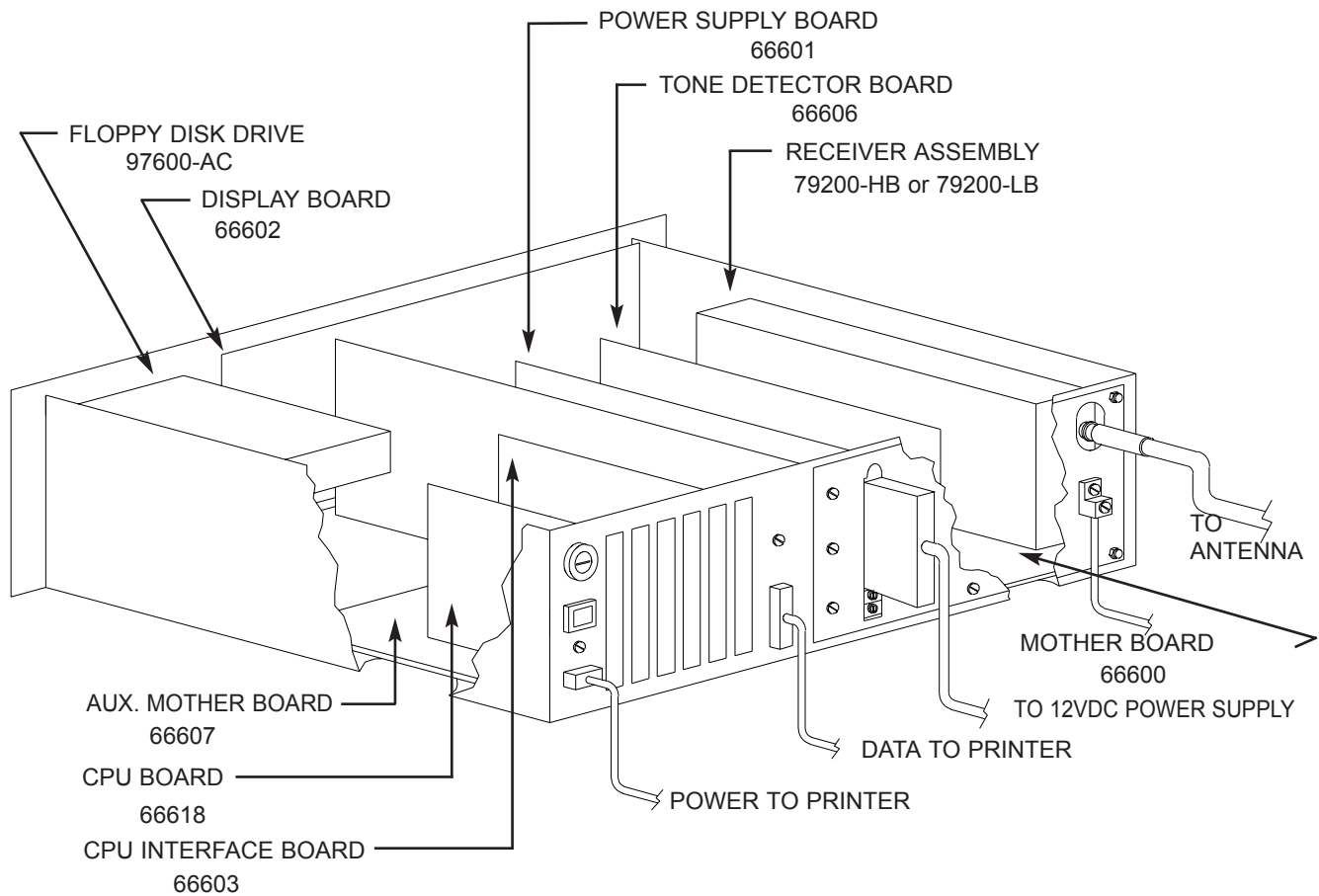
CAUTION: THIS IS AN EMERGENCY PROCEDURE!

The last control a dispatcher/operator may need to locate in an emergency is the reset switch located on the rear panel of the unit (see next section).

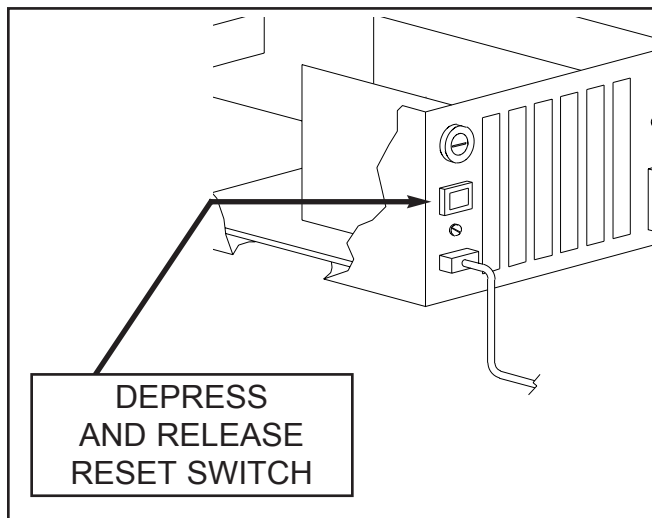
In the unlikely event that the front panel does not respond to any signals, tests, and the clock refuses to display, a system reset may be required. This could be caused by severe voltage transients or static. The system supervisor should be notified if this condition should ever occur.

After using the reset switch, the MEMORY READ FUNCTION will not be valid until 24 hours have elapsed.

REAR PANEL LAYOUT & CONNECTIONS



RESET SWITCH LOCATION



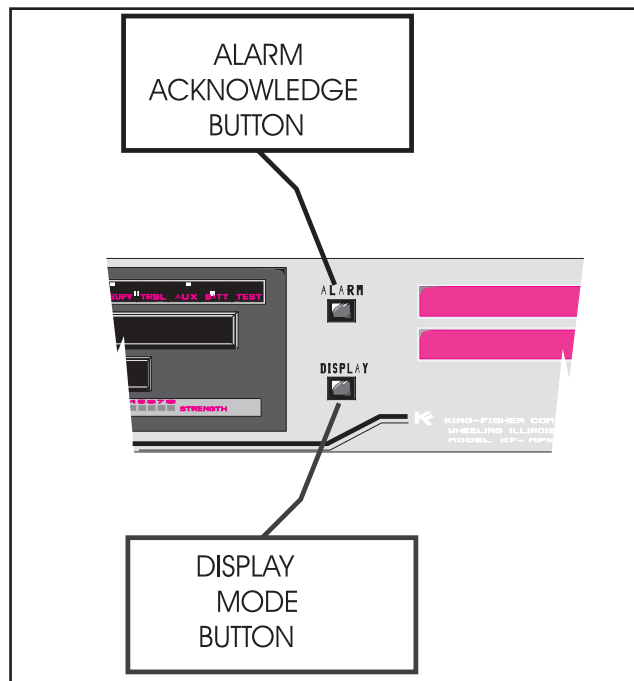
In emergency situations, the reset switch may be used to restart the unit. It is located on the rear panel at the lower left-hand corner.

CAUTION:

DO NOT ADJUST MAIN POWER SUPPLY CONNECTED TO THE RECEIVER!! IT HAS BEEN FACTORY SET AND ADJUSTED TO +13.00 VOLTS AT THE TERMINALS OF THE RECEIVER. SEVERE DAMAGE COULD OCCUR IF VOLTAGES ARE IMPROPERLY ADJUSTED.

RISK OF ELECTRICAL SHOCK!! HIGH VOLTAGE (120V) IS PRESENT AT AND NEAR THE AC POWER SUPPLY. REFER SERVICE TO KING-FISHER COMPANY AUTHORIZED SERVICE PERSONNEL.

CONDENSED OPERATION GUIDE



ALARM OPERATION:

After Alarm is received. ALARM (Acknowledge) will silence audible signal, steady the display, and log to the printer. Check printer to ensure no other alarms are present. Press Paper Feed, open cover and pull paper out to view and verify all current alarm entries.

CLEAR DISPLAY AFTER ALARM:

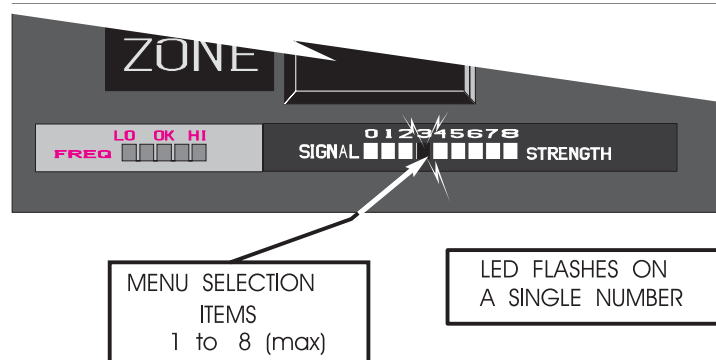
After Alarm is dispatched, DISPLAY button will clear the old alarm. Press DISPLAY again to restore the CLOCK.

(Date will appear below the Clock for a few seconds.)

MENU FUNCTIONS:

To access the MENU Functions, press and hold the DISPLAY button for about 4 seconds until the Menu Item 1 LED starts to blink.

Press and release the DISPLAY button until the blinking LED moves to the Menu Item desired. Press the ALARM (Acknowledge) button to select this item.



MENU FUNCTIONS:

1. Audible Alarm/Siren Test
2. Memory Read
3. Speaker Monitor ON/OFF
4. Clock Time Set
5. Date Set

Notes:

1. Audible Alarm / Siren Test: Use ALARM (Acknowledge) to silence the alarm.
2. Memory Read: Lists all transmitters with problems to the printer (MB, S, LB, LS).
3. Speaker Monitor: Monitors Channel: ZONE 01 = "ON", 00 = "OFF".
4. Clock Set: Change each digit with DISPLAY, ALARM (Acknowledge) to "set" and advance next digit.
5. Date Set: Change each digit with DISPLAY, ALARM (Acknowledge) to "set" and advance next digit

BATTERY INSTRUCTION SHEET

Systems that have only one AC power source, require 60 hours of battery back-up. This is accomplished by using one sealed lead acid, 12 volt; 75 Ahr. battery (KF#17123) per KFRA-C.

Systems that have two (2) independent AC power sources, require 24 hours of battery back-up. This is accomplished by using one sealed lead acid, 12 volt; 25 Ahr. battery (KF#17015) per KFRA-C.

The above battery sizes are arrived at by using the following calculations:

Stand-by current < .75 A.

.75 A. X 60 hrs = 45 Ahr. standby

1.8 A. printing for 1 sec. each X 12 prints /hr. = .01 Ahr.

Maximum Alarm Current < 2A. X 15 min. = .5 Ahr.

Total back-up capacity for 60 hrs. = 45.51 Ahr. (KF#17123)

Stand-by current < .75 A.

.75 A. X 24 hrs = 18 Ahr. standby

1.8 A. printing for 1 sec. each X 12 prints /hr. = .01 Ahr.

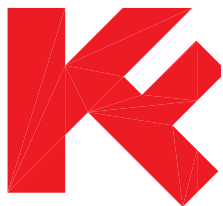
Maximum Alarm Current < 2A. X 15 min. = .5 Ahr.

Total back-up capacity for 24 hrs. = 18.51 Ahr. (KF#17015)

If the power supply is to be remotely located from the subplate assembly, then the following wire size shall not have less than .075 ohms between batteries, power supply and primary DC to power supply.

12.5 ft. away shall use 16 awg.

20.0 ft. away shall use 14 awg.



KFRA-C EMERGENCY ALARM RECEIVER

TROUBLESHOOTING/ MAINTENANCE MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

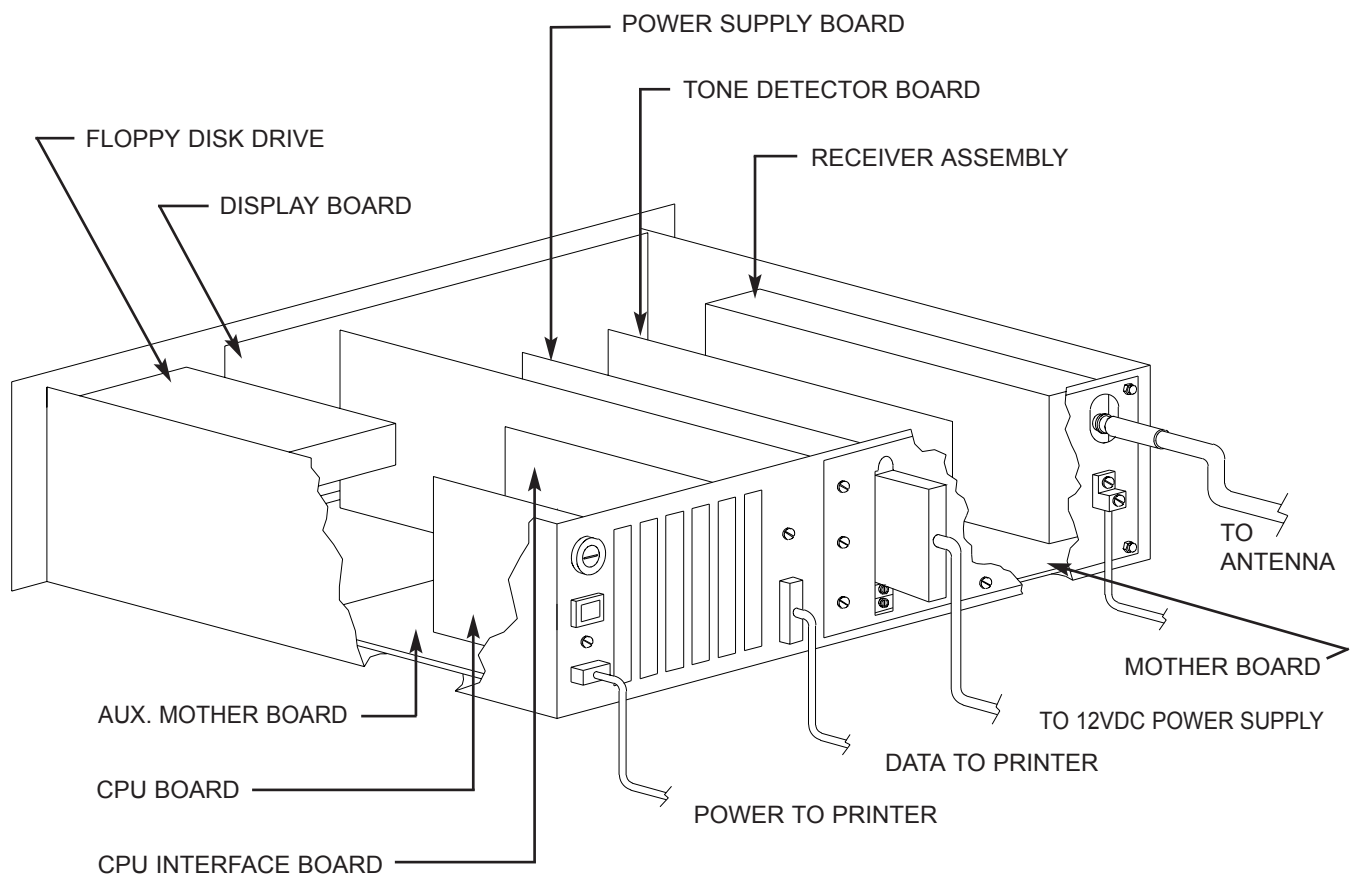
Internet: www.kfco.com



PRECAUTIONS

- READ ALL INSTRUCTIONS AND MANUALS BEFORE OPERATING.
- RISK OF ELECTRICAL SHOCK!! DISCONNECT 120 VAC POWER BEFORE INSTALLING, REMOVING OR SERVICING.
- DO NOT REMOVE OR INSTALL CIRCUIT CARDS OR MODULES WHILE POWER IS APPLIED.

REAR PANEL, BOARD, & MODULE LAYOUT



TROUBLESHOOTING HINTS:

CAUTION: Do not remove or change any components unless power has been removed from the unit and the antenna has been disconnected. Do not service during periods of storm, lightning, or while water is present on floors. Refer all service to authorized service personnel.

I. COMMON PROBLEMS

Check the following items before proceeding to the individual components.

- * Check all connectors, pins - external and internal.
- * Check all boards - must be properly seated.
- * Check all fuses.
- * Check for metal (paper clips, screws, etc.) laying on boards.
- * Check for water or signs of corrosion, especially on antenna connectors.
- * Check for cracked/broken boards or components.
- * Check for heat damage, discolored boards or components.
- * Check external power supplies for voltage.
- * Observe all external and internal indicators, LEDs, etc.
- * List all symptoms, determine if anything is working correctly.
- * If you have two units, compare components, voltages, mini jumper plug settings, switch setting, etc.
- * Know (and mark) which spare parts have been tested to be good.

II. ANTENNA SYSTEM

The antenna system should provide good reception from all remote sites (line-of-site wherever possible). The receiver is designed for a 50 ohm antenna and 50 ohm coaxial cable. A heavily-grounded lightning protector must be installed between the antenna and the receiver. The best unit for this purpose is a shunt 1/4 wave "T" stub (see King-Fisher Installation Manuals).

The receiving antenna, coax and lightning protection must be checked for SWR prior to operation and periodically as part of a standard maintenance procedure, using a transmitter operating on the receiving frequency.

TROUBLESHOOTING: The KFRA-C unit provides a continuous log of signal strength from each transmitter during test transmissions (check paper tape printout). This log can be used to monitor the system performance over long periods of time. If you notice a sudden shift in signal strength from all transmitters, the antenna could be the cause. If you have two antennas, label the coax (Antenna 1 & 2, hi & lo, N & S, etc.) then try swapping the connectors between receivers. If you have a spare antenna, try hooking it up on a temporary basis.

Antenna problems are usually the result of:

- * Defective connections.
- * Interfering objects, such as trees, gutters, etc.
- * Loose hardware.
- * Damage from wind, construction, or vandals.

III. RECEIVER CARD

The KFRA-C Receiver is a frequency-synthesized design which utilizes digital circuits to generate and control local oscillators for the received channel. The prime function of the receiver is to convert RF signals on the channel into an audio signal which is further processed into alarm information. The incoming RF information is first amplified, then converted to a lower IF frequency where it is filtered to remove other frequencies which are not on the same channel. After additional amplification, it is sent to an AM detector or audio discriminator and converted to an audio signal.

NOTE: All active cards in the KFRA-C unit have been designed for extremely fast replacement or exchange. The best way to service the unit is to replace the defective assemblies with spare cards.

TROUBLESHOOTING: If you notice a sudden shift in signal strength from all transmitters, the Receiver Card could be the reason.

These audio tones can be monitored through the speaker. The simplest way to check the receiver is to listen to these tones (refer to Operation Manual - Page 11 - Menu Item #3). If the tones are clear and loud, the receiver is probably working reasonably well. If the tones are inaudible, weak or mixed with other abnormal noises, the receiver may be defective. If you have two receivers, compare the tones between them.

There are no user-servicable adjustments or alignments on the Receiver Card. If service is required, please return the card to the factory.

IV. TONE FILTER/DETECTOR CARD

The Tone Filter/Detector gets the recovered audio from the receiver and sends it into a series of precision audio filters. The audio filters selectively amplify specific tones which comprise the alarm information. This allows the unit to reject noises and pulses which are not related to the system alarms. The filtered tones are then detected as digital signals and the information is sent to the Interface Card (and subsequently to the CPU Card).

TROUBLESHOOTING: In order to simplify troubleshooting, the Tone Filter/Detector Card is equipped with “diagnostic LEDs” located along the entire top side of the card. As each tone in the transmission is detected, the appropriate LED will flash. For example: if the transmitter sends 1234, the LEDs will flash in sequence 1, 2, 3, and 4. Each of 11 LED and filter sections is labeled (0 to 9 inclusive plus X). If no LEDs flash, the problem could be the Receiver Card.

The easiest way to troubleshoot this card is to carefully view the LEDs and match the sequence with a known transmitter signal. A battery-powered call box is probably the best way to generate the transmitted signal. Send the same sequence over and over until you verify the proper sequence of LED flashes. Start with a simple sequence (2 or 3 digits) and continue changing the transmitter address code plugs until all tones have been checked and verified. Make certain only those LEDs which represent the tones transmitted illuminate.

Check the paper tape printout and determine if any patterns exist in the transmitters which are not processing properly. In some cases, a particular tone can be isolated as the cause of a major problem. For example: if all transmitters which contain the digit “3” are never received, this immediately points to a potential problem with the number 3 filter/detector.

Other problems could be more difficult to diagnose and do not surface using the LED technique. The only way to diagnose these problems is to change the card with a working spare unit.

V. INTERFACE CARD

The (CPU) Interface Card provides several functions relating to communication with the CPU. It receives tone data from the Tone Filter/Detector Card and converts it into binary data for the CPU. It takes Automatic Gain Control (AGC) voltage from the Receiver Card and converts it into binary data. It collects data from front panel switches and communicates the status to the CPU. It communicates with the CPU and controls; the Front Panel Display, the audible alarm system, and several other functions on the Power Supply Card.

TROUBLESHOOTING: This Interface Card consists primarily of high speed digital logic. It would be difficult to adequately troubleshoot the card without sophisticated test equipment. If most of the unit is operating, but some problems are encountered in the display or other “digital” communication subsystem, then replacement would be the best diagnostic test.

VI. DISPLAY BOARD

The Display Board is the largest circuit board mounted behind the front panel. It contains several LED displays and control circuits. This board consists primarily of output circuits and displays with the exception of the two front panel switches. The alarm “type” indicators across the top of the board each have two LEDs for reliable, redundant operation. In most cases, problems on this board will be localized to the individual display or LED device.

TROUBLESHOOTING: This board is slightly more difficult to exchange than all of the “slide-out” cards, but it should rarely need service once in operation. Before removing the original, a second board can be plugged-in and tested above the chassis. Support the replacement board on a piece of cardboard or wood and make sure no metal touches any circuits on the front or rear of the new board.

VII. POWER SUPPLY CARD

The Power Supply Card is located in the center of the unit near the Tone Filter/Detector Card. It contains the main voltage supply regulators for +12 Volts, +5 Volts and -12 Volts. It has sophisticated battery charge circuits and power trouble detection circuits. It also has audible alarm circuits, audio monitor circuits and audio amplifier circuits.

TROUBLESHOOTING: Three LEDs are mounted on the CPU side of the chassis on the Aux. Mother Board located along the base of the chassis. Check these three red LEDs labelled +12, +5 and -12. If any LED is off, then the Power Supply Card may be defective.

The Power Supply Card should be changed if any of the following symptoms are present:

- * Unit dead.
- * Some or all LEDs fail to light.
- * Fuses blow continuously.
- * Some functions dead or weak.
- * No audible alarms.
- * No receiver or speaker audio.
- * Extremely distorted audio.
- * Power Supply Card running hot.
- * Voltage measurement points not per marking.

VIII. CPU CARD

The CPU card contains a microprocessor, memory, serial ports, on-board batteries and a clock/calendar. It is specially designed for harsh industrial environments and demanding applications. Since it is an integral part of almost all functions, it would be difficult to list all problems which could be caused by a CPU malfunction. In real world testing, it has been proven to be extremely reliable and due to the self-testing nature of CPU subsystems, it is usually the last card to be changed in normal troubleshooting.

TROUBLESHOOTING: The CPU Card should be checked/changed if any of the following symptoms are detected:

- * Unit dead, especially if Power Supply Card checks good.
- * Unit powers up, but audible alarms will not silence.
- * Can't bring the clock up on the display.
- * All other boards seem to be working, but unit will not process any remote signal.
- * Can't load new transmitter numbers into memory.
- * Clock jumps erratically or loses setting on power down.
- * Floppy Drive will not read.
- * Printer (RS232) does not print.

CPU CARD SPECIAL HANDLING

CAUTION: CPU CARD HAS AN ON-BOARD BATTERY. HANDLE THE BOARD ALONG THE EDGES. DO NOT TOUCH THE SOLDER SIDE (BOTTOM). DO NOT LAY THE BOARD ON ANY METALLIC OR CONDUCTIVE SURFACE.

CPU CARD REMOVAL AND INSTALLATION:

1. Power the unit down completely by removing the plug-in connector at the rear (center) of the chassis. Carefully grasp the plastic connector and work the top and bottom out from the unit slowly. Do **NOT** pull on the wires! Some connectors are tight. Check all LEDs to make sure power is off.
2. Locate the CPU Card. See Rear Panel Layout & Connections. Carefully remove any hold-down hardware or screw. Do not allow any hardware to fall into the unit. Carefully remove cables. Mark cables with masking tape to aid re-assembly. Slide CPU Card straight up and out of unit. Lay on a clean piece of cardboard in an area with good lighting.
3. Re-install the CPU Card (or new CPU) and hardware following the reverse sequence used to remove the card. Install connectors and cables.

IX. FLOPPY DISK SUBSYSTEM

The Floppy Disk Subsystem is installed on units when it is necessary to add or delete transmitters on a regular basis. Whenever the unit is powered-up or reset, it checks the floppy disk drive for new information or new transmitter number files. If the new file is found, it installs the new list of transmitters into the CPU memory (non-volatile). The subsystem consists of a Floppy Disk Drive, a data/ribbon cable and a Floppy Drive power cable.

TROUBLESHOOTING: The Floppy Disk Cable should be changed or temporarily removed if any of the following symptoms are detected. The floppy system is an optional accessory used during loading and is not required for normal operation after the system has been loaded and updated.

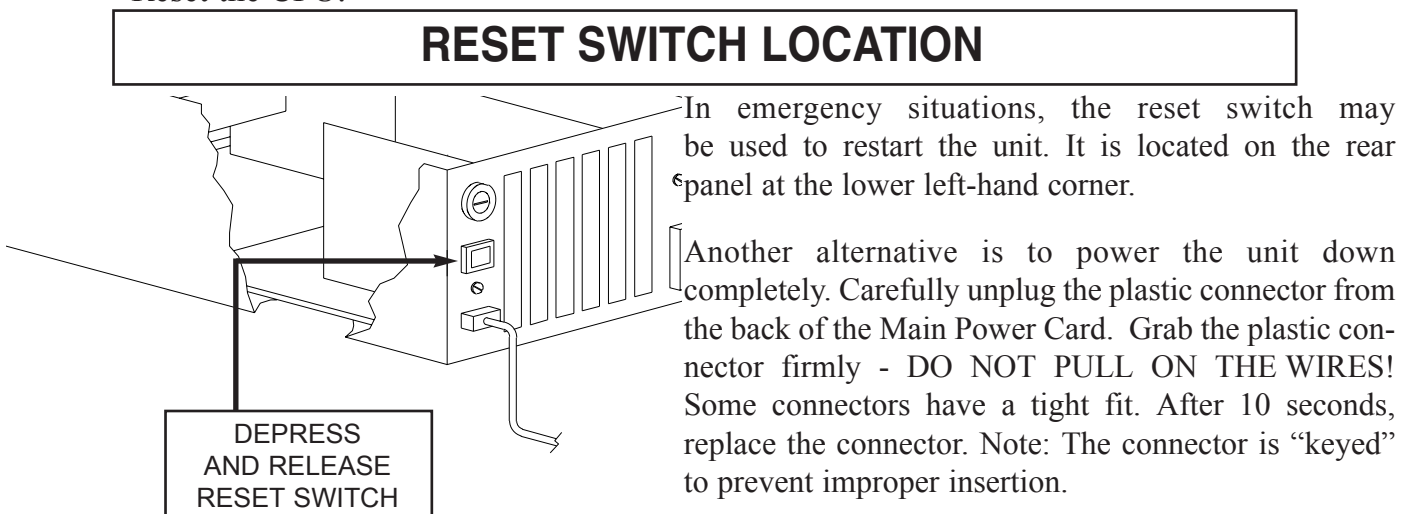
- * Unit dead.
- * Any CPU-related problem (see CPU section).

X. PRINTER SUBSYSTEM

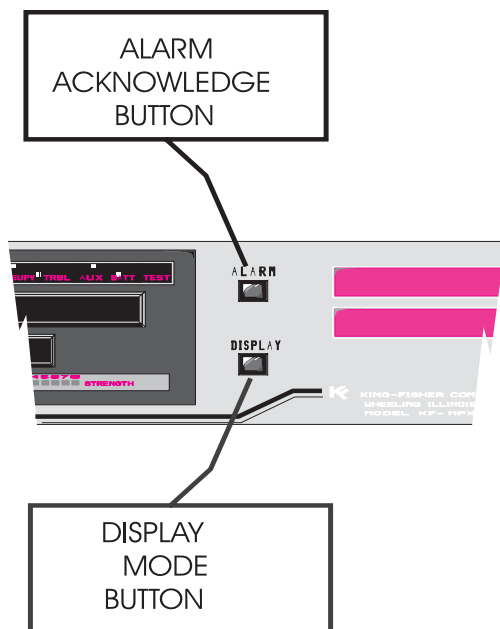
The Printer is located in a separate chassis. It consists of a printer mechanism with ribbon and print head, a separate printer board which includes a printer microprocessor controller. Power for the printer is provided on a rear connector (2 pin) of the KFRA-C chassis. A fuse is located on the rear panel (or side wall) of the KFRA-C unit. The printer data is sent in serial form on the RS232, DB25m connector located on the rear of the KFRA-C chassis.

TROUBLESHOOTING: The following items should be checked/tried if printing problems are present.

- * The printer fuse should be checked on the KFRA-C chassis.
- * Change the RS232 cable.
- * Temporarily unplug power to the printer.
- * Check the voltage going to the printer (+12 Volts).
- * Reset the CPU.



CONDENSED OPERATION GUIDE



ALARM OPERATION:

After Alarm is received. ALARM (Acknowledge) will silence audible signal, steady the display, and log to the printer. Check printer to ensure no other alarms are present. Press Paper Feed, open cover and pull paper out to view and verify all current alarm entries.

CLEAR DISPLAY AFTER ALARM:

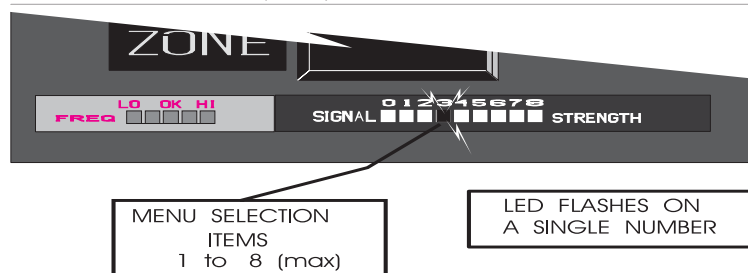
After Alarm is dispatched, DISPLAY button will clear the old alarm. Press DISPLAY again to restore the CLOCK.

(Date will appear below the Clock for a few seconds.)

MENU FUNCTIONS:

To access the MENU Functions, press and hold the DISPLAY button for about 4 seconds until the Menu Item 1 LED starts to blink.

Press and release the DISPLAY button until the blinking LED moves to the Menu Item desired. Press the ALARM (Ack) button to select this item.



ALARM OPERATION:

1. Audible Alarm/Siren Test
2. Memory Read
3. Speaker Monitor ON/OFF
4. Clock Time Set
5. Date Set

Notes:

1. Audible Alarm / Siren Test: Use ALARM (Acknowledge) to silence the alarm.
2. Memory Read: Lists all transmitters with problems to the printer (MB, S, LB, LS).
3. Speaker Monitor: Monitors Channel: ZONE 01 = "ON", 00 = "OFF".
4. Clock Set: Change each digit with DISPLAY, ALARM (Acknowledge) to "set" and advance next digit.
5. Date Set: Change each digit with DISPLAY, ALARM (Acknowledge) to "set" and advance next digit.

IN CASE OF PROBLEMS:

CHECK FOR LOOSE OR IMPROPER CONNECTORS, FRAYED OR LOOSE WIRES, BENT PINS, INTERNAL BOARDS WHICH ARE NOT FULLY SEATED, INTERNAL *LEDs* WHICH ARE NOT ON, COMPONENTS WHICH HAVE BURNT, OR DISCOLORED COVERINGS AND BLOWN FUSES.

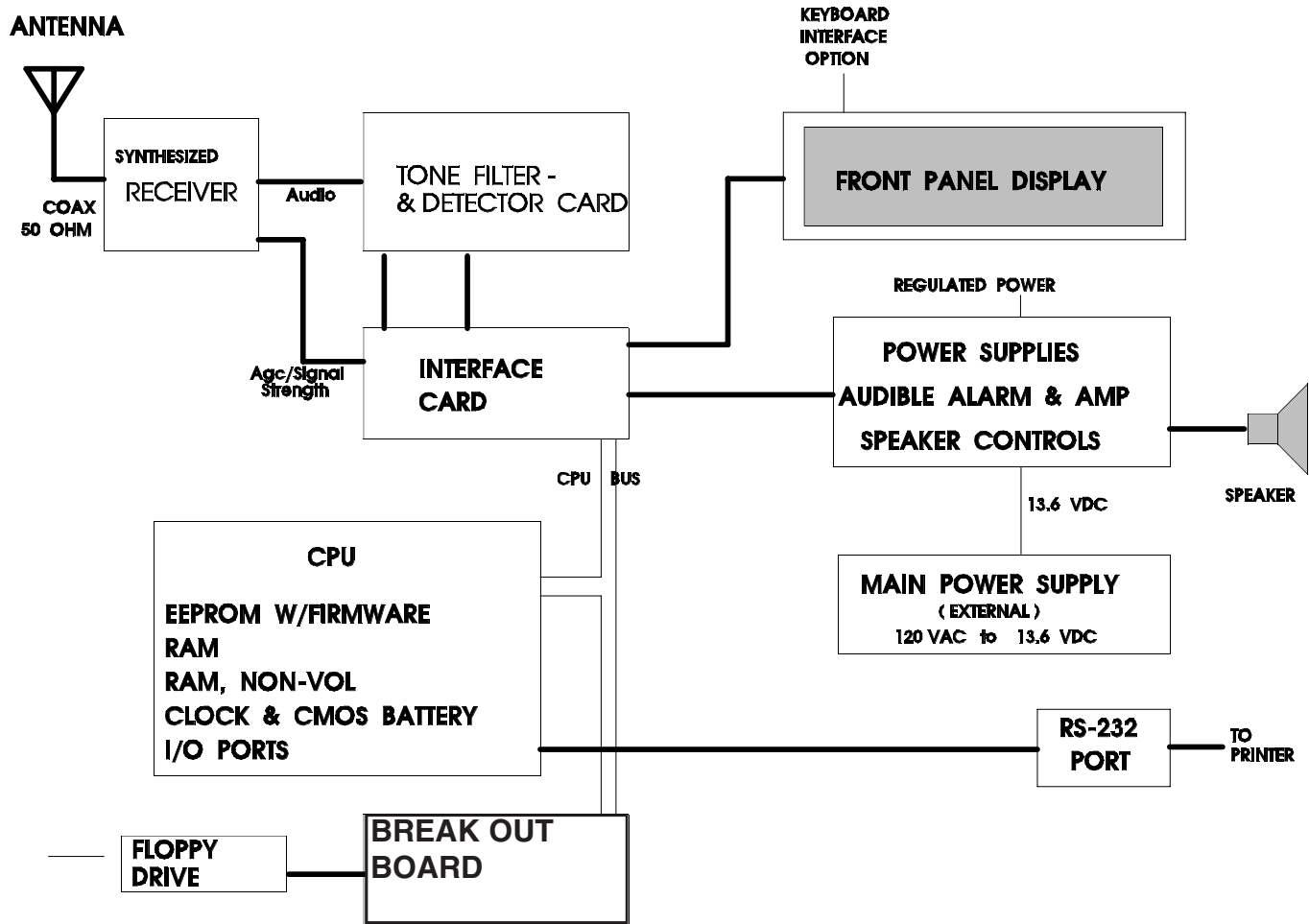
TWO EXTERNAL FUSES ARE LOCATED ON THE BACK OF THE MAIN POWER BOARD AND TWO INTERNAL FUSES ARE LOCATED ON THE BOARD ITSELF. THE PRINTER FUSE IS LOCATED ON THE REAR PANEL, AND A MAIN AC POWER FUSE MAY BE LOCATED ON THE LOWER SUBPLATE.

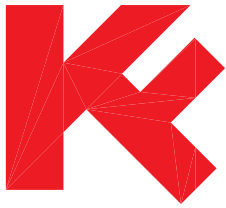
CAUTION:

DO NOT ADJUST MAIN POWER SUPPLY CONNECTED TO THE RECEIVER!! IT HAS BEEN FACTORY SET AND ADJUSTED TO +13.00 VOLTS AT THE TERMINALS OF THE RECEIVER. SEVERE DAMAGE COULD OCCUR IF VOLTAGES ARE IMPROPERLY ADJUSTED.

RISK OF ELECTRICAL SHOCK!! HIGH VOLTAGE (120V) IS PRESENT AT AND NEAR THE AC POWER SUPPLY. REFER SERVICE TO KING-FISHER COMPANY AUTHORIZED SERVICE PERSONNEL.

KFRA-C BLOCK DIAGRAM





KFRAC EMERGENCY ALARM RECEIVER DUAL PRINTER

OPERATION MANUAL

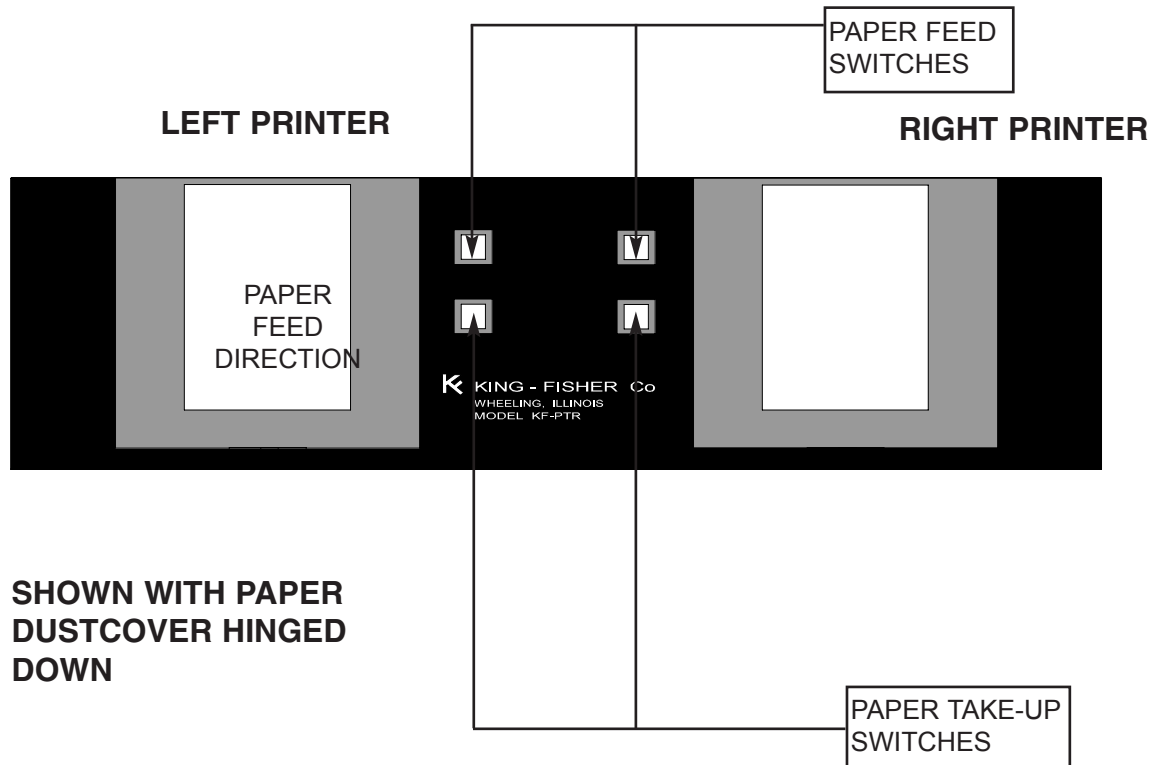


KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet: www.kfco.com

MAJOR FRONT PANEL CONTROLS



MECHANISM PRINTS AT THE TOP OF THE PAPER

LAST INFORMATION PRINTED WILL BE AT THE TOP

OLDER INFORMATION WILL BE LOWER

ALWAYS CHECK DATE AND TIME FOR SEQUENCE

IF LAST PRINT OUT IS NOT VISIBLE, PRESS AND HOLD THE “PAPER FEED” BUTTON UNTIL PRINT IS VISIBLE. PAPER FEED AUTOMATICALLY FEEDS AND TAKES UP PAPER AS LONG AS THE BUTTON IS HELD

TO RETRIEVE OLDER INFORMATION, OPEN THE PAPER DUST-COVER (DOOR) AND GENTLY PULL THE PAPER OUT FROM THE BOTTOM SIDE. USE THE “PAPER TAKE-UP” BUTTON TO SPOOL THE PAPER BACK INTO THE UNIT.

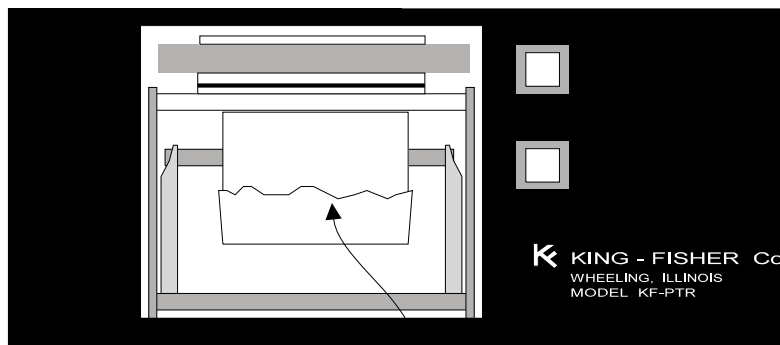
CHANGING PAPER

CAUTION: ALTHOUGH THE PRINTER CONTAINS NO HIGH VOLTAGE, THE POWER CONNECTOR MUST BE REMOVED FROM THE REAR OF THE UNIT PRIOR TO SERVICING. THIS WILL REDUCE THE RISK OF ELECTRICAL SHOCK OR DAMAGE TO SENSITIVE COMPONENTS.

TWO FULLY INDEPENDENT PRINTERS ARE LOCATED WITHIN THE COMMON CHASSIS. THE TWO PRINTERS ARE SIMILAR BUT ARE NOT TOTALLY IDENTICAL IN TERMS OF COMPONENT LOCATION.

THE DRAWINGS SHOW TYPICAL VIEWS WHICH SHOULD BE REPRESENTATIVE OF BOTH UNITS.

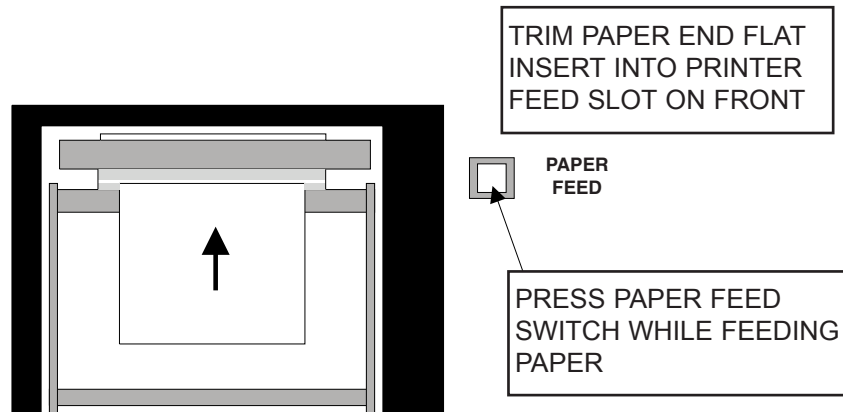
Step 1: Slide the unit forward in the rack until the paper path becomes visible from the top. Locate the spool rod where the new roll of paper will be mounted. Lift the spool rod straight up, remove the old plastic roll holder and insert the rod into the new roll of paper such that the free paper is below the roll as shown below.



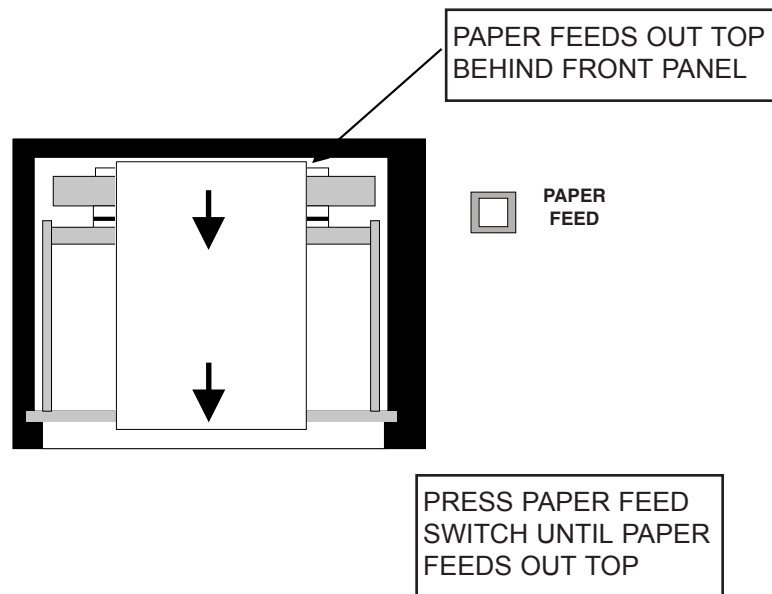
LOAD NEW ROLL ON
SPOOL ROD INSIDE
PRINTER

CHANGING PAPER

Step 2: Route the paper out the front and trim the end square with a pair of scissors. Feed the paper into the printer while pressing the “paper feed” button.

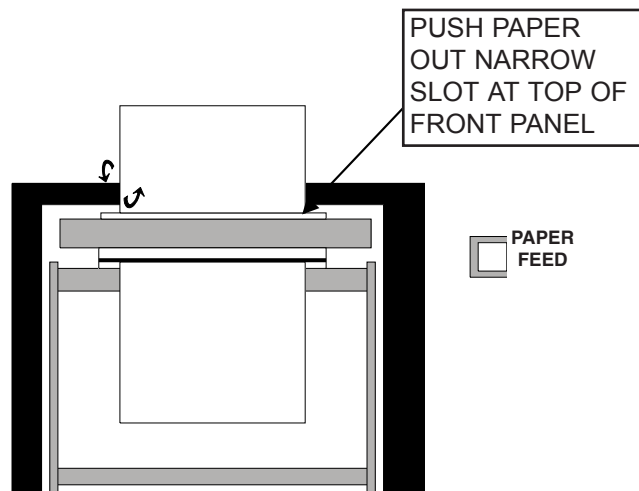


Step 3: Continue feeding the paper until several inches of paper are exposed above the printer.

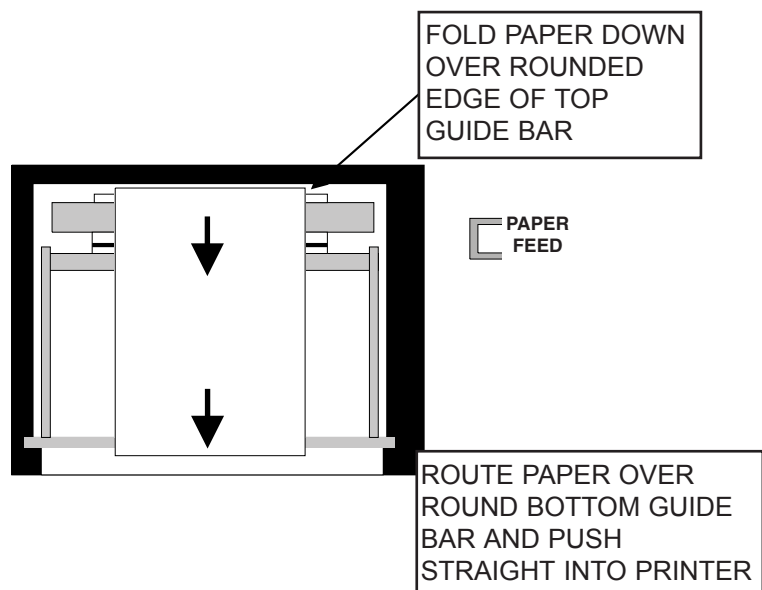


CHANGING PAPER

Step 4: Re-route the paper from the top of the printer out through the front panel in the narrow slot above the printer mechanism.

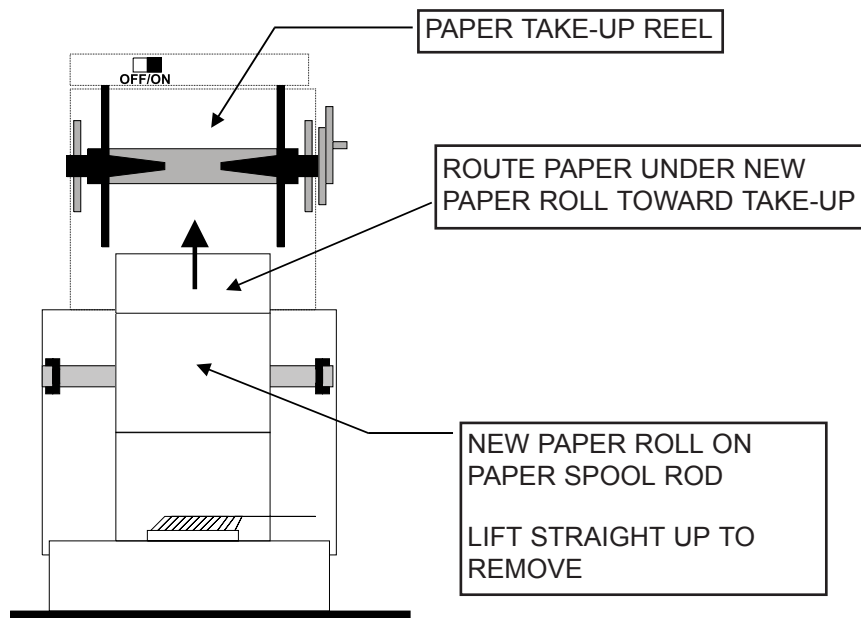


Step 5: Continue routing the paper over the guide bar, straight down the front panel, and around the bottom guide bar. Push the paper into the printer until the paper is visible from the top of the unit behind the new paper roll.

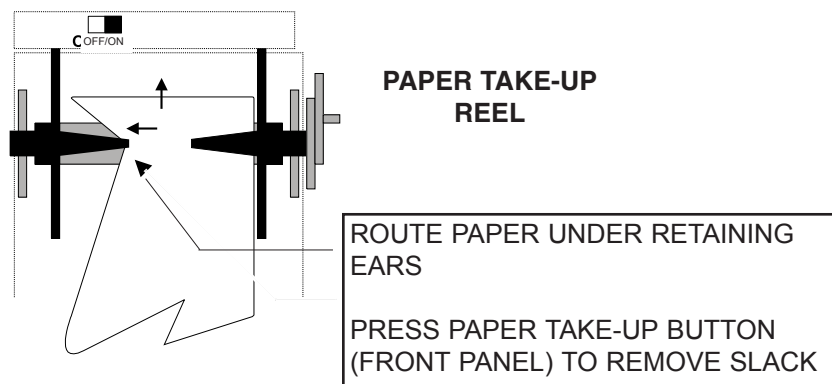


CHANGING PAPER

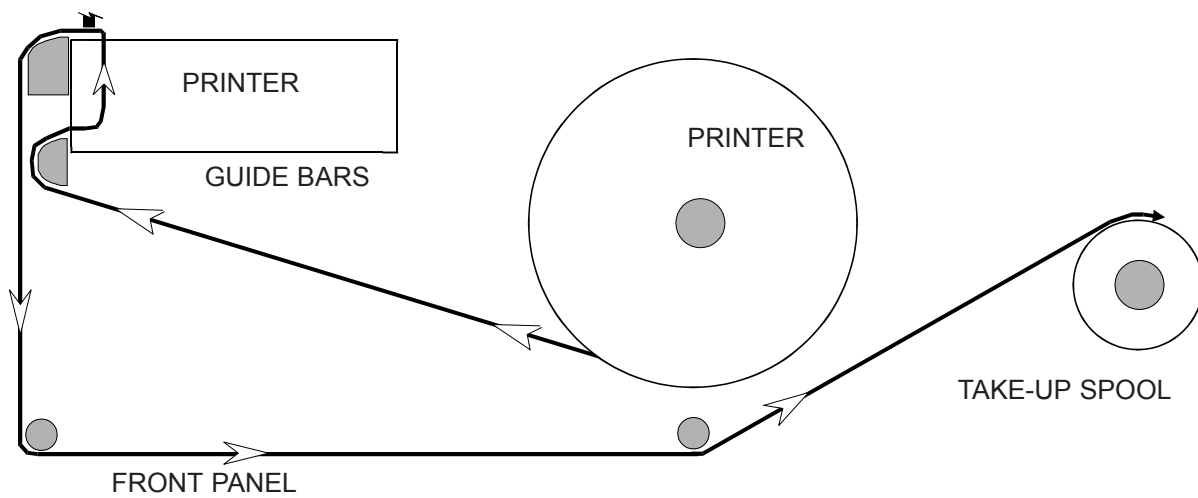
Step 6: Continue feeding paper until the paper extends past the take-up reel at the rear of the mechanism.



Step 7: Secure the end of the paper under the retaining ears of the take-up spool. Insert one side of the paper first, then the other, as shown. Press the “paper take-up” button to remove slack.

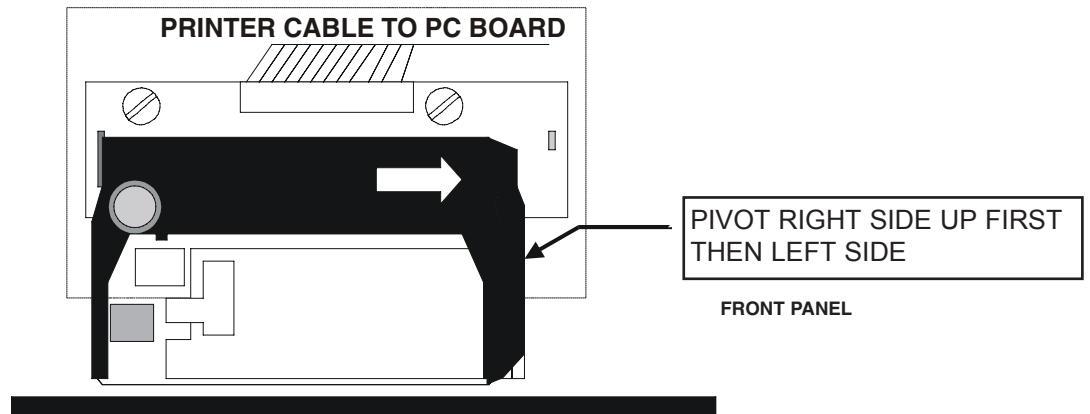


PAPER PATH

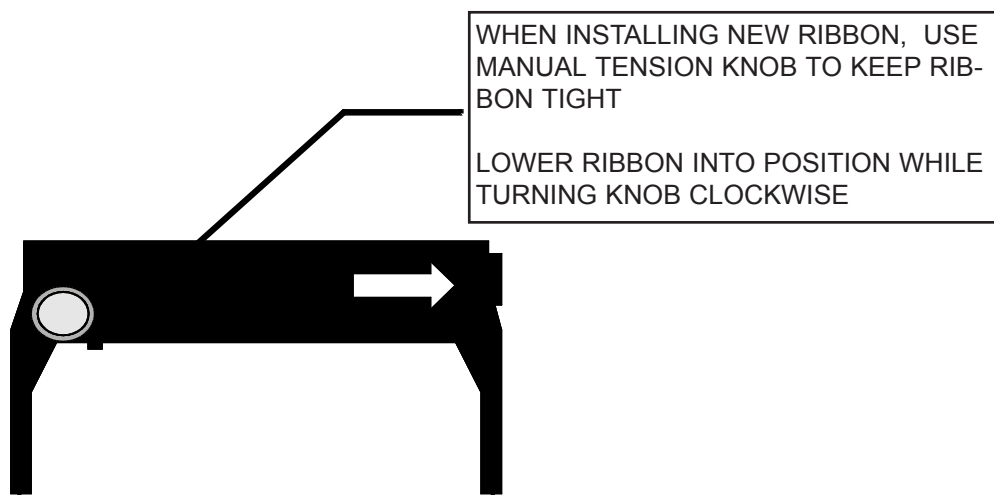


CHANGING RIBBON

Step 1: Locate the plastic ribbon cartridge at the top/front of the printer mechanism. Lift the right side of the ribbon cartridge at the point indicated by the large arrow on the cartridge. Carefully work the left side and the right side of the cartridge until it can be lifted straight up out of the mechanism.



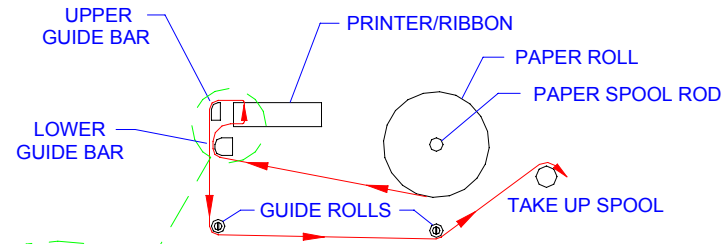
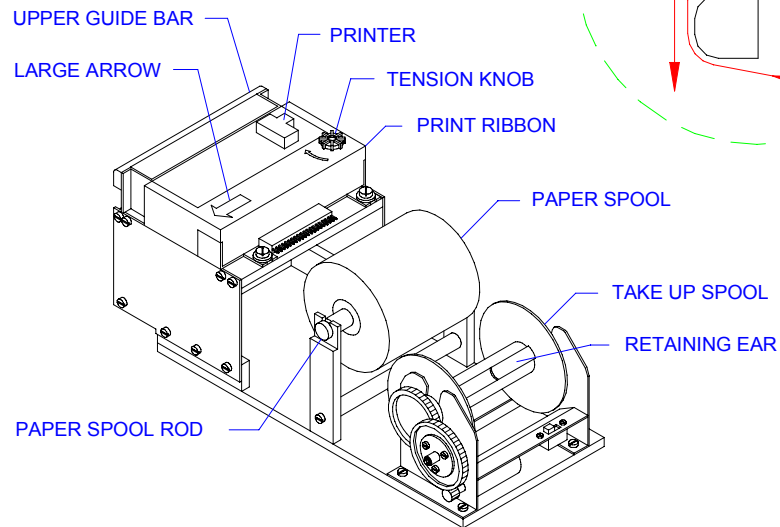
Step 2: Install the new ribbon cartridge using the opposite technique. Secure the left side first, then lock the cartridge by pressing the right side down until it locks. Turn the manual tension knob clockwise to keep the ribbon tight and in position while installing the new cartridge.



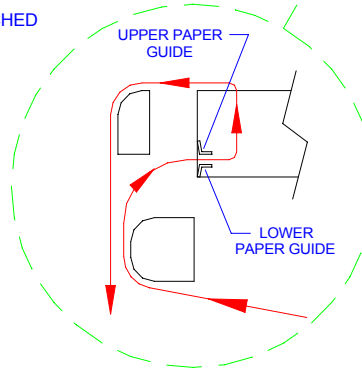
PAPER ROLL / RIBBON INSTALLATION

PAPER ROLL INSTALLATION

- 1) REMOVE THE PAPER SPOOL ROD AND SLIDE NEW PAPER ROLL ON THE ROD.
 (SEE PAPER REEVING DETAIL)
- 2) ROUTE THE PAPER OUT THE FRONT AND TRIM THE END SQUARE WITH A PAIR OF SCISSORS.
- 3) FEED THE PAPER BETWEEN THE PAPER GUIDES OF THE PRINTER WHILE PRESSING THE " PAPER FEED " BUTTON ON THE FRONT PANEL.
 NOTE: KEEP THE PAPER FEED BUTTON DEPRESSED
 ALLOWING FOR ENOUGH PAPER TO BE ATTACHED
 TO THE PAPER TAKE UP REEL.
- 4) FOR BEST RESULTS SEE KF MANUAL #75861



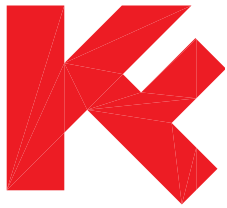
PAPER REEVING



RIBBON INSTALLATION

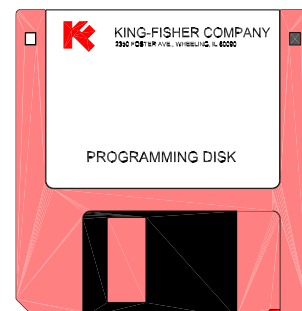
- 1) TURN THE TENSION KNOB CLOCKWISE AND KEEP THE RIBBON TIGHT WHILE POSITIONING AND PRESSING THE CARTRIDGE IN PLACE.
- 2) SECURE THE LARGE ARROW SIDE FIRST BY PRESSING DOWN, THEN LOCK THE CARTRIDGE IN PLACE BY PRESSING THE OPPOSITE SIDE DOWN.
- 3) REMOVE ANY SLACK IN THE TAPE WITH THE TENSION KNOB.
- 4) FOR BEST RESULTS SEE KF MANUAL #75861

KING-FISHER COMPANY
 WHEELING, IL 60090



KFRA-C EMERGENCY ALARM RECEIVER

PROGRAMMING MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet: www.kfco.com

PRECAUTIONS

- READ ALL INSTRUCTIONS AND MANUALS BEFORE OPERATING.
- DO NOT EXPOSE THE FLOPPY DISKS TO STRONG MAGNETIC FIELDS, LOUDSPEAKERS, MOTORS, X-RAYS, DIRT OR LIQUIDS. STORE IN A PLASTIC COVERED CONTAINER AND KEEP THE CONTAINER IN A STEEL FILE CABINET.
- KEEP FLOPPY DISKS CLEARLY LABELED AND DATED. MAKE EXTRA COPIES!
- THE CONTENTS OF THIS MANUAL ARE SUBJECT TO CHANGE AT ANY TIME. CONSULT FACTORY FOR LATEST VERSION.



TRANSMITTER BOX NUMBERS / DESCRIPTION OF OPERATION

This manual provides a detailed explanation of how transmitter “box” numbers are stored in the receiver and how you can add or delete transmitters in your system.

The process of adding or deleting box numbers is accomplished through the floppy disk drive located on the front panel of the receiver (this is an optional module which can be field installed).

Every time the receiver is “powered-up” or “reset” , it checks to see if a floppy disk has been inserted into the drive. If the floppy disk is present, it checks for the file containing the list of box numbers. If the list is present, it loads the new numbers into the system (non-volatile) memory. If no list is present, it retains the previous set of numbers without any changes.

By simply loading the appropriate floppy disk into the drive and then “resetting” the receiver, an entirely different set of numbers can be quickly loaded in a matter of seconds. This is particularly convenient when a backup unit must be moved, changed or placed into service quickly.

LOADING FLOPPY

STEP #1

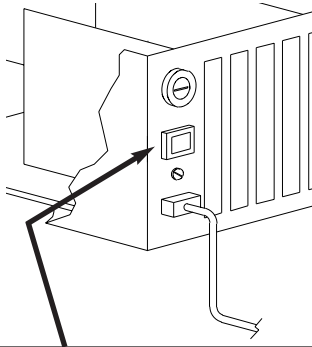


A pre-programmed disk is normally provided with the system. Insert the floppy disk into the slot of the disk drive located at the upper right hand corner of the receiver, as shown. Hold the disk with the metal side facing the receiver and the top label facing you, as shown.

Press the eject button (on the drive) once to remove any floppies which might have been left inside.

Gently slide the floppy disk into the drive (covered door) until the disk drops down and locks into position (disk clicks into place and the eject button pops out).

STEP #2



Locate the Reset Switch on the rear panel of the receiver.

Press the pushbutton in for 2 seconds and release while someone watches the LED light on the front of the disk drive. The LED should turn on for a few seconds while the disk drive spins the disk.

After a few more seconds, the receiver should resume normal operation including the new list of transmitter numbers.

STEP #3



STEEL FILE
CABINET OR BOX

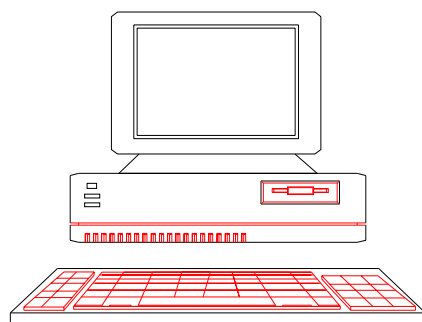
Remove the floppy disk by pressing the eject button on the front of the disk drive.

Label and date the floppy disk, place in a plastic container and store in a dry steel file cabinet or steel box.

Do a memory read on the receiver to view the new list of transmitter numbers (refer to Operation Manual - Page 10 - Menu Item #2).

Test the receiver thoroughly to verify the added transmitter numbers and functions are correct.

ADD - DELETE TRANSMITTER NUMBERS



Write
Protect
Switch



REQUIREMENTS:

Adding or deleting transmitter numbers requires the use of a desktop or laptop computer running MS-DOS 5.0, 6.0 or 6.2 with a floppy disk drive capable of reading/writing 1.44 MB, 3.5 inch floppy disks.

COPY ORIGINAL BEFORE STARTING:

Before attempting to edit the list of transmitter numbers, a copy of the previous disk should be made. This can be done using the DISKCOPY command, your favorite utility program or copying everything to an empty directory on your hard disk. Before copying, it is always a good idea to flip the write protect switch on the floppy disk to the “open”, see-through position. This prevents damaging the original disk. Date and store the original in a safe location as previously described.

Directory of A:\					
	<DIR>		04-12-96	11:48a	
	<DIR>		04-12-96	11:48a	
EDIT	COM	69,886	07-11-95	9:50a	
KFRACNUM	DAT	12,535	03-11-98	4:51p	
TINDEXC	EXE	28,921	02-03-98	11:15a	
TINDEX	DAT	7,085	03-13-98	9:02a	
TDIGITS	DAT	6	12-11-97	8:34p	
ALM-CK	EXE	53,156	03-20-98	9:19a	
USRTYP	DAT	48	03-19-97	8:44a	
CHANGE	BAT	52	02-23-98	12:33p	
8 file(s) 171,689 bytes					
??? bytes free					

Directory Example

ADD-DELETE PROCEDURE:

Insert the new copy into the PC and change drives to the floppy drive as follows (example shown for A: floppy drive):

screen shows C:\>type A: ← (Enter)

screen shows A:\>type DIR ← (Enter)

Your screen display should now look similar to the example shown at the left (*Directory Example*).

FILE DESCRIPTIONS:

TINDEX.DAT	Compiled Transmitter Numbers
KFRACNUM.DAT	ASCII List of Customer Numbers
TINDEXC.EXE	Special Compiler Program

ADD - DELETE TRANSMITTER NUMBERS

ADD - DELETE PROCEDURE:

The list of transmitter numbers you will be required to edit is the file described as KFRACNUM.DAT

This is a standard "ASCII" file which contains a list of all transmitter numbers followed by a single character which describes each transmitter as a certain type (Street box, 4 Zone Master Box, 8 Zone Interior Box, 52 Zone Interior Box, etc.). Deleting a transmitter from the list consists of opening this file in an edit mode, deleting the entire line on which the transmitter appears, reducing the quantity of transmitter entries and saving the file. Open the file as follows by carefully typing exactly as shown:

screen shows A:\>

type **CHANGE** ← (Enter)

The screen should fill with a list of transmitter numbers with a different number located on each line. See print-out at left. Your display should look similar to the one shown.

1116A
1124A
1149C
1152C
1153B
1154F
1155F
1156F
1157F
1158A
1161C
1162C
1163B
1164B
1215F
1223F
2127F

ADD - DELETE TRANSMITTER NUMBERS

NOTE:

In the partial list at left, the transmitter numbers are 1149 and 1158.

The 5th Character just to the right of the transmitter number is the transmitter type. In this case the following letters are used:

C = a "KF1-3/KF3-3 Format" Master Box
with 4 Master Zones Available.

A = an "8 zone Combo"

FILE
1149C
1158A

DELETE A TRANSMITTER:

To delete transmitter 1155, simply cursor down or up until the cursor is flashing on the line containing 1155. Now use the **Del** key to erase each character to the right of the cursor to erase each character to under or left of the cursor.

When 1155 is completely gone, the next line should move up to take it's place.

SAVE THE FILE:

When you are though editing the list, you must SAVE the file by pressing **Alt + F** (file).

Then press the **S** (save) key. The screen should briefly indicate that the file was saved.

EXIT THE EDITOR:

Press **Alt + F** again. This time press the **X** key to exit the editor and run the compiler automatically.

The screen should fill with transmitter numbers and you should be able to quickly check the list against your changes. Press “ESC” to exit, then do a DIR (directory) and verify that the TINDEX.DAT shows the current date and time.

screen shows A:\>

type **DIR** ← (Enter)

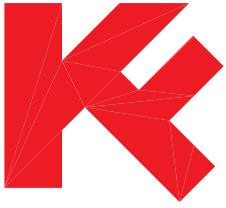
ADD TRANSMITTERS:

Adding transmitters is similar to the previous process of deleting transmitters except that the editor must be placed in the “Insert” mode (toggle the **INSERT** or **INS** key).

Keep the list of transmitters in numeric order so it is easy to edit. Cursor to the beginning of the line at the proper position for the new transmitter entry. The line above should be a lower transmitter number and the current line should be a larger transmitter number. Press the enter key (←) once. If the insert mode is correct, a new blank line should be created with the larger transmitter number moving down. Carefully type the new transmitter number on this line, followed by the correct transmitter “type” designation. Review other similar transmitters on the list to ensure use of the correct type. Save the file as previously described and exit the editor. Do a final check on the transmitter list, do a directory and check the file dates and times.

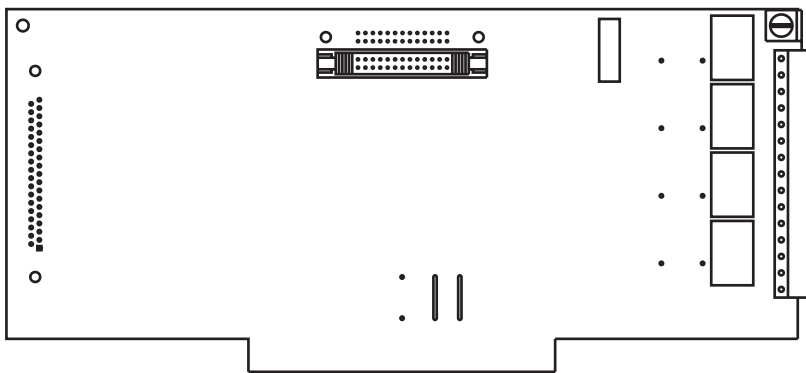
FLOPPY DISK:

Remove the floppy from the PC and follow the procedure for loading the floppy into the Receiver as previously described.



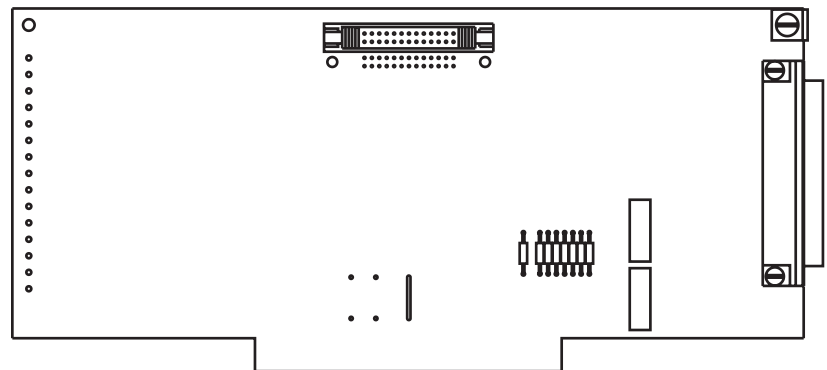
AUXILLARY RELAY BOARD for KFRA-C RECEIVING CONSOLE

TECHNICAL MANUAL



INTERNAL RELAY CONTROL

EXTERNAL RELAY CONTROL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

AUXILIARY RELAY BOARD

The Auxiliary relay board when used in a KFRA-C can activate pumps, sirens, lights or other electrically-controlled devices when the proper code is received. There are two versions of this assembly.

- a Assembly 66265 has four STDP form C relays which provide a maximum contact current of 7 amps at 240vac or 30vdc. There is a 15 pin connector protruding from the back of the KFRA-C with terminals for attaching control wires from the devices to be controlled.
- b. Assembly 66266 has a 37 pin connector that protrudes out of the back of the KFRA-C for connecting an external relay board. This board can have up to 24 relays.

The relays can be individually programmed for different transmitters, zones, message types and delay times.

The relay board is supplied with a diskette that has relay information considered to be typical of an installation in a Fire Station or other Facility where the receiving Console would be located.

The four relays are programmed in the following manner.

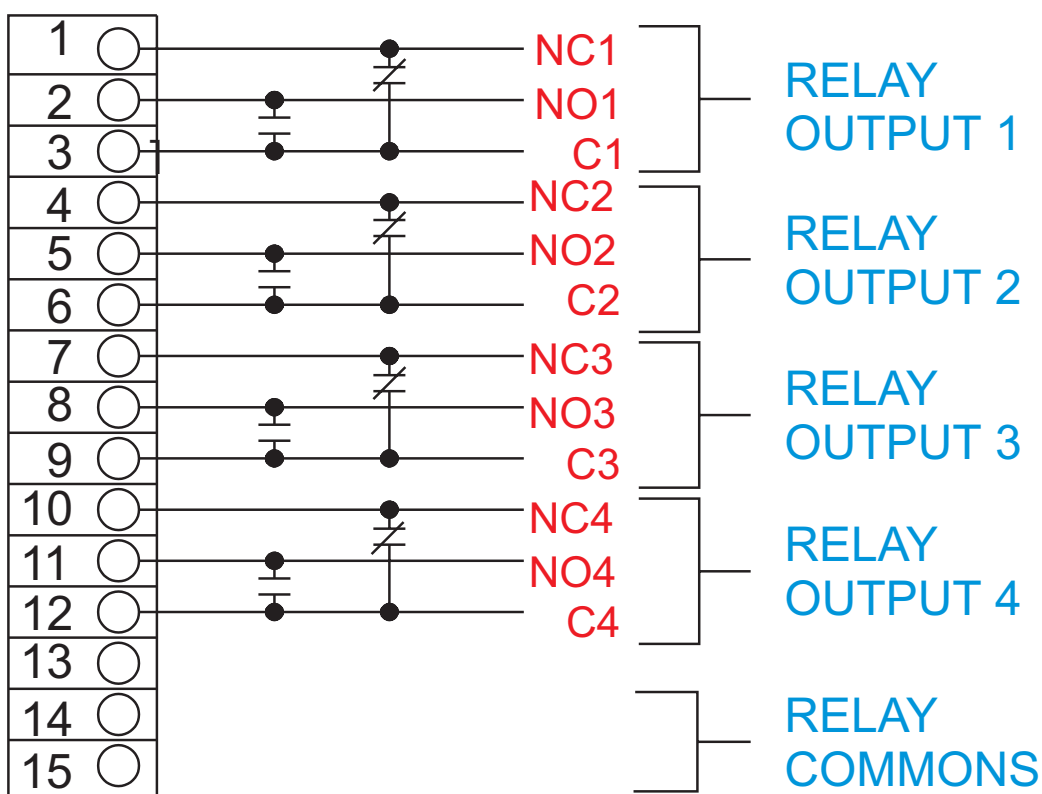
ALL RELAYS ARE PROGRAMMED TO RESPOND TO ALL FIRE ALARMS.

1. Relay 1 will activate after a 3 second delay and remain activated for 3 seconds. This relay is intended to turn on the house bells.
 - Terminal 1 - normally closed
 - Terminal 2 - Normally open
 - Terminal 3 - Common
2. Relay 2 will activate after a 4 second delay and remain activated for 10 minutes. This relay is intended to turn on the house lights.
 - Terminal 4 - Normally closed
 - Terminal 5 - Normally open
 - Terminal 6 - Common
3. Relay 3 will activate after a 5 second delay and remain activated for 2 seconds. This relay is intended to open the bay doors.
 - Terminal 7 - Normally closed
 - Terminal 8 - Normally open
 - Terminal 9 - Common

4. Relay 4 will activate after a 6 second delay and remain activated for 2 seconds. This relay is intended to turn off the stove if it was on..
- Terminal 10 - Normally closed
Terminal 11 - Normally open
Terminal 12 - Common

NOTE:

If the common of all relays are to be connected together, install jumpers JP1 thru JP4 on the relay board. The commons will now be at Terminals 14 and 15.



If different programming is required, follow the instructions below or contact King-Fisher Company for specialized programming.

FOLLOWING ARE THE STEPS FOR PROGRAMMING THESE RELAYS.

1. These boards work with software version 2.05 or above for the KFRA-C.
2. To program the relay outputs on the KFRA-C, a file "RELAY.DAT" needs to be programmed. The file should be on a floppy disk and the KFRA-C should be rebooted with the disk in the floppy drive.

The file should consist of 6 columns. The maximum number of lines in the file are 250.

Column 1: The transmitter number followed by a comma. If you don't want to list specific transmitter(s) and have all transmitters activate relay(s), put -1 followed by a comma.

Column 2: The zone number followed by a comma. If you don't want to list specific zone numbers and have all zones activate relay(s), put -1 followed by a comma.

Column 3: The message type followed by a comma.

- 0 — Fire
- 1 — Medical/Emergency
- 2 — Police
- 3 — Tamper
- 4 — Supervisory
- 5 — Trouble
- 6 — Service
- 10 — Don't care

Column 4: Relay number (1-24) followed by a comma.

Column 5: The on delay time (0-250 seconds) followed by a comma.

Column 6: The off delay time (1-999 seconds).

	<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>	<u>Column 5</u>	<u>Column 6</u>
Row 1	1234,	2,	0,	16,	1,	4
Row 2	2345,	34,	10,	3,	12,	3
Row 3	3456,	-1,	0,	21,	4,	15
Row 4	-1,	-1,	5,	18,	8,	111

An example of a “relay.dat” file is as follows:

Row 1 means that if zone 2 of transmitter 1234 is in fire alarm, relay 16 will be turned on after a 1 second delay and turned off 4 seconds later.

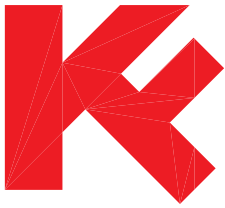
Row 2 means that any type of messages (1-6) from zone 34 of transmitter 2345 will turn on relay 3 after a 12 second time delay and turn it off 3 seconds later.

Row 3 means that if any zones from transmitter 3456 is in fire alarm, relay 21 will be turned on after a 4 second delay and turned off 15 seconds later.

Row 4 means that any trouble message will turn on relay 18 after an 8 second time delay and the relay will stay on for 111 seconds.

3. The last relay output can be aborted by pressing the Alarm Acknowledge Button three times within 3 seconds.
4. Jumper settings on the CPU board should be:
W1[1-2] “S”; W1[3-4] “X”; W1[5-6] “N”; W1[7-8] “T”
W1[9-10] “IB”; W2[4-6], and W2[3-5].

P/N 75050



KFRTI-20/52 SYSTEM



**Factory
Mutual
System**

Approved

KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

GENERAL DESCRIPTION

The King-Fisher Industrial Radio Alarm Control System (IRACS) is a modular, self-contained system designed for detecting the operation of any approved signal initiating device, indicating by annunciator LEDs the area of the alarm condition, and operates all alarm and auxiliary devices.

The IRACS System is available in two model configurations, the Model KFRTI-20 and KFRTI-52 Panels, having a maximum expansion of up to 20 zones and 52 zones respectively. Both models are furnished in a Nema 3R rainproof enclosure.

In addition, the modular KFRTI-20/52 Panel has the optional capability of automatic radio reporting for alarms, supervisory, and trouble conditions with “true interrogate” test status reporting for use with a compatible receiving unit.



KFRTI-20

BASIC FIRE ALARM CONTROL FEATURES

The Model KFRTI-20/52 Fire Alarm Control System is modular in its construction; and, can initially be installed and operated as a local control panel with a base unit consisting of the following features:

- Modular 30 Volt, 3 Amp Power Supply (plug-in-board)
- Modular Intelligent Alarm Control Board
- Modular four input class B zone boards (expandable to 20 or 52 zones)
- Modular two input class A zone boards (expandable to 10 or 26 zones)
- Modular releasing device zone boards (expandable to 5 or 13 zones)
- Audible alarm and trouble signal outputs
- Inputs for remote alarm silence, trouble silence, acknowledge and panel reset
- Auxiliary 24 VDC smoke detector supply
- Auxiliary 24 VDC alarm signal output for each zone
- Front panel annunciation of total alarm system status for each zone
- Quick insertion/removal field wiring terminal blocks
- Modular 1-piece sub-plate for easy installation and service
- Modular controls for easy operation

- NEMA 3R rain-proof compact cabinet enclosures with security lock

Up to 52 Fire Alarm zones can be added, quickly and easily, in increments of four zones at a time, just by inserting additional “zone input cards.” The KFRTI-20/52 Panel is designed to meet the demands of any large or growing facility. The KFRTI-20/52 Panel, two model concept, allows the user to select the model best suited for his future needs as well as the present. For expansion of either model, additional zones may be added which compliment the total KFRTI-20/52 Panel capacity to either “20” or “52” zones.

For Class A or releasing device circuitry requirements, modular two input Class A zone cards (expandable to 10 or 26 zones) and/or releasing device zone cards (expandable to 5 or 13 zones) are available.

KFRTI-20/52 PANEL OPERATION

Both the KFRTI-20 and KFRTI-52 Fire Alarm Control System’s primary function is to monitor up to either 20 or 52 zones of emergency detection devices for the presence of an alarm condition.

When an initiating device detects an alarm condition, the KFRTI-20/52 Panel begins an alarm sequence which can include automatic local annunciation, building evacuation, remote signalling, reporting, and optional extinguishing agent release. The following sequence illustrates alarm operation.

ALARM CONDITION - If an alarm condition exists on one of the zones in the KFRTI-20/52 Panel, that zone will latch into alarm and at the same time:

- Pulse the respective individual zone’s red alarm LED.
- Pulse the common red alarm LED.
- Activate the alarm indicating devices (horns, bells, strobes, internal buzzer, etc.)
- Acknowledging the alarm (operating the acknowledging switch) steadies the flashing LEDs.
- Subsequent alarms will pulse their respective zone LED(s) and the common red alarm LED.
- Subsequent alarms will re-activate the alarm indicating devices if they were previously silenced.

NOTE: The alarm condition will not clear until manually reset by authorized personnel.

The KFRTI-20/52 Panel also provides full supervision of the field wiring for each initiating zone and each audible indicating circuit. A detected fault produces the following sequence.

TROUBLE CONDITION - Whenever a trouble condition exists on one of the zones in the KFRTI-20/52 Panel:

The amber trouble LED for the zone in trouble will light.

The amber common trouble LED on the alarm control board will pulse.

The panel's internal trouble buzzer will pulse.

In addition to a zone trouble condition, the KFRTI-20/52 Panel monitor's, its own operational status for the following conditions:

- SYSTEM TROUBLE
- BOARDS NOT PROPERLY INSERTED
- CONTROL SWITCHES ABNORMAL
- CONTROL CABLES ABNORMAL
- AUDIBLE CIRCUIT TROUBLE
- GROUND FAULT CONDITION
- LOSS OF PRIMARY POWER
- BATTERY TROUBLE



“HUMAN ENGINEERED” CONTROLS AND INDICATORS

Operation of the King-Fisher KFRTI-20/52 Panel is totally free from complicated controls and indicators. The KFRTI-20/52 Panel has been human engineered by keeping all six controls in order and grouped into three basic categories of Silencing, Restoration and Testing. The following is a description of the six control functions.

CONTROL FUNCTION DESCRIPTION

ALARM SILENCE	- Silences Audible Alarm Devices, position monitored by visual and audible trouble signals.
TROUBLE SILENCE	- Silences Audible Trouble Devices.
ACKNOWLEDGE	- Steadies flashing red LED on the Common Alarm Control Board and the zone(s) in alarm at that point in time.
RESET	- Restores the KFRTI-20/52 Panel to normal condition and resets zone devices that are normal
DRILL	- Operates “Local Notification Appliance Circuit” only.
LAMP TEST	- Illuminates all Control Panel Common and Zone Indicators (momentary action).

PANEL CONSTRUCTION

The KFRTI-20/52 Panel is modular in design and construction. All electronic boards are mounted on a removable sub-plate, which is housed in a NEMA 3R rainproof locked enclosure. A lexan viewing window displaying panel and zone status is installed on the front door. All electronic circuitry is solid

state C-MOS logic installed on top quality epoxy glass printed circuit boards with gold plated connectors for ribbon, edge, and battery connectors. KFRTI-20/52 panel contains a corrosion inhibitor tape designed to protect the internal electronics for up to one year under normal ambient conditions. The operating temperature range of all KFRTI-52 components, are -40 deg F to +140 deg F (-40 deg C to +60 deg C).

EMERGENCY BATTERY BACK UP

The KFRTI-20 or KFRTI-52 Panel operates directly from 120 VAC line voltage, or during AC power outage, automatically switches to a 24 volt DC back-up battery power supply. The stand-by back-up battery power supply capacity of the KFRTI-20/52 Panel can be custom tailored to each particular feature configuration, especially where an application may require a higher battery current capacity. The batteries for the KFRTI-20 and KFRTI-52 Panel are maintained at full charge by the power supply's built-in two stage programmable constant current recharging unit.

EASY MAINTENANCE

Maintenance and repair of the King-Fisher KFRTI 20/52 Panel is extremely simple. Because the entire system is of modular construction, service is easily accomplished by utilizing board level swap-out techniques. This procedure allows even the most inexperienced maintenance personnel to return the system including the power supply, to full service within minutes.

OPTIONAL RADIO FIRE ALARM REPORTING FEATURE

The KFRTI-20/52 Panel with its modular design can be easily upgraded from its fire alarm configuration to a radio fire reporting system within a matter of minutes. Simply add a transmitting antenna, coaxial cable, and two modular plug-in boards consisting of a modular CPU board and transmitter board, for one-way reporting.

The KFRTI-20/52 Panel with its capability of automatic radio reporting for alarms, supervisory, and trouble conditions is now ready for use with a compatible receiving unit.

With the radio fire reporting transmitter option now added to the KFRTI-20/52 Panel, any alarm condition on one of the zones will activate THE PANEL'S TRANSMITTER TO SEND THREE ROUNDS OF SIGNAL INDICATING THE ZONE ALARM MESSAGE.

Whenever a trouble condition exists on one of the zones in the KFRTI-20/52 Panel, THE PANEL'S TRANSMITTER WILL SEND THREE ROUNDS OF "TROUBLE" MESSAGE.

In addition to transmitting a zone Alarm message or zone Trouble condition, the KFRTI-20/52 Panel will transmit a "TROUBLE" message when the trouble occurs for any of the operational status conditions listed in the FIRE ALARM CONTROL PANEL OPERATION, under TROUBLE CONDITION. Each time the KFRTI-20/52 Panel reports with a test message it also will report with a trouble message, until the trouble condition is clear. A low battery condition will be transmitted as a "LOW BATTERY" signal to the Radio Base Receiving Station.

In the event of primary power failure, a 90 second time delay will occur before "TROUBLE" is sent.

When the stand-by battery capacity has dropped to approximately 20%, a “LOW BATTERY” message will be sent. If the stand-by batteries are not serviced, and the stand-by battery capacity continues to drop to 0%, the KFRTI-20/52 Panel will transmit a shutting down “LOW BATTERY” signal before the panel shuts down completely. This shut-down feature of the KFRTI-20/52 Panel preserves the stand-by batteries so they may be reused when primary power is restored.

Another option offered is a two-way radio interrogation feature which provides on-demand status reporting from any KFRTI-20/52 Panel. The KFRTI-20/52 Panel also offers the capability of remote control operation for equipment and/or auxiliary devices which may be connected to the KFRTI-20/52 Panel by using the optionally available auxiliary relay modules and decoder units.

This remote start/shut-down feature offered for both the one-way and two-way radio KFRTI-20/52 Panel utilizes the optional “Auxiliary Relay Module” to connect auxiliary devices for automated function control such as turning on fire pumps, releasing extinguishing agents, HVAC control, electrical shunt trip circuits, remote alarm annunciation and other requirements. By adding the “Modular Decoder Unit” to the KFRTI-20/52 Panel auxiliary functions can be individually addressed and activated remotely on demand from the radio base receiving station using two-way interrogation.

APPROVALS

All Model KFRTI-20/52 Panels including the radio transmitter reporting option are Factory Mutual listed and designed to comply with all applicable NFPA standards (NFPA 72 and 1221) while providing the capability of monitoring up to 52 emergency zones. Both the KFRTI-20 and KFRTI-52 Panels radio options are FCC Type Accepted.

In addition, King-Fisher KFRA and KFRA-C Base Receiving Stations are Factory Mutual listed for reception of AM or FM coded Radio Transmissions on frequencies in the 72-76MHz, 132-174 MHz, and 450 MHz range.

FUNCTIONS

FUNCTION	INDICATOR	LOCATION	CONDITION WHEN LIT
Zone Alarm	Red LED	Zone Card (s)	Zone in Alarm
Zone Trouble	Amber LED	Zone Card (s)	Zone in Trouble
Common Alarm	Red LED	Alarm Control Board	One or more zones in alarm
Common Trouble	Amber LED	Alarm Control Board	*One or more zones in trouble
Power On	Green LED	Alarm Control Board	Primary power is on
CPU Busy	Green LED	CPU Board	CPU is processing instructions
Transmitting	Green LED	Transmitter Board	Transmitter sending message

The KFRTI-20/52 Panel has seven LED status indicators five for the Control Panel Section, one for the CPU board (optional) and one for the transmitter (optional).

The following table lists the indicator description and condition when lit for the KFRTI-20/52 Panel

and the optional radio fire alarm reporting feature.

*Or, one of the following conditions: CONTROL SWITCH ABNORMAL, LOW OR NO BATTERY, LOSS OF PRIMARY POWER, POWER SUPPLY FAILURE, CPU FAILURE, CPU BOARD NOT SEATED, CIRCUIT BOARD NOT SEATED, NOTIFICATION APPLIANCE CIRCUIT

All indicators illuminate with the exception of the CPU and transmit LED during a lamp test. This is because neither of these functions are control panel features. Each individual zone has its own set of zone alarm and trouble LED indicators; so the total number of visual indicators will depend on the number of zones installed in the KFRTI-20/52 Panel.

All KFRTI-20/52 Panel indicators with exception of “CPU Busy” and “Transmitting” are visible through the KFRTI-20/52 annunciator window. Quick visual inspection of the window reflects the exact current status of the KFRTI-20/52 Panel without opening the panel door.

SYSTEM CAPABILITY

KFRTI-20/52 Panels can be installed; as a basic fire alarm panel, a fire suppression panel, or as a radio alarm panel in an existing or new Radio Fire Alarm Reporting System using King-Fisher Compatible Radio Base Receiving Stations. For additional information on adding KFRTI-20/52 Panels to your existing King-Fisher Radio Fire Alarm Reporting System, please consult the factory.

TYPICAL KFRTI-20/52 SPECIFICATION

GENERAL DESCRIPTION

The FACP shall be self-contained and designed for detecting the operation of any approved signal initiating device, indicating by annunciator LEDs the area of the alarm and/or trouble condition, and operate all alarm and auxiliary devices.

The FACP shall have a capacity of 1-52 zones with a maximum expansion of up to 52 zones. The FACP must be capable of accepting zone cards in increments of four zones per card for class B applications, or two zones per card for class A application. Additionally, the FACP shall (have) (be optionally capable of) automatic radio reporting for alarms, supervisory, and trouble conditions with “True Interrogate” test status reporting for use with an approved compatible radio alarm receiving unit.

PANEL CONSTRUCTION

The FACP housing shall be a NEMA 3R rainproof locked enclosure. All electronic boards shall be mounted on a removable sub-plate. A lexan viewing window displaying common and zone status conditions shall be mounted on the front door. All electronic circuitry shall be solid state C-MOS Logic installed on top quality epoxy glass printed circuit boards with gold plated connectors for all ribbon, edge, and battery connectors. The operating temperature range of all components shall be -40 degrees F to +140 degrees F (-40 degrees C to +60 degrees C).

PANEL OPERATION

The FACP shall, as a minimum, contain the following features: When one or more of the zone initiating devices latches the panel into an alarm condition, the FACP shall begin an alarm condition sequence which will pulse the respective individual zones RED alarm LED, pulse the common RED alarm LED activate the notification appliances, and (Optionally, transmit the appropriate zone(s) to the central receiving unit).

The FACP shall provide full supervision of the field wiring for each initiating zone and each notification appliance circuit. A detected fault shall light the Amber trouble LED for the zone in trouble, pulse the Amber common trouble LED on the alarm control board, and pulse the internal panel trouble buzzer, and (Optionally, transmit the appropriate zone(s) to the central receiving unit).

In addition to the above, the FACP shall monitor its own operational status for; system trouble, improper board insertion, control switches or cables abnormal, notification appliance circuit trouble (opens or short circuits), ground fault condition, loss of primary power, and battery circuit trouble.

CONTROL FUNCTIONS

A minimum of six controls shall be available for silencing, restoration, and testing of the FACP. The six controls shall be alarm silence, trouble silence, acknowledge, reset, drill, and lamp test.

EMERGENCY BATTERY BACK UP

The FACP shall operate directly from 120 VAC line voltage, and in the event of AC power outage automatically switch to a 24 volt DC back-up battery power supply. Loss of AC power shall not cause a trouble signal until 1-2 minutes after failure. The emergency battery back-up system shall consist of a two-stage programmable constant current recharging system built into the panel power supply. Batteries shall be of the rechargeable sealed lead acid type.

OPTIONAL RADIO FIRE ALARM REPORTING

The FACP shall be easily upgraded from its basic fire alarm configuration to a radio reporting system by adding an antenna, coaxial cable, and two modular plug-in printed circuit boards.

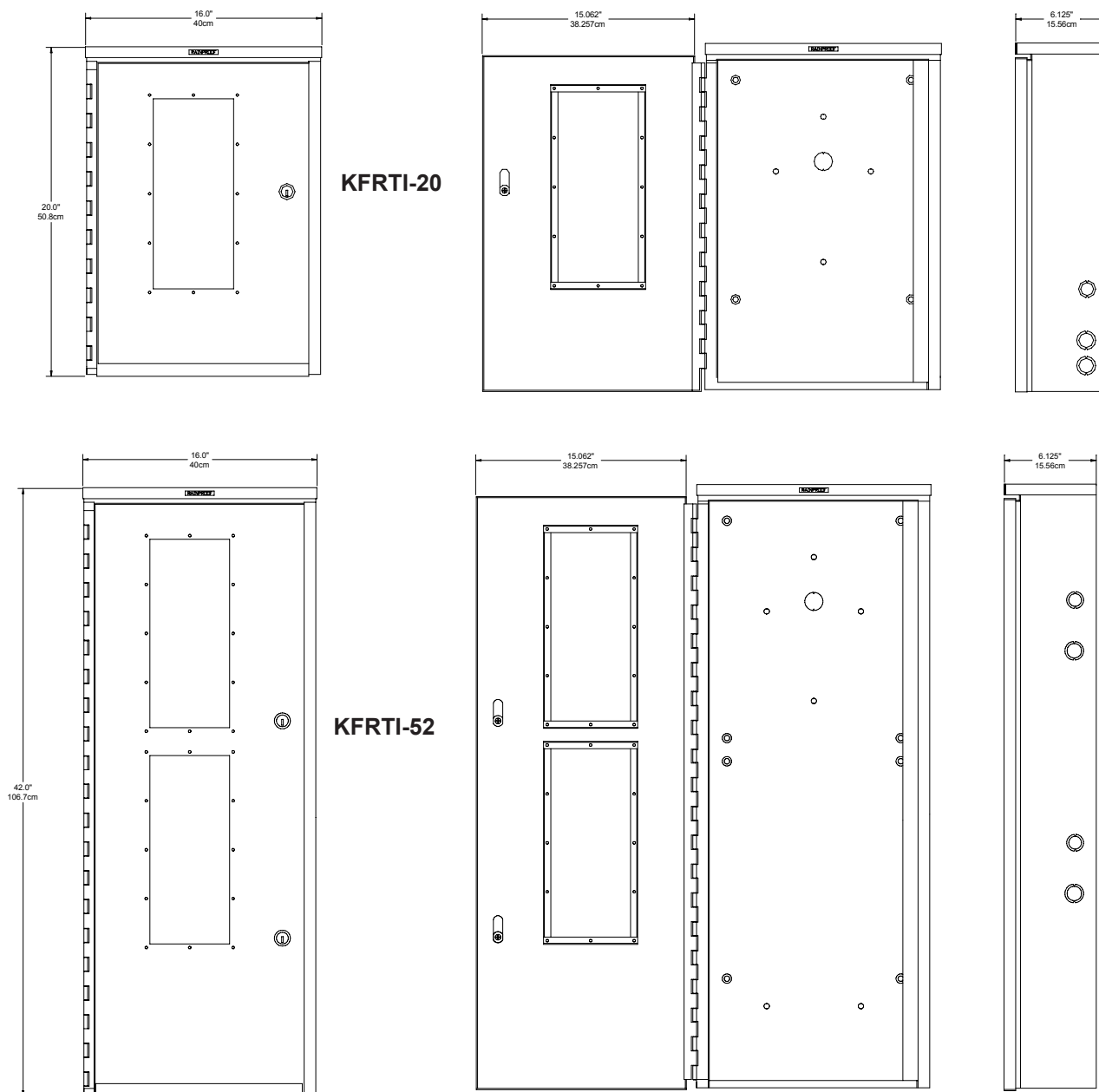
APPROVALS

All FACP's furnished shall be Factory Mutual approved/listed and be designed to comply with all applicable NFPA standards (NFPA 72 and 1221).

In addition, the FACP's are to be FCC type accepted, California Fire Marshal Listed and Factory Mutual approved and listed for reception of AM or FM coded radio transmissions on frequencies in the 72-76 MHZ, 132-174 MHZ and 400-450 MHZ range.

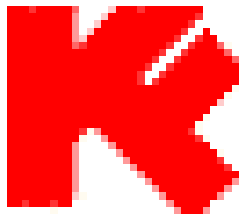
The FACP's shall be King-Fisher Company model KFRTI-WP-20/52.

KFRTI-20/52 PANEL (NEMA 3R)



ZONES	PART NO.	WEIGHT		CUBE	
20	KFRTI-20-20	42 lbs	19 Kg.	1.1 Ft. ³	.031M ³
52	KFRTI-52-52	75 lbs.	34 Kg	2.3 Ft. ³	.065M ³

NOTE: Installed in a NEMA 3R Rainproof enclosure, each unit includes a Time Delay Trouble Output, Individual Zone Alarm and Trouble L.E.D. Indicators, and an integral Battery Charger that services the KFRTI-20/52 Panel Batteries. Batteries must be ordered separately. Standard color of the NEMA 3R enclosure is Red.



KFRTI-20/52
CLASS A

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 **f** 847 • 255 • 1507 **e-mail** sales@kfco.com **Internet** www.kfco.com

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATION IN DIRECT SUNLIGHT AND IN RAIN RUNOFF PATHS.
- DO NOT INSTALL CONDUIT INTO THE TOP SURFACE OF THE CABINET.

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR ZONE INPUTS, ANTENNA, AND AC POWER
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AN ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

INSTALLATION OF ENCLOSURE

GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

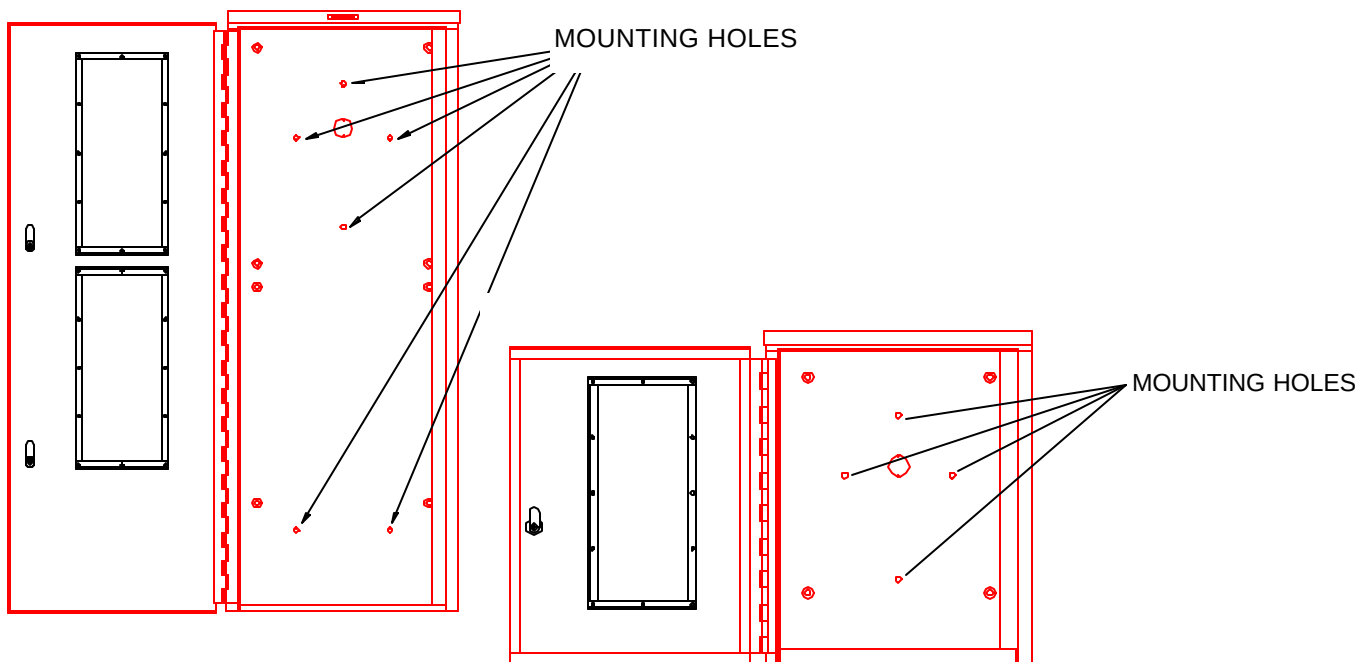
Read all instructions first.

Do not connect batteries or apply power until wiring and installation is complete and checked.

King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, The National Electric Code, the Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.

Locate a suitable position and structure for mounting the enclosure.

1. REMOVE the subplate(s) assembly from the enclosure by removing the four (4) nuts and washers (KFRTI-20) (8) nuts & washers KFRTI-52 panel
2. REMOVE the mouting hole knockouts located at the rear of the enclosure.



3. MOUNT the enclosure on a wall using appropriate hardware shown. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.

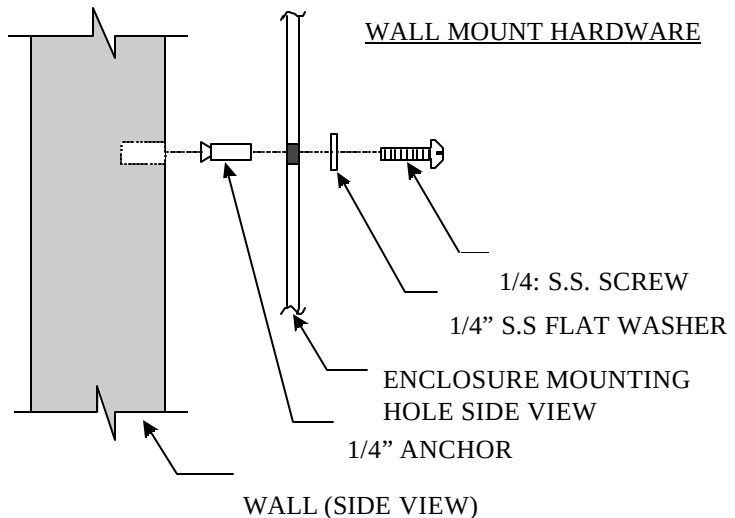
4. Run all conduit necessary to the enclosure. Conduit must NOT enter through the top of the enclosure. Knockouts are provided on the sides and bottom of the cabinet. DO NOT remove knockouts with sub-plate(s) installed. Attach conduit to the enclosure using water-proof fittings with star locknuts. DO NOT use reducing washers.

These separate conduit runs are required:

AC Power

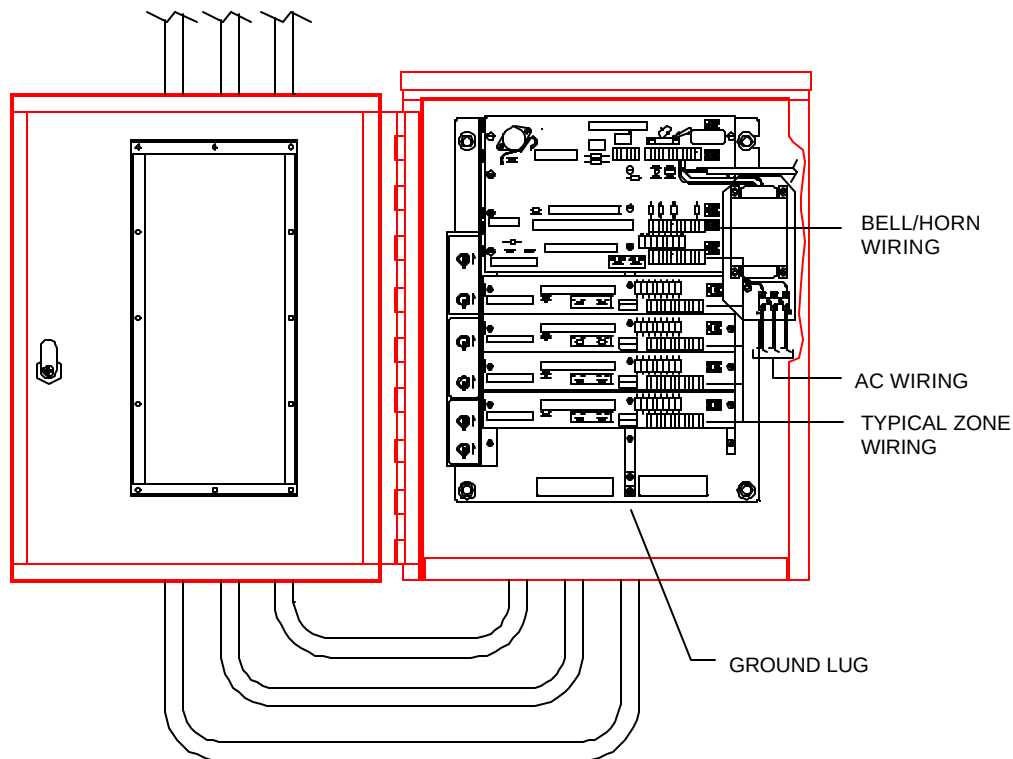
Zone Inputs and Audibles

Antenna Coax Cable



5. Reinstall sub-plate(s) and secure with 4 nuts and washers (8 nuts & washers in KFRTI-52 panel).

6. Remove all PC boards. Slide each circuit board out, one at a time, and lay them down in order on a clean, dry, non-conductive surface. Keep all circuit boards and zone boards in sequence as they are individually coded for proper transmission.

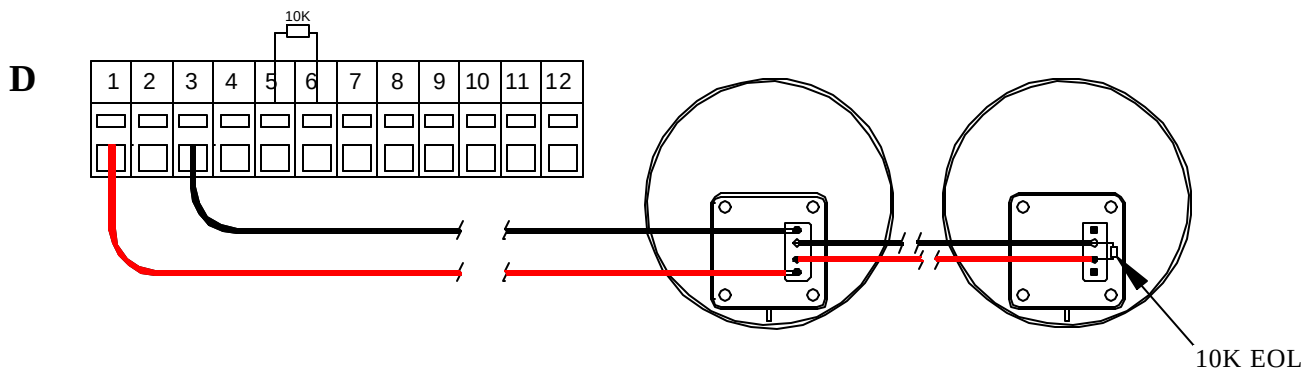


PANEL WIRING

All wiring must be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction. Reference drawing 76807, 76810, 76803-1, and 76806-1 while reading the following instructions.

NOTE: Dress field wiring around the bottom and right sides of the enclosure.

7. Pull AC wiring into the cabinet. The KFRTI-20/52 panel operates on 120 VAC. 50/60Hz. single phase power. Connect HOT and NEUTRAL to terminals. This panel requires a 15 Amp/120 VAC Circuit Breaker or fused circuit to be installed external to the panel. Connect Earth ground at the bottom of the sub-plate(s) to the ground lug(s) provided.
8. Pull Alarm Indicating Wiring into the panel. Connect Bell/Horns to terminals D1 and D3 and observe proper polarity. If the alarm indicating circuit (bells, horns, sirens, etc.) wiring is longer than 100 feet from the panel to EOL device.



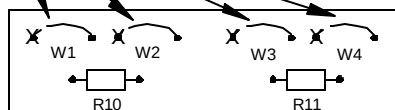
9. Pull all zone wiring into the enclosure. Zone wiring must be connected as per specifications and in accordance with King-Fisher instructions and drawings.

When wiring line powered smoke detectors the positive (+) zone terminal (1&4;5&8) must connect to the positive (+) terminal of each detector. A maximum of 2.5 mA. can be drawn from each zone.

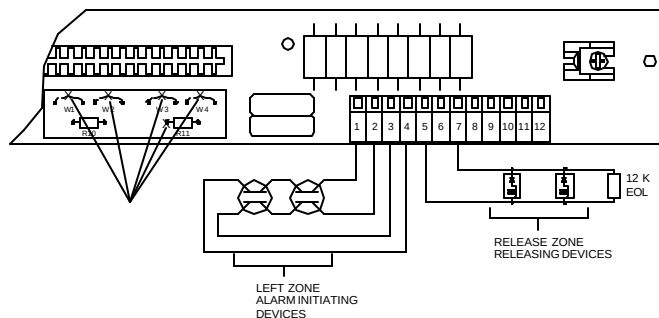
Properly supervised wiring is series-parallel connected with NO separate runs or “T” taps permitted.

The following diagrams depict Class “A” wiring for use with either the dual zone or the single zone with release Class “A” boards, when applicable. Jumpers W1,W2 and resistor R10 are for programming the Left Zone. Jumpers W3,W4 and resistor R11 are for programming the Right Zone (Dual Zone Card Only). Cut one side of resistors and jumpers as shown and bend back leaving one leg attached to the board.

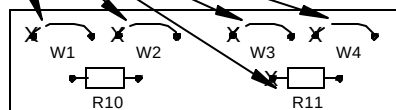
Cut One Side of W1, W2, W3, W4 to Activate Class "A" Zone Wiring



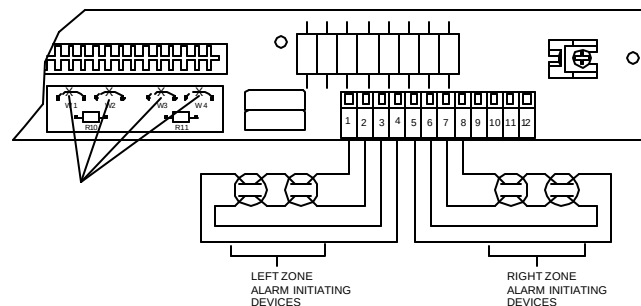
ZONE PROGRAMMING
DUAL ZONE CLASS "A" BOARD



Cut One Side of W1, W2, W3, W4 & R11 to Activate Class "A" Zone and Release Wiring

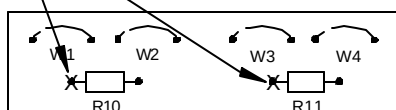


ZONE PROGRAMMING
SINGLE ZONE W/RELEASE CLASS "A" BOARD

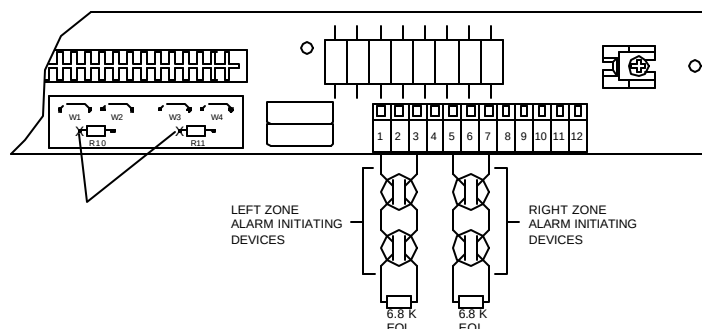


The following diagrams depict Class "B" wiring for use with either the dual zone or the single zone with release Class "A" boards, when applicable. Jumpers W1,W2 and resistor R10 are for programming the Left Zone. Jumpers W3,W4 and resistor R11 are for programming the Right Zone (Dual Zone Card Only). Cut one side of resistors and jumpers as shown and bend back leaving one leg attached to the board.

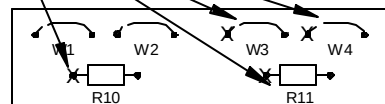
Cut One Side of R 10 and R 11 to Activate Class "B" Zone Wiring



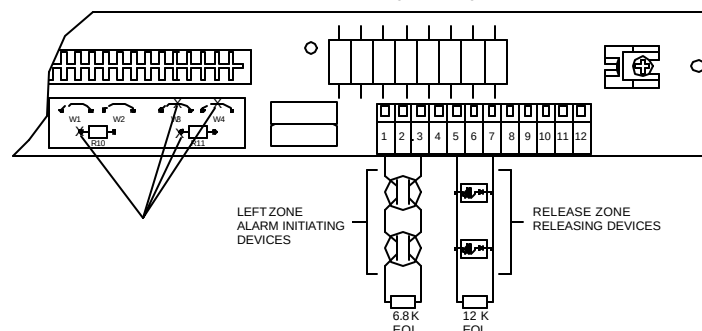
ZONE PROGRAMMING
DUAL ZONE CLASS "A" BOARD



Cut One Side of R10, R11, W3 and W4 to Activate Class "B" Zone and Release Wiring



ZONE PROGRAMMING
SINGLE ZONE W/RELEASE CLASS "A" BOARD



10. Install Antenna, Reference drawing 76504 or 76506 depending on the type of antenna being installed.
11. After connection of field wiring, test the panel using the Testing Procedure starting on the following page.

Caution: Do not apply power to the panel, except as directed in the testing procedure.

The tests should be performed by persons who are familiar with King-Fisher radio systems. Refer to the KFRTI-20/52 Class “A” Operations manual if you are unfamiliar with the product.

This procedure only tests the Panel locally. It is highly recommended that all detectors and pull stations be activated before final approval of the system.

VISUALLY INSPECT:

Check Terminal Connections - All wiring should be terminated at a terminal block on one of the Mother-boards. Tug on the wires to be sure they are secure and look for exposed metal wires sticking out of a terminal which might cause a short or later corrode. AC wires should be all the way into the terminal block (No bare metal exposed). Be sure the ribbon cable is properly connected to each mother board and zone mother board (the red stripe is on the left).

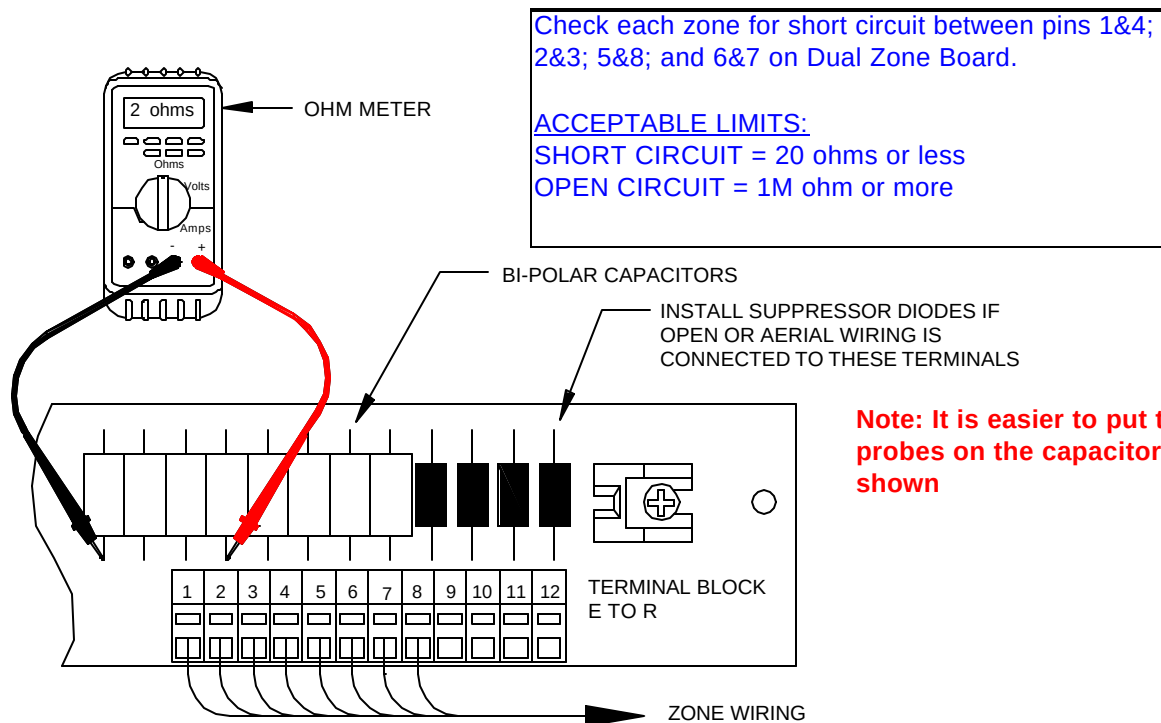
Check BNC Connection - Gently twist connector while holding cable secure. Connector should not rotate or come loose. The center tip should be flush with the outer sheath for good contact with the transmitter connector. Look for shorts between the ground sheath and the center conductor. Use an Ohm Meter to check the connector for shorts (Disconnect the coax from the antenna). Look for strayed ground wires sticking out of the connector.

READ CLASS “A” ZONE WIRING:

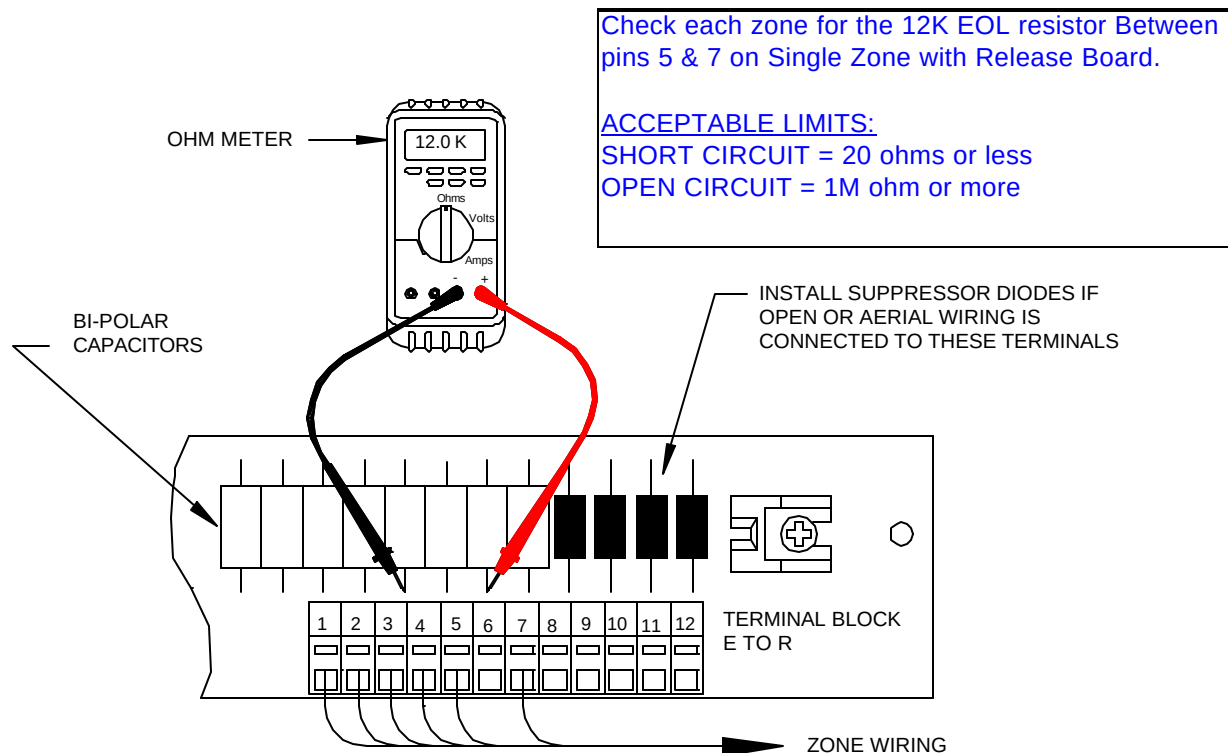
Check For Alarm or Open Circuit - Use an ohm meter to check for OPEN CIRCUITS between pins [1 and 4] and also pins [2 and 3] of terminal blocks E to R. During normal operation, these lines should indicate short circuit. Be sure the zone boards are removed, and the meter leads are making good contact with the zone wires or bi-polar capacitors as shown. There is no need to check the spare zones with no field wiring connected.

Check Zone For Short Circuit - Use the ohm meter to check for SHORT CIRCUITS between pins [1 and 2], [1 and 3], [2 and 4], and [3 and 4] of terminal blocks E to R. These lines should normally indicate 6.8K resistance.

Check Zone For Ground Fault Condition - Use the ohm meter again to check for open circuit (NO shorts) between chassis ground and each zone wire. Testing between ground and zone wires should indicate open circuit.



Check Releasing Devices For Shorts or Open Circuits - If devices are connected, use a digital ohm meter to check for the 12K EOL resistor across releasing device pins [5 and 7] of terminal blocks E to R. Be sure the Zone Board is removed, and the meter leads are making good contact with the two wires.

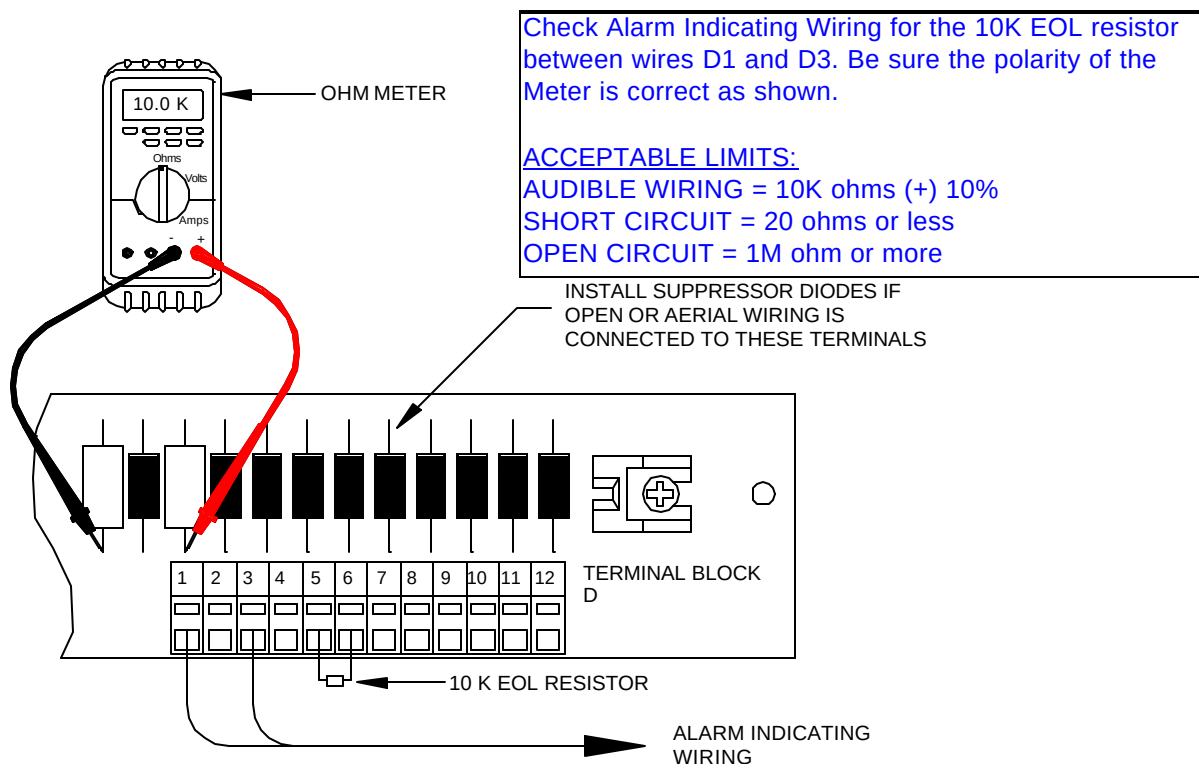


READ ALARM INDICATING WIRING:

Check For Short or Open Circuit - If horns or bells are connected, use a digital ohm meter to check for the 10K EOL resistor across audible terminals D1 and D3. Be sure the Alarm Control Board is removed, and the meter leads are making good contact with the two wires.

Check For Ground Fault Condition - Also check for open circuit (No shorts) between chassis ground and terminals D1 and D3.

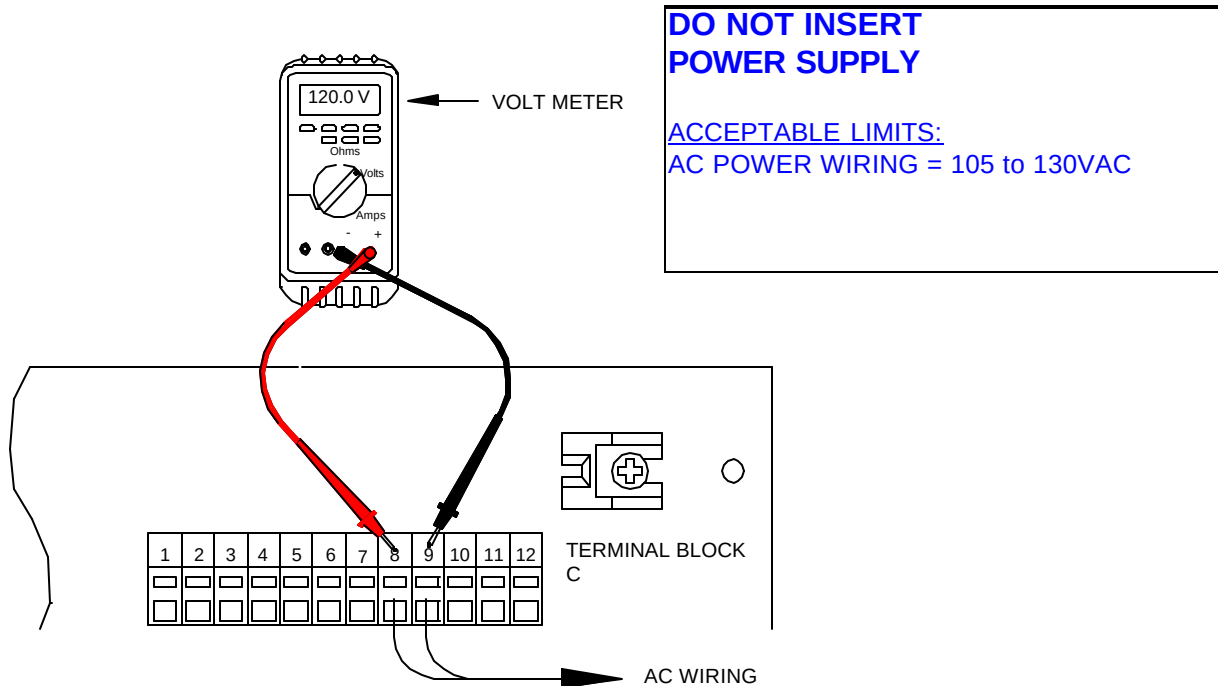
NOTE: Be sure there is a 10K EOL resistor across pins D5 and D6, or the panel will indicate trouble.



APPLY AC POWER TO MOTHER BD:

NOTE: Check the color of the wiring first. Black=Hot, White=Neutral, Green=Ground

Check Polarity - Switch on the AC power going to the Mother Board, and check terminals C8, C9, and C10 which are Hot, Neutral, and Ground respectively. The ground connection should be made at the ground lug on the bottom of each subplate. The AC power connection and polarity must be correct, otherwise the power supply will be severely damaged. Switch off AC power before proceeding.



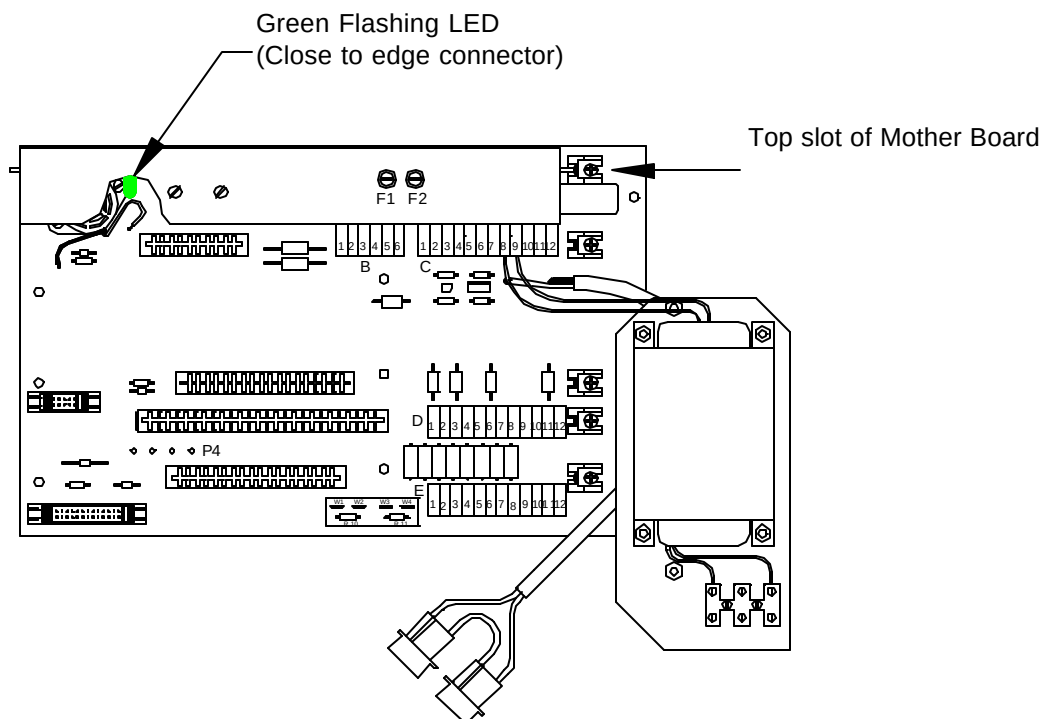
REMOVE POWER AND INSERT POWER SUPPLY:

Remove power at the circuit breaker. Use a flat blade screwdriver to remove both fuses (F1 and F2), and then slide the power supply into the top slot of the Mother Board. The power supply should snap firmly into place.

INSTALL FUSE F2:

F2 is a 120 volt, 3 Amp, slo-blo fuse.

Switch on AC Power - Turn on the power at the circuit breaker. Check For Power “ON” - Inside the Power Supply is a Green LED which will begin flashing whenever AC or Battery Power is applied. It should begin flashing after AC Power is switched on.

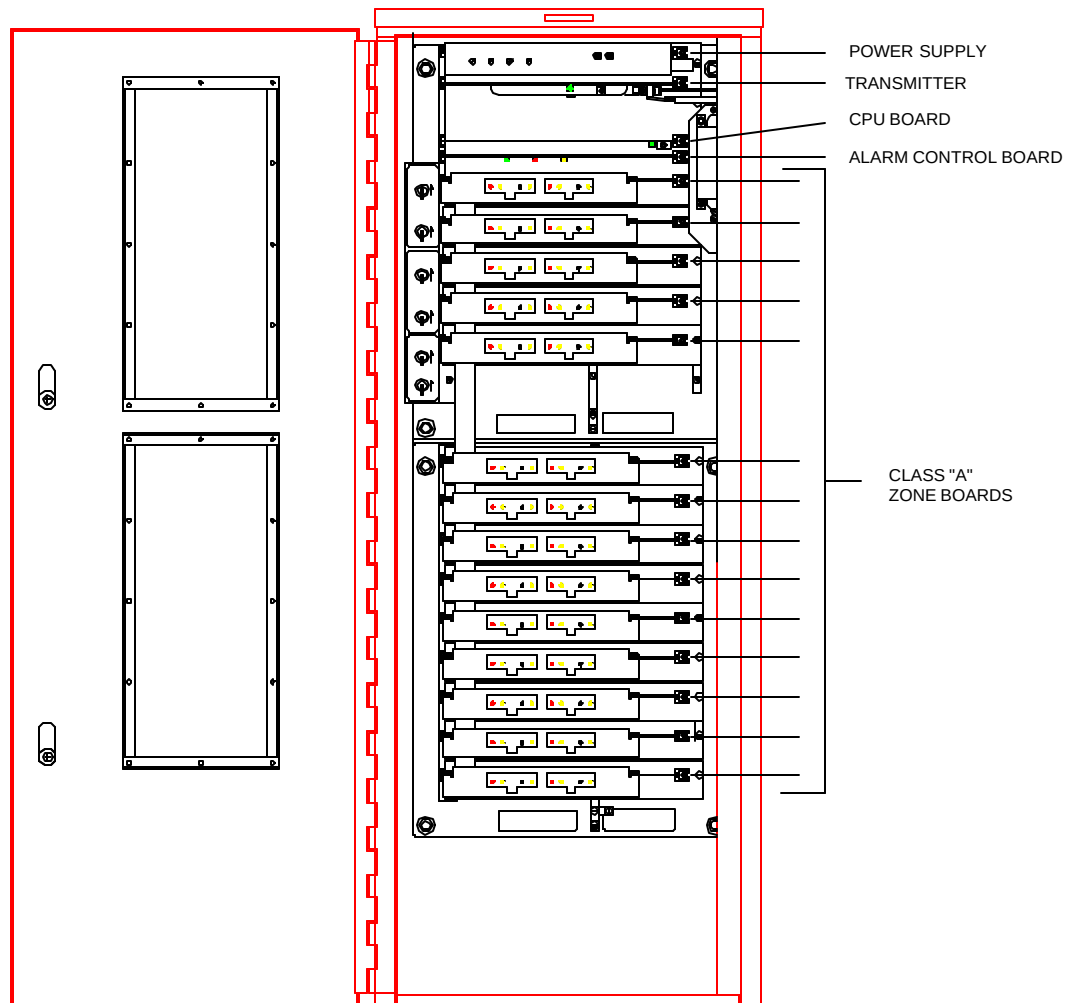


REMOVE FUSE F2:

Check For Power “OFF” - The Power Supply’s flashing LED should turn off after removing fuse F2.

INSERT ALL PCB’S

BE SURE NO POWER IS APPLIED. Slide each Printed Circuit Board (PCB) one at a time into its correct position. Zone Cards are not interchangeable; replace in the same order as removed. Reference the zone card programming sheet at back of manual. Push boards firmly into place for proper seating into the edge connector. Also attach the antenna coax connector to the transmitter (if applicable). Remove the dummy load if it is still attached to the transmitter.



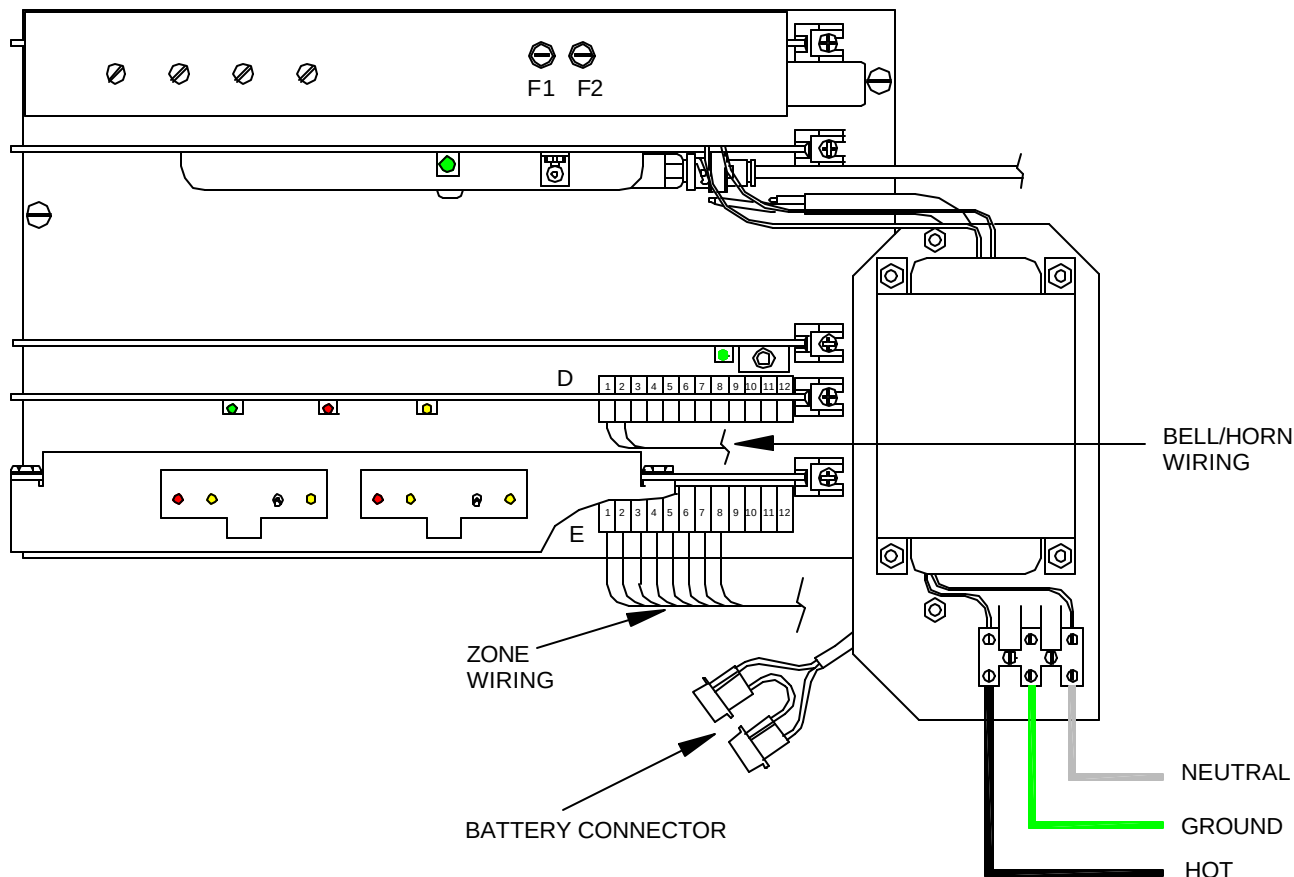
INSTALL AC POWER AND FUSE F2:

Check For Power “ON” - The green AC power LED on the Alarm Control Board should illuminate. The common trouble LED and internal buzzer will be pulsing because the batteries are not connected. Use the “Trouble Silence” switch to silence the buzzer.

INSTALL BATTERIES AND FUSE F1:

The battery connectors are polarized, so do not try and force them together. Fuse F1 is a 28 volt, 3AG, 4 Amp, normal-blow fuse.

Check For Normal Condition - After both batteries are connected, AC Power is applied, and the trouble silence switch is in normal (down) position, the panel should be completely out-of-trouble. Only the AC Power LED is on. This is the “Normal Operating Condition” of the KFRTI-20/52 Panel.



ALARM ALL ZONES:

Trip one zone at a time locally at the panel by shorting the terminals with a 12 inch piece of single strand wire bent in half with both ends stripped. Place the shorting wire across terminals [1 and 2] or [3 and 4] to trip each Class “A” zone. Reset each alarm and check the receiver for the proper reception before going to the next consecutive zone.

Check the LED Condition - The Common Alarm and Each Zone Alarm tripped should flash until acknowledged.

Check that the Alarm Indicating Devices are Operating - Each alarmed zone should operate all horns, bells, etc. connected to the panel.

Check the Transmission (if applicable) - Check the base receiving station and confirm that each alarm tripped was received and processed. Also check that the green transmit LED and the green CPU LED came on during these tests.

OPERATE SWITCHES:

Alarm a zone and check the following switches:

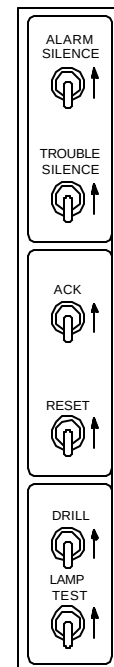
Check “Alarm Silence” Switch - This switch will turn off all audible/visual alarm indicators and the internal buzzer. Subsequent zones alarmed will reactivate these devices.

Check “Acknowledge” Switch - This switch will change all flashing alarm LEDs to a non-flashing steady state.

Check “Reset” Switch - This switch will turn off all alarm LEDs, whose initiating devices are no longer in alarm condition. It will also reset any smoke detectors which are powered by the panel. The panel will continue processing all alarms and troubles loaded into the CPU’s memory.

Check “Drill” Switch - This switch will operate all alarm indicating devices for testing the panel’s bell/horns. No message is transmitted when using the Drill switch.

Check “Lamp Test” Switch - This switch will illuminate all alarm and trouble LED indicators. The CPU and transmitter LEDs will not light during lamp test.



GO TO ANY OF THE DEVICES:

Have the installer open one of the initiating devices (Pull Station, detector, etc.) to access the field wiring.

Check that the Wiring is Correct - There should be two wires coming into the detector box, and two wires going out to the next detector or the panel itself.

Check For Open Circuit Trouble Detection - Disconnect one of the wires and check the panel for zone trouble and the base receiving station for Trouble 2 Message. Trip the alarm with the wire disconnected. Reconnect the wire.

Check For Ground Fault Trouble Detection - Use the shorting wire to short one of the wires to ground. Again, check the panel for trouble and the base receiving station for Trouble 2 Message.

Check For Alarm and Transmission - Trip the initiating device by performing an actual alarm test under normal conditions. e.g. Blow smoke into a smoke detector.

PRESS “TEST” SWITCH:

The “TEST” Switch is located on the right side of the CPU board.

Check For “TEST” transmission to Receiver - Check the base receiving station for the correct message received.

ANTENNA SWR (IF APPLICABLE):

Only perform this section if a SWR meter is available and you know how to use it.

Check the Forward Power - Connect a Bird watt meter in-line between the transmitter and antenna. Turn the slug so that the arrow is pointing forward (towards the antenna). Press the TEST switch. The meter should momentarily read 0.5 to 1.0 watt during transmission.

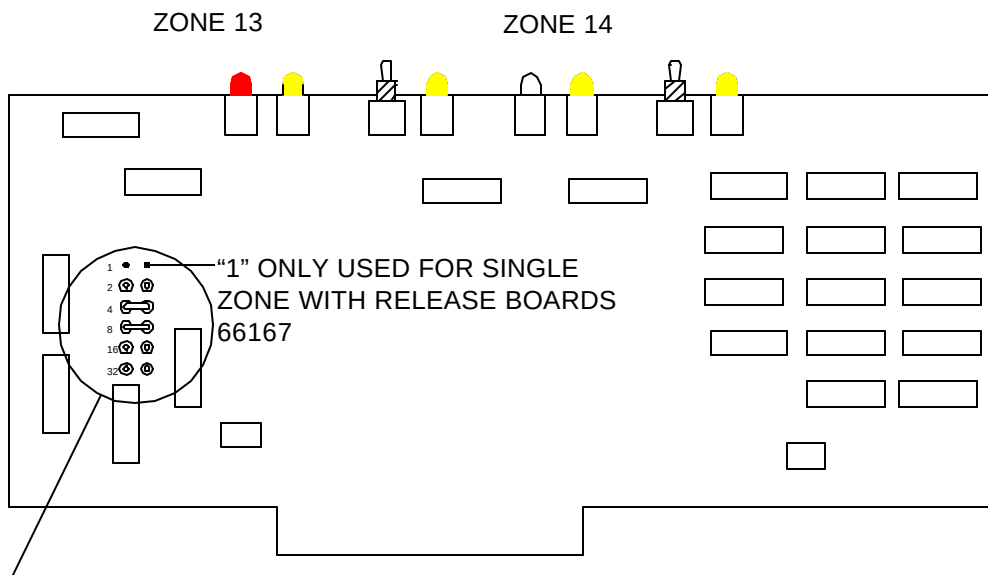
Check the Reflected Power - Turn the slug towards the transmitter. Press the TEST switch again. The meter should read 0 watts if the coax, connectors, and antenna are assembled correctly.

KFRTI-20/52 CLASS "A" ZONE BOARD PROGRAMMING

Remove power (AC and Battery) before removing or installing any of the circuit boards. Zone boards must be coded as shown below in order to operate correctly. Do Not interchange zone board positions. Jumper plugs inserted are additive. The sum of the plug positions (32, 16, 8, 4,2,&1) plus one(1) is the first zone number of that card. E.G.:

For zones 13 & 14, plugs should be inserted in positions 4 and 8; $4 + 8 + (1) = 13$.

NOTE: The programming shown below and on the following page is for Dual Zone and Single Zone with Release Class "A" boards. Dual Zone boards' first zone MUST be an odd number (1, 3, 5, 7, - 51). Some zone numbers may have to be skipped when intermixing these two types of zone boards.



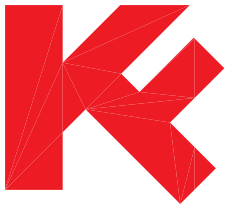
ZONE BOARD PROGRAMMING

KFRTI-20/52 CLASS "A" ZONE BOARD PROGRAMMING

ZONE 1 (&2) 1 2 4 8 16 32	ZONE 5 (&6) 1 2 4 8 16 32	ZONE 9 (&10) 1 2 4 8 16 32	ZONE 13 (&14) 1 2 4 8 16 32	ZONE 17 (&18) 1 2 4 8 16 32
ZONE 2 1 2 4 8 16 32	ZONE 6 1 2 4 8 16 32	ZONE 10 1 2 4 8 16 32	ZONE 14 1 2 4 8 16 32	ZONE 18 1 2 4 8 16 32
ZONE 3 (&4) 1 2 4 8 16 32	ZONE 7 (&8) 1 2 4 8 16 32	ZONE 11 (&12) 1 2 4 8 16 32	ZONE 15 (&16) 1 2 4 8 16 32	ZONE 19 (&20) 1 2 4 8 16 32
ZONE 4 1 2 4 8 16 32	ZONE 8 1 2 4 8 16 32	ZONE 12 1 2 4 8 16 32	ZONE 16 1 2 4 8 16 32	ZONE 20 1 2 4 8 16 32

ZONE 21 (&22) 1 2 4 8 16 32	ZONE 25 (&26) 1 2 4 8 16 32	ZONE 29 (&30) 1 2 4 8 16 32	ZONE 33 (&34) 1 2 4 8 16 32
ZONE 22 1 2 4 8 16 32	ZONE 26 1 2 4 8 16 32	ZONE 30 1 2 4 8 16 32	ZONE 34 1 2 4 8 16 32
ZONE 23 (&24) 1 2 4 8 16 32	ZONE 27 (&28) 1 2 4 8 16 32	ZONE 31 (&32) 1 2 4 8 16 32	ZONE 35 (&36) 1 2 4 8 16 32
ZONE 24 1 2 4 8 16 32	ZONE 28 1 2 4 8 16 32	ZONE 32 1 2 4 8 16 32	ZONE 36 1 2 4 8 16 32

ZONE 37 (&38) 1 2 4 8 16 32	ZONE 41 (&42) 1 2 4 8 16 32	ZONE 45 (&46) 1 2 4 8 16 32	ZONE 49 (&50) 1 2 4 8 16 32
ZONE 38 1 2 4 8 16 32	ZONE 42 1 2 4 8 16 32	ZONE 46 1 2 4 8 16 32	ZONE 50 1 2 4 8 16 32
ZONE 39 (&40) 1 2 4 8 16 32	ZONE 43 (&44) 1 2 4 8 16 32	ZONE 47 (&48) 1 2 4 8 16 32	ZONE 51 (&52) 1 2 4 8 16 32
ZONE 40 1 2 4 8 16 32	ZONE 44 1 2 4 8 16 32	ZONE 48 1 2 4 8 16 32	ZONE 52 1 2 4 8 16 32



KFRTI-20/52 CLASS "A"

OPERATIONS MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

GENERAL

The KFRTI-20/52 Class “A” Panel is capable of monitoring and transmitting up to 52 zones of detection devices and switch contacts. It also monitors itself for panel trouble and sends a daily test message (when used as a radio transmitter) including the panel’s current status.

This Operations manual is divided into five sections:

CONTROLS AND INDICATORS - Gives a brief description of each switch, LED, and the internal buzzer.

ALARM CONDITION - Describes what happens when the panel detects an alarm.

TEST CONDITIONS - Describes the two types; Manual and Automatic Test.

TROUBLE CONDITIONS - Describes what happens when a panel detects trouble.

SELECTABLE OPTIONS - Describes the programmable options available with Class “A” panels.

CONTROLS AND INDICATORS

Operation of the King-Fisher KFRTI-20/52 Class “A” Panel is simple and free from complicated controls and indicators. The control panel, switches, and LED indicators have been human engineered for ease of operation.

SWITCH CONTROLS

There are nine possible front panel controls which are grouped in four categories; Silencing, Restoration, Disconnect and Testing. Refer to the Illustration on the following page, while reading the descriptions below.

Silencing Switches:

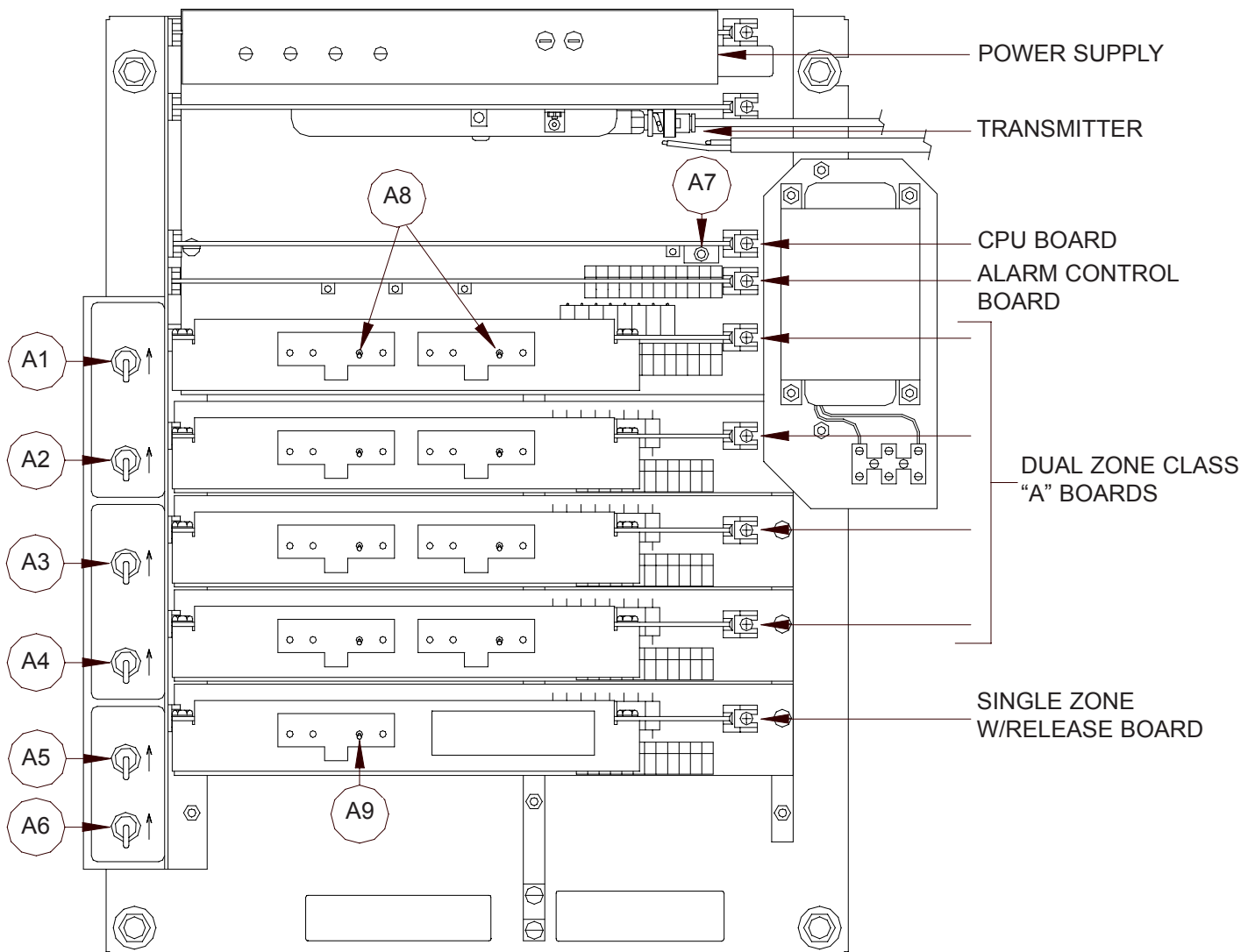
ALARM SILENCE (A1) - Momentary-contact switch which silences all alarm indicating devices (bells, horns, strobes, etc.) and the internal buzzer subsequent to a zone alarm. The indicating devices will be re-triggered by succeeding zone alarms.

TROUBLE SILENCE (A2) - Two-position switch which silences trouble audible devices and the internal pulsing buzzer subsequent to a trouble condition.

Restoration Switches:

ACKNOWLEDGE (A3) - Momentary-contact switch which changes all flashing red LEDs in alarm, to a non-flashing steady-state. Any subsequent alarm will cause the corresponding zone alarm and common alarm LEDs to flash until acknowledged again.

RESET (A4) - Momentary-contact switch which restores all circuits to their normal stand-by condition and resets each zone device unless they are locked in alarm. However, the transmitter will continue sending all



SWITCH CONTROLS

A1 - ALARM SILENCE SWITCH

A2 - TROUBLE SILENCE SWITCH

A3 - ACKNOWLEDGE SWITCH

A4 - RESET SWITCH

A5 - DRILL SWITCH

A6 - LAMP TEST SWITCH

A7 - TEST SWITCH

A8 - DUAL ZONE DISCONNECT SWITCH

A9 - ACTUATOR DISCONNECT SWITCH

messages which were latched into the CPU's memory, until complete.

Testing Switches:

DRILL (A5) - Momentary-contact switch which operates alarm indicating circuits for testing horns, bells, strobes, and the internal buzzer. No message is transmitted when using the Drill switch.

LAMP TEST (A6) - Momentarily illuminates all control panel LED indicators except for the green transmitter LED and the Green CPU Busy LED.

MANUAL TEST (A7) - Push-button located on the right side of the CPU board, used to interrogate the panel and/or transmit two rounds of test (If applicable).

Disconnect Switches:

Dual Zone Disconnect (A8) - Two-position switch (2 per board) located on the Dual Zone Class "A" Board. This switch will disable all alarm processing yet annunciate an alarm condition for purposes of testing, servicing, or isolating a zone. Placing the switch in the up (disconnect) position will cause the disconnect trouble LED to illuminate until the switch is restored to the normal (down) position.

Actuator Disconnect (A9) - Two-position switch located on the Single Class "A" with Release Board. This switch disables alarm processing and also shuts down the release actuator output yet annunciates alarm conditions when present. Placing the switch in the disconnect (up) position causes a zone trouble until the switch is restored to the normal (down) position.

LED INDICATORS

There are nine possible types of LED indicators located on the boards listed below. Refer to the illustration on the following page while reading the descriptions below.

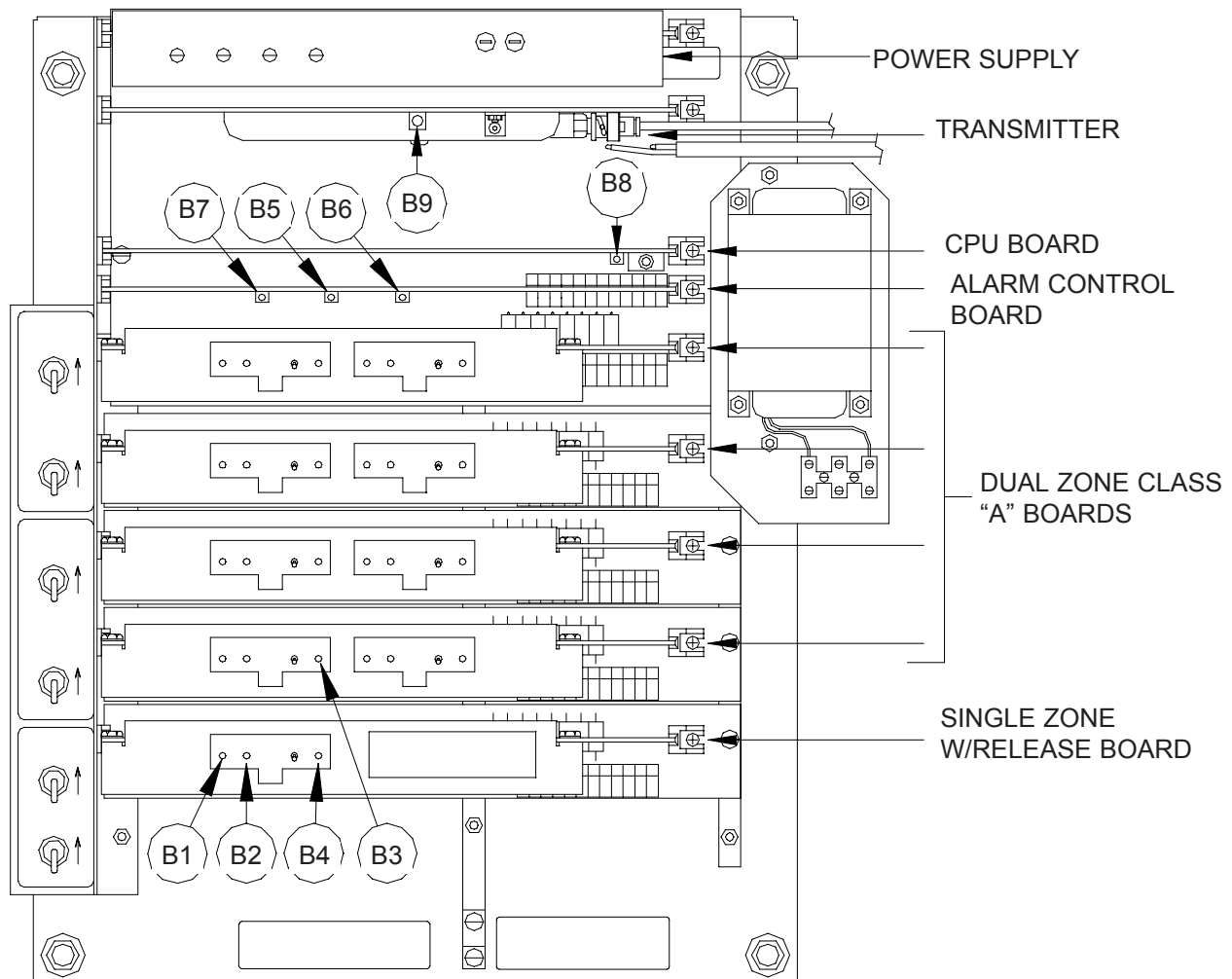
Class "A" Zone Boards LEDs:

ZONE ALARM LED (B1) - Red LEDs (1 or 2 per Single or Dual Zone Class "A" Board) which pulse when a zone has an alarm condition caused by a short placed across the zone wiring. Steadies when acknowledged.

ZONE TROUBLE LED (B2) - Amber LEDs (1 or 2 per Single or Dual Zone Class "A" Board) which illuminate when a zone has a trouble condition caused by a ground fault or broken wire. The LED will stay lit until the trouble is corrected. When a zone trouble condition is detected, the corresponding zone trouble LED and common trouble LED will:

- a. Flash in-phase for an open circuit (broken wire) condition.
- b. Flash out-of-phase for a ground fault condition.
- c. Be steady for both trouble conditions.

DISCONNECT TROUBLE LED (B3) - DUAL ZONE BOARD ONLY - Amber LEDs (2 per board) which annunciate a trouble condition caused by placing the zone disconnect switch in the up position. The



B1 - ZONE ALARM LED (TYPICAL)

B5 - COMMON ALARM LED

B2 - ZONE TROUBLE LED (TYPICAL)

B6 - COMMON TROUBLE LED

B3 - DISCONNECT TROUBLE LED
(Dual Zone Class "A" Board only)

B7 - AC POWER LED

B4 - DISCONNECT TROUBLE LED
(Single Zone with Release Board only)

B8 - CPU BUSY LED

B9 - TRANSMIT LED

LED will continue to flash until the switch is placed in the “Normal” (down) position.

DISCONNECT TROUBLE LED (B4) - SINGLE ZONE WITH RELEASE BOARD ONLY - Amber LED (1 per board) which:

- a. Flashes when the disconnect switch is in the up position.
- b. Is steady when a trouble condition (Ground Fault, Open Circuit, or short circuit) is detected on the release output wiring, regardless of the disconnect switch status.

Alarm Control Board LEDs:

COMMON ALARM (B5) - Red LED which pulses when one or more zones are in alarm. Steadies when acknowledged. Also flashes if re-triggered by a new alarm.

COMMON TROUBLE (B6) - Amber LED which pulses when there is; one or more zones in trouble, a low or no battery condition, loss of primary power, a board failure, or a board not seated properly. The LED will flash until the trouble is corrected.

AC POWER (B7) - Green LED which is lit while primary ac power is on. This LED will not be illuminated while on secondary or battery power only.

CPU Board LEDs (If Applicable):

CPU BUSY (B8) - Green LED which lights while the CPU is processing instructions. Waits until all messages have been sent and panel has timed out before it clears.

Transmitter LEDs (If Applicable):

TRANSMIT (B9) - Green LED which lights while the transmitter is sending a message. Lights momentarily for all three message rounds sent.

SINGLE TONE BUZZER

The internal buzzer is located on the mother board and will sound when one of the following conditions occur.

ALARM - A constant buzzer sound when a zone alarm is tripped or while pressing Drill. Can only be turned off by flipping the alarm silence switch or by resetting the panel.

TROUBLE - A pulsing buzzer sound when a zone or panel is in trouble. Can only be turned off by putting the trouble silence switch in the up position or by correcting the problem.

TRANSMIT - A momentary buzzer sound during a transmission of a message (if applicable).

ALARM CONDITION

An Alarm condition will occur when a detection device or pull station has imposed a short across the zone's field wiring. The alarm detection devices may be a smoke detector, flow switch, heat detector, etc., depending on the system specifications.

INITIAL ALARM CONDITIONS

When an alarm condition exists on one of the zones, the panel will latch into alarm and indicate the following:

1. The respective RED Zone Alarm LED will begin flashing.
2. The RED Common Alarm LED will begin flashing.
3. The Audible Alarm Device(s) will operate (horns, bells, strobes, etc.).
4. The Transmit LED (if applicable) will momentarily light during the three rounds of emergency message transmission.

OPERATOR ACKNOWLEDGMENT

Upon arrival at the panel of an alarm message, the panel operator should perform the following tasks:

1. Observe all annunciated status indicators and record their current states.
2. Press the Acknowledge switch to steady the Alarm LEDs. The common alarm LED will begin flashing again if any other zone alarm is tripped and the alarm indicating devices will be switched on again.
3. If desired, silence the alarm indicating devices by switching the Alarm Silence switch momentarily up.
4. Reset the Panel once all zones are cleared of alarm and the panel has stopped transmitting.

NOTE: All Alarm LEDs can be turned off by pressing the Reset Switch. Any zone whose field devices are locked in alarm will cause these zones to re-alarm.

TEST CONDITIONS

MANUAL TEST

The KFRTI-20/52 Class "A" Panel has a test push-button located on the CPU board which when pressed will transmit two rounds of test plus all current panel status (alarms and troubles) to the base receiving station. The internal buzzer will momentarily sound during each message transmitted, but none of the external alarm indicating devices will operate.

AUTOMATIC TEST

The KFRTI-20/52 Class "A" Panel will automatically transmit two rounds of test plus current panel status each day to show that it is operating correctly. The exact time automatic daily test is sent depends upon the time the panel's internal clock was reset. The test clock can be reset by operating ACKNOWLEDGE and

LAMP TEST switches simultaneously. Once the internal clock is reset, the panel will send TEST after 12 hours, and then TEST every 24 hours thereafter.

The KFRTI-20/52 Class “A” Panel is normally programmed to send three kinds of trouble messages (1, 2, or 3). Trouble message #1 is sent when the panel has a problem with a: PC Board, switch, audible device, power. Trouble message #2 is sent when the panel has a zone or disconnect switch in trouble. Trouble message #3 is sent prior to the panel shutting down due to a low battery voltage being detected while on battery backup. This signal (#3) indicates that the panel will be non-operational at the end of this message.

ZONE TROUBLE

A zone trouble condition occurs when the zone’s field wiring, disconnect switch or zone device has an open state or a ground fault, possibly causing the zone to be inoperative. Whenever a trouble condition does exist on one of the zones, the following will occur:

1. The respective AMBER Zone or Disconnect Trouble LED will illuminate on the Zone Board.
2. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
3. The Audible Trouble Device(s) and Internal Buzzer will pulse.
4. The Transmitter will send three rounds of TROUBLE message #2 (if applicable).

AUDIBLE TROUBLE

The KFRTI-20/52 Panel monitors all alarm indicating devices. When there is a trouble condition on the alarm indicating wiring, the following will happen to the panel:

1. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
2. The Panel’s Internal Buzzer will pulse.
3. The Transmitter will send three rounds of TROUBLE message #1 (if applicable).

PC BOARD TROUBLE

PC Board trouble is when a circuit board is out of place, malfunctioning, or loses it’s power. The following will occur when there is a board trouble:

1. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
2. The Panel’s Internal Buzzer will pulse.
3. The Transmitter will send three rounds of TROUBLE message #1 (if applicable).

SWITCH PANEL TROUBLE

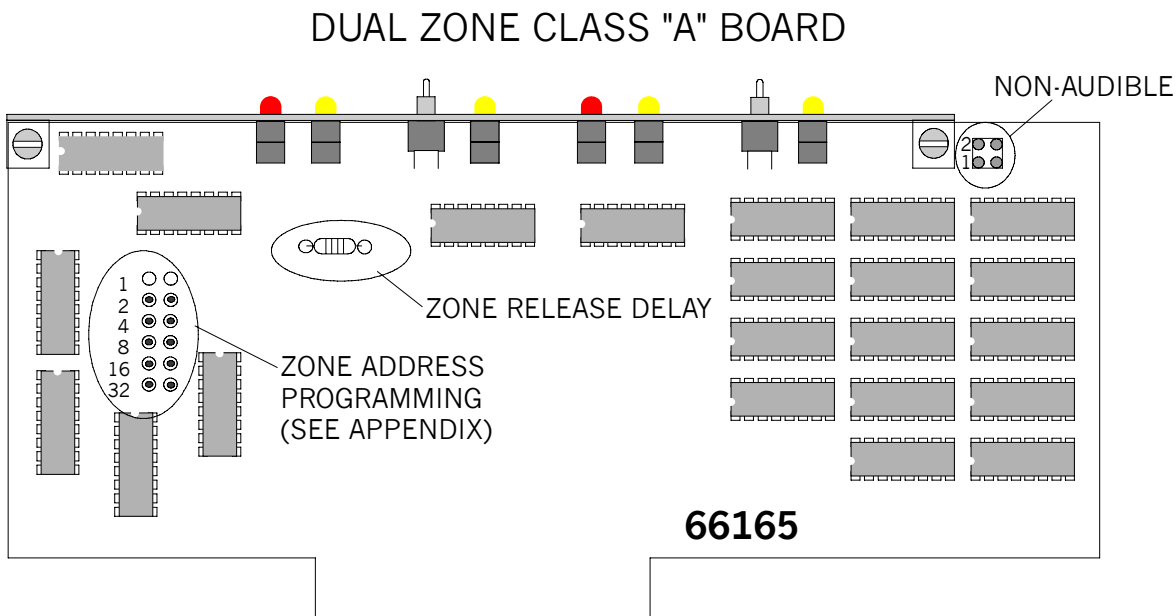
Switch panel trouble can occur when one or more of the panel’s switches are out of position or a wire is broken leading to the switches. The following will happen when there is switch trouble:

1. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of TROUBLE message #1 (if applicable).

POWER TROUBLE

Power trouble can occur at any time, and is probably the most critical supervisory feature of the KFRTI-20/52 Class "A" panel. The following will happen if primary AC power is lost:

1. The AC Power LED will go off.
2. After a 70 second time delay, the AMBER Common Trouble LED will pulse.
3. The Panel's Internal Buzzer will pulse.
4. The Panel will Transmit three rounds of TROUBLE message #1 (if applicable).
5. If the battery voltage drops below the 24.0 volt Low Battery Threshold, the panel will send three rounds of TROUBLE message #3 (if applicable) with LOW BATTERY message (LB).
6. If the battery voltage drops down to 22.3 volts, the panel will send four to six rounds of TROUBLE message #3 (if applicable) with LOW BATTERY message (LB) and then shut off all power completely until the batteries are replaced and/or the AC power is re-applied.



SELECTABLE OPTIONS

Reference the selectable options in the illustrations below while reading the the descriptions of each. Some of the options are to be factory programmed only.

ZONE ADDRESS PROGRAMMING

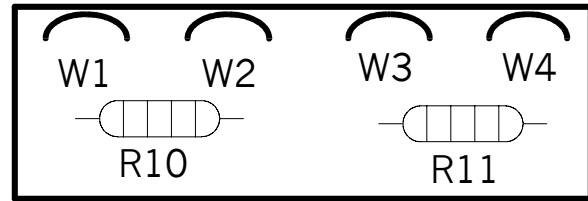
Dual zone and single zone with release class "A" boards have to be individually programmed with the correct zone numbers when the panel is used as a transmitter. Jumpers are used to symbolize the first zone

number location of each class “A” board. To program any board, use the tables in the KFRTI-20/52 Class “A” Zone Card Programming Appendix.

NOTE: Dual class “A” zone boards’ first zone MUST be an odd number. i.e. 1, 3, 5, 7,...51. DO NOT use the “1” plug position. Some zone numbers may have to be skipped when inter-mixing dual and single zone boards.

NON-AUDIBLE SELECTION

Both dual and single zone boards have the capability of not sounding the audible horns and bells during an alarm. The non-audible mode can be selected for any zone by simply inserting a jumper plug in the positions shown. The numbers 1 and 2 next to the socket refer to either the left or right zone respectively on each zone card.



ZONE PROGRAMMING

CLASS “A” OR “B” SELECTION

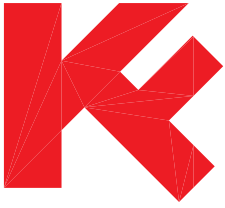
Class “A” boards are equipped for either class “A” (4-wire) or class “B” (2-wire) operation. This means that any of the zones can be programmed to monitor equipment and devices in either classification mode. Consult the factory for more information.

NON-TRANSMIT SELECTION

Both Class “A” boards have the capability of not transmitting alarm signals to the receiver. The non-transmit mode can be selected for one zone or both zones. To do so, consult the factory.

ZONE RELEASE DELAY SELECTION

There is a selectable time delay between a zone alarm and a zone release. This selection is only possible on the Class “A” with release card. The delay period is normally factory preset for NO DELAY but can set for a 10 second delay by removing resistor R20.



KFRTI-20/52
CLASS "A"

MAINTENANCE MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

CAUTION -

RISK OF ELECTRICAL SHOCK

Only Qualified Service Technicians should attempt repairs to KFRTI-20/52 Panels.

Chassis Must be connected to earth ground. Hot and Neutral polarity MUST be observed when connecting AC Power.

All Test and Service areas should be equipped with 120 VAC to 120 VAC isolated transformers and ground fault detecting circuit breakers, if possible.

DO NOT Remove or install any circuit boards or field wiring while the panel is under power.

Refer to King-Fisher KFRTI-20/52 Operations Manual #75854 for correct operating procedure of the panel.

Use special tool (K-F part #22155 or #22158) for removing and installing wires into terminals.

<u>Power-Down Procedure:</u>	<u>Power-Up Procedure:</u>
1. Unplug either battery at battery connector.	1. Install fuse F2 into power supply.
2. Turn off AC Power at the circuit breaker or fuse connected to the panel.	2. Turn on the Circuit breaker or install fuse.
3. Remove fuse F2 from Power Supply using a small flat blade screwdriver.	3. Connect battery(s) and observe green AC Power LED on Alarm Control Board.

ROUTINE TESTING

KFRTI-20/52 Panels should be tested on a regular basis. It is recommended that each panel be tested every 3 to 6 months or whenever user maintenance programs require. The following should be checked:

- A. TRIP each zone by activating alarm initiating devices. Confirm their transmission at the base receiving station.
- B. OPERATE each switch. Trip a zone into alarm. Acknowledge the alarm (steady the LEDs) by momentarily placing the "ACK" switch in the up position. Silence the alarm audibles. Reset the alarm circuits and devices.
- C. PRESS the test switch and check for two rounds of test at the console receiver.
- D. DISCONNECT the batteries and check the voltage of each (approx. 13 to 14 vdc.).
- E. REMOVE AC power and check the operation of panel on battery backup for a few minutes.

RETURN ALL SWITCHES AND DEVICES TO NORMAL BEFORE LEAVING THE PANEL

POWER PROBLEMS

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. PANEL IS DEAD, OR GREEN AC POWER LED IS OFF	1. Circuit Breaker	Reset AC Breaker to the "on" position
	2. AC Wiring	Check for 120 VAC on terminals C8 and C9 of the Mother Bd. Replace AC wiring
	3. Main Mother Board	Check for 120 VAC on Pins 13 & 14 of edge connector J1 on mother bd. Replace Mother board
	4. AC Power Fuse F2	Main AC Fuse F2 (in power supply) is blown. Replace with same type
	5. Power Supply	Green AC power LED should be on inside Power Supply with AC power and/or battery power applied. Replace Power Supply and check for green LED on
B. AC POWER IS OK BUT NO BATTERY BACKUP POWER	1. Defective Batteries	Each battery should have at least 12 volts across terminals when disconnected. Replace battery(s)
	2. Battery Cable	Remove AC power and check battery voltage at Mother board. Voltage should be between 24-28 vdc. Replace cable if necessary
	3. Battery Fuse F1	Battery fuse F1 inside Power Supply may be blown. Replace fuse F1 with same type
	4. Power Supply	With only battery power applied, check green LED is on inside Power Supply. Replace Power Supply
C. PANEL IS HUNG-UP (CPU LED STUCK ON)	1. Power Supply	If the CPU LED stays illuminated for more than 2 minutes, power down and then power up
	2. CPU Board	Replace CPU board if power down sequence doesn't work
D. PANEL IS HUNG-UP (TRANSMIT LED STUCK ON)	1. Power Supply	If Transmitter LED stays on for more than 1/2 sec per message sent, power down and then power up
	2. Transmitter	Replace Transmitter if power down sequence doesn't work

TRANSMISSION PROBLEMS

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. PANEL INDICATES ZONE ALARM BUT DOES NOT TRANSMIT	1. Alarm Control Board	The red common alarm LED should be flashing. Replace the alarm control board
	2. CPU Board	The CPU LED should illuminate for only 10 to 40 seconds per alarm activation. If not, replace CPU board - swap ID chip
	3. Transmitter	The transmit LED should turn on for 1/2 sec per message sent. If not, replace Transmitter
B. PANEL'S LEDs LIGHT BUT ISN'T RECEIVED BY CONSOLE	1. Transmitter ID Chip	Was the CPU Bd and/or address chip (U20) recently changed? Replace ID chip
	2. Console ID Numbers	Check the console receiver to be sure the transmitter's address number is programmed into the console, by pressing Memory Erase and then Memory Read (KFRA). Either program console board 4C, or replace IC U20 on CPU board with a valid number
	3. Transmitter	Check for RF output with SWR meter
C. WEAK SIGNAL (SOME SIGNALS NOT RECEIVED BY CONSOLE)	1. Weak Transmitter	Press the TEST button and check that each message sent by the Transmitter is received by the console. If the message periodically misses, try another Transmitter board
	2. BNC Connector	The connector should be securely fastened to the coax. Gently twist the connector. Look for rotation of improperly installed connectors. Be sure tip isn't pushed in
	3. Antenna Connector	Check for good tight connection of antenna coax connector, and shorts between ground and center conductor
	4. Antenna Location	Problems may result from recent structures built too close to transmitter antenna (6 ft from conductive elements) or trees and shrubs which have substantially grown over the years. Check with local listings

ZONE PROBLEMS

SYMPTON	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. CONSTANT ZONE ALARM	1. Detection Device	Find Device and clear it's alarm
	2. Zone Wiring	Check zone wiring for proper EOL resistance. Replace zone wiring if necessary
	3. Zone Board	Try swapping Zone board with one of the same type
	4. Zone Mother Board	Check for the correct operation of Acknowledge and Reset. Replace Mother board
	5. Reset Switch	Check the operation of Reset switch. Replace switch, Switch Panel or Alarm Control Board
B.CONSTANT ZONE TRBL (SENDS TROUBLE MESSAGE #2)	1. No EOL Device	Check for 6.8K EOL resistor across zone wires (with Zone board removed). If open, install EOL
	2. Zone Wire Grounded	Check zone wiring for a short to ground (with Zone board removed). Replace wiring if necessary
	3. Zone Board	If steps 1 and 2 above don't fix the problem, try replacing the Zone board
	4. Fuse F1 (Mother Bd)	If all zones are in trouble, replace FUSE F1 located on the Mother board below the Power Supply.
C. ZONE(S) WILL NOT ALARM	1. Zone wiring	Create an Alarm at the panel by placing short across zone terminals. This should cause an alarm condition. If not, replace Zone board
	2. Zone Board	Try another Zone board in it's place. If this doesn't work, replace Alarm Control Board

COMMON (PANEL) TROUBLE

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. PANEL'S COMMON TROUBLE LED IS FLASHING BUT NO ZONE LED'S ARE ON (PANEL SENDS TROUBLE MESSAGE #1)	1. Switch Out of Position	Flip all switches up then down. This might clear out a defective or dirty switch contact
	2. Switch Panel's Ribbon Cable	Be sure cable is securely connected to Mother board connector. Plug a known working Switch Panel into Mother board. See Switch Trouble section
	3. Battery Problems	Check FUSE F1 in Power Supply. Unplug batteries, check for 13 to 15 volts across each battery, and then plug them back in. Recheck voltages while they are being charged (approx. 14.5vdc.).
	4. AC Power Off	AC Power LED on Alarm Control board should be illuminated. Restore proper power. See Power Problems section.
	5. Zone Ribbon Cable	Check for good tight connection on all Mother board connectors. Push on ribbon cable connectors. Be sure they are seated properly. Check ribbon cable connector for broken or bent pins. Replace Zone Mother board, Mother board, or ribbon cable. (Red stripe on left side)
	6. Board Not Seated	Check to be sure all circuit boards are in their correct positions and not slanted or loose. Firmly push all circuit boards into Mother board connector
	7. Bell/Horn Circuit	Check for 10K EOL resistor across terminals D1& D3. Look for shorts, ground faults, and open circuits. Also, check audible devices to see if they are all operated on 24vdc. They must have Diode installed properly
	8. Trouble Input Circuit	Be sure a 10K EOL resistor is between terminals D5 & D6
	9. Fuse F1	Check FUSE F1 on Alarm Control board for open circuit. Replace FUSE F1 with same type

COMMON (PANEL) TROUBLE (CONT.)

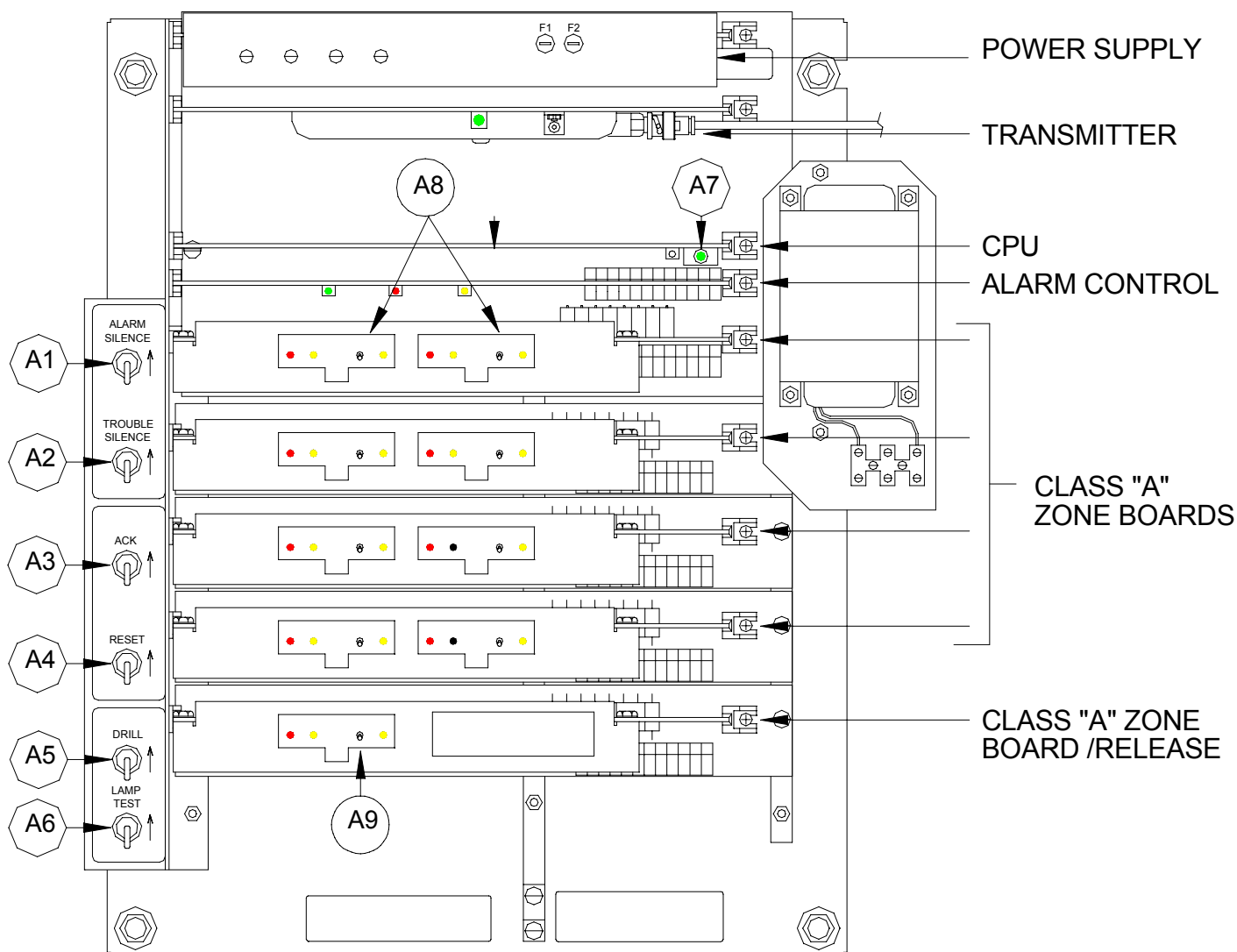
SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
B. IF NONE OF THE PREVIOUS STEPS (1 TO 9) REPAIR THE PANEL TROUBLE, TRY STEPS 10 TO 17	10. Extension Zone Boards	Disconnect the ribbon cable from the main Zone Mother boards) Mother board to isolate the Extension Zone boards from the first Zone board. Trouble cleared? If trouble clears, install ribbon cable and one Zone board at a time until trouble reappears. Replace bad Zone board or Zone mother board. If not, continue with steps 11 through 17 below
	11. First Zone Board	Swap first Zone board. If trouble is corrected, replace Zone board
	12. Alarm Control Board	Swap Alarm Control Board. If trouble is corrected, replace Alarm Control board
	13. CPU Board	Swap CPU board. If trouble is corrected, replace CPU board
	14. Transmitter Board	Swap Transmitter. If trouble is corrected, replace Transmitter
	15. Power Supply	Swap Power Supply. If trouble is corrected, replace Power Supply
	16. Mother Board	Try a new Mother board
	17. Switch Trouble	Swap Switch Panel. If trouble is corrected, then see Switch Trouble section

SWITCH TROUBLE

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. ONE OF THE SWITCHES DOESN'T WORK	1. Switch Panel Ribbon Cable	Check continuity between Mother board and Switch Panel
	2. Defective Switch	Check contact closure of all switches with an ohm meter. Replace Switch Panel
	3. Alarm Control Board	Change the Alarm Control board
	4. Main Mother Board	Change Main Mother board
B. ACK DOESN'T WORK	1. Zone Board	If alarms do not acknowledge (steady) on a particular Zone board. Replace the board
C. RESET DOESN'T WORK	1. Mother Board	If Smoke Detectors are connected to panel, replace Mother board
	2. Zone Board	Replace Zone board which won't Reset
D. DRILL DOESN'T WORK	1. Bell/Horn Wiring	Check audible wiring by Zone Alarm testing
	2. Alarm Control Board	Change the Alarm Control board
E. LAMP TEST DOESN'T WORK	1. Zone Board	If a particular Zone board's LED(s) do not turn-on during Lamp Test, then replace that board
	2. Alarm Control Board	Change Alarm Control board

REPLACEMENT PARTS LIST

CIRCUIT BOARDS	REPLACEABLE PARTS	PART #
A. 30V POWER SUPPLY		66115-12
	Fuse F1 (3AG, 4 Amp, Norm-Blo)	30004
	Fuse F2 (3AG, 3 Amp, Slo-Blo)	30013
	LED, Green (Inside Power Supply)	19015
B. AM TRANSMITTER-HIGH BAND		66120-5
	LED, Green (Ultrabrite)	19060
C. AM TRANSMITTER-LOW BAND		66121-2
	LED, Green (Ultrabrite)	19060
D. CPU BOARD		66150-3
	LED, Green (w/90 Mount)	19090
E. ALARM CONTROL BOARD		66156-4
	Fuse F1 (3AG, 2 Amp, Fas-Blo)	30012
	LED1, Green (w/90 Mount)	19090
	LED2, Red (w/90 Mount)	19092
	LED3, Amber (w/90 Mount)	19091
F. DUAL ZONE CLASS "A" BOARD		66165-8
	Jumper Plugs (Zone Address)	22091
	LED, Red (w/90 Mount)	19092
	LED, Amber (w/90 Mount)	19091
G. MAIN MOTHER BOARD		66099-2
	Fuse F1 (3AG, 2 Amp, Fas-Blo)	30012
H. ZONE MOTHER BOARD		66107-0
	EOL Res., Zone (6.8K, 1/4W)	53022
I. SWITCH PANEL ASSEMBLY		66111-1
J. SINGLE ZONE W/RELEASE		66167-8
	Jumper Plugs (Zone Address)	22091
	Fuse F1 (2 amp, Norm-Blo, 2AG)	30017
	LED, Red (w/90 Mount)	19092
	LED, Amber (w/90 Mount)	19091
K. MISCELLANEOUS PARTS		17014
	12V/5AH Battery	
	12V/12.5AH Battery	17012
	Wire Insertion Tool (Large)	22155



SWITCH CONTROLS

A1 - ALARM SILENCE SWITCH

A2 - TROUBLE SILENCE SWITCH

A3 - ACKNOWLEDGE SWITCH

A4 - RESET SWITCH

A5 - DRILL SWITCH

A6 - LAMP TEST SWITCH

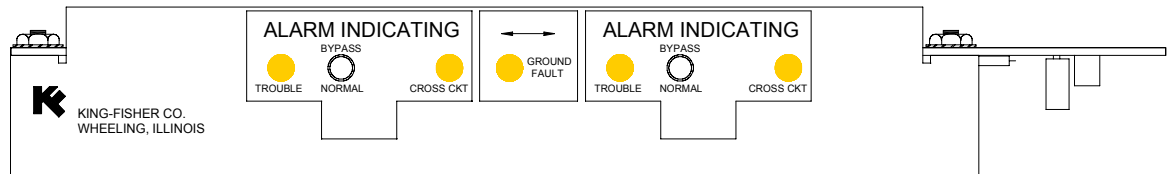
A7 - TEST SWITCH

A8 - DUAL ZONE DISCONNECT SWITCH

A9 - ACTUATOR DISCONNECT SWITCH



DUAL ALARM NOTIFICATION MODULE (DAN BOARD) TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com

DUAL ALARM NOTIFICATION MODULE (DAN BOARD)

GENERAL

The Dual Alarm Notification Module expands the capabilities of the King-Fisher KFRTI-20/52 alarm control panel to include operation of alarm notification devices with a total connected load of up to six amps, in either “Class A” or “Class B” configuration. Two independent circuits are provided, each of which may be configured for actuation by the control panel alarm audible output or by the common alarm or zone alarm open collector outputs. The module will power 24VDC devices by using either one or two King-Fisher auxiliary power supplies. Optional bypass switches may be incorporated to disconnect the devices for servicing or testing purposes when the module is [not used for primary or evacuation audible control](#). Each audible circuit has a Trouble Output available. The module is fully supervised and requires minimal standby power. The module interfaces with the control panel via the dual alarm notification mother board, which requires the same physical space as one zone input module mother board.

PRECAUTIONS

READ ALL INSTRUCTIONS BEFORE INSTALLATION.

RISK OF ELECTRICAL SHOCK – DISCONNECT ALL POWER PRIOR TO INSTALLATION OR SERVICING.

DO NOT REMOVE OR PLUG IN ZONE CARDS WHILE POWER IS APPLIED.

DO NOT EXPOSE CIRCUITRY TO MOISTURE, STATIC, DUST, OR DIRT.

INSTALLATION 66811-3 DUAL ALARM NOTIFICATION MOTHER BOARD

The physical mounting of this Mother Board will be done at the factory when this module is ordered with a new KFRTI-20/52. However, if this module is installed as an add-on to an existing panel, a separate drawing will be generated to show positioning and wiring. Three 6-32x1/4” pan head screws are all that’s needed to mount the board on existing standoffs on the subplate. The hardware will be supplied. The wiring to the terminals is covered in the [Installation of the 66810 Dual Alarm Module](#).

INSTALLATION 66810 DUAL ALARM MODIFICATION MODULE

Follow the drawings #76110 (Latched) and 76111 (Unlatched). Check the options list to ensure the module is set up per order. If the unit needs to be reconfigured, call the factory for assistance if necessary. All inputs will be factory installed on complete KFRTI-20/52 but as some modules may be add-on units, the mounting and internal wiring needs to be carefully followed. A custom drawing will be generated for these applications.

Follow drawing #76110 or 76111. Observe polarity on TB1 pins 1 & 2; 3 & 4; 5 & 6. Make sure enough power is available for the circuits to be driven. TB1 pin 7 is pulsing + 5 volts for lamp test. TB1 pin 8 can be wired to either reset or alarm silence and, if a proper set up is on the card for unlatched mode, no hook up

is necessary. TB1 pins 9 & 10 are the trouble loop. TB1 pin 9 goes either to an EOL resistor or to the next module in the loop. The last module will then have an EOL resistor installed to TB1-1. TB1 pin 10 comes from either D5 (KFRTI-20/52 Main Mother Board) or from a previous trouble out circuit. If the module is so configured TB1 pins 11 and 12 are Auxiliary Power Trouble inputs. (Inputs that need to be pulled to ground). Pin 11 is for Auxiliary Power Supply #1 and pin 12 is for Auxiliary Power Supply #2. This configuration also gives 2 open collector inputs (1 per circuit) on TB2 pin 2 and 4 for circuits 1 and 2 respectively. If the module is configured to have its inputs driven by supervised lines then the open collector inputs are not used. TB2 pins 1 & 2 and 3 & 4 are then used and circuit initiators connected to D2 and D4 as shown. When only one Auxiliary Power Supply is used, tie TB1-11 and TB1-12 together.

Check the mode programming configuration on the Dan Mother Board lower right corner and check against circuits to be wired. If it is not already set up. Jumper W1 and W2 and/or W3 and W4 or the resistors R1 and/or R2 will have to be cut. If this is a 4 wire, Class A circuit, leave the resistor and cut the jumpers. If a 2 wire, Class B, circuit is used, leave the jumpers intact, cut out the resistor, and place another resistor (10 K $\frac{1}{4}$ W) at the end-of-line. The two circuits may be configured either Class A or Class B independently. Make sure the driven devices are polarized according to the drawing. TB3 pin 1 is an Open Collector Output. It is capable of pulling 0.5 Amp to ground when audible circuit 1 is in Open Circuit, Cross Circuit or Blown Fuse Trouble. TB3 pin 2 is the same for Circuit 2.

DUAL ALARM NOTIFICATION MODULE TESTING AND MAINTENANCE

Once the module is wired and checked for polarity, shorts and faults, apply power through the auxiliary power supply and system power supply. Check the LEDs on the front of the card to be sure all are off.

Depending on the way this module is configured, different operations must be performed to check the output circuits. If this module is configured to run off the audible output in both circuits then the drill switch will initiate the output circuits. If zone open collectors are used to trip this circuit then the appropriate zone must be tripped to check the circuit. Once the circuit is energized, measure the voltage at the panel. It should be above +24 volts DC.

To check the supervision, disconnect the end-of-line resistor, or open each loop one at a time, depending on whether Class A or Class B wiring is used. The appropriate circuit trouble LED will light, the Circuit Trouble Output opens and the panel will go into trouble. Place loop or resistor back to normal and the LED goes off, the Circuit Trouble Output will pull low and the panel returns to normal. Place a temporary short to ground and the ground fault trouble LED will light and the panel will go into trouble. Remove the short to ground and it should return to normal. Place a temporary short across the loops or EOL. LED will light and the panel will go into trouble. Remove the short circuit and the panel returns to normal. Removal or blowing of a fuse will result in circuit and panel trouble, and the Circuit Trouble Output will pull low.

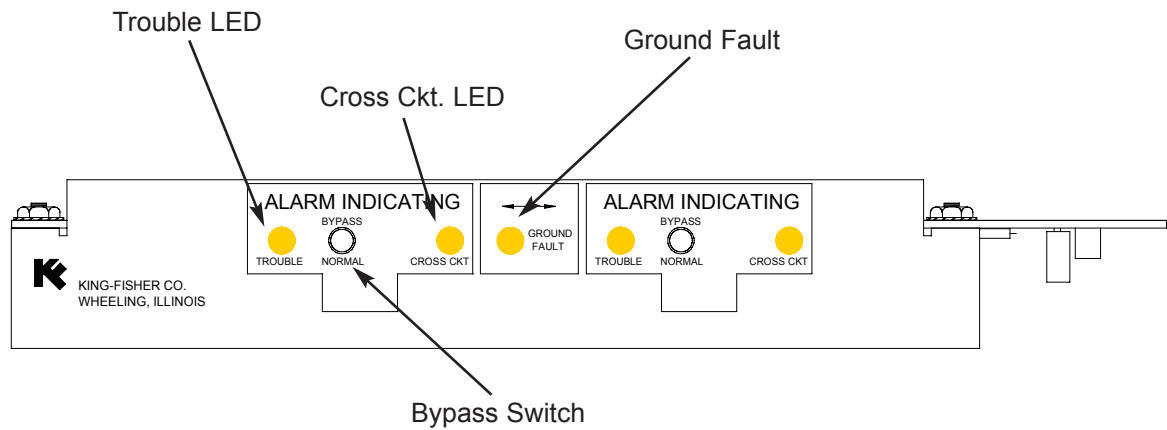
If the optional bypass switch is installed, putting the switch in the bypass mode will light the appropriate circuit trouble LED and put the panel into trouble. Restoration of the switches returns the circuit and panel to normal. **[The bypass switch will NOT be installed when the module will be operating the primary alarm notification devices].**

Other circuits to be checked are the alarm silence/reset and the lamp test, if they are used. Certain configurations will not use a separate silence/reset input. In all KFRTI-20/52 panels, a lamp test feature can be installed to operate off the panel lamp test switch. Press up the switch and all LEDs will light, release the switch and the LEDs go off. Lamp test will activate both trouble outputs.

Since most of the circuitry is opto-isolated, very few outside problems should cause circuit failure. The main items for maintenance parts will be the fuses of correct value. The value is calculated from the load of the circuit. Both circuits need not be fused the same. Check the label beneath each fuse for specified value.

CONTROLS AND INDICATORS

All of the LEDs and switches are located on the front panel of the module. Refer to illustration below while referencing the following descriptions.



Trouble LED - Amber LED (2 per module) which light whenever one of the following trouble conditions exists:

- Open Circuit
- Missing or Defective fuse
- Switch Out-of-Position

Cross Ckt. LED - Amber LED (2 per module) which light whenever the zone wiring has a low impedance (5K ohms or less) between the wiring loop. This is typically caused from one of the following:

- No supervision diode in series with device(s)
- Supervision diode or device reversed
- Wrong type of device connected (Must operate on 24vdc)
- Short between wires

Ground Fault LED - Amber LED which illuminates whenever a ground fault is present on one of the zone wires.

Bypass Switch (Optional) - Two position switch (2 per module) which will disable output actuation for purposes of testing, servicing or isolating a circuit. Placing this switch in the up (Bypass) position will cause the trouble LED to light until the switch is restored to the normal (down) position.

Note: the Bypass switch will not be installed when the module will be operating the main alarm notification devices.

SPECIFICATIONS

Input Voltage: 21.4 - 28.8 vdc (24.0 vdc Nominal)

Standby Current:

Module only: 21 mA.

with Aux. Supply: 41 mA.

Power Supply Current (Alarm):

w/one KF Aux. Supply 3 amps Max.

w/two KF Aux. Supplies 6 amps Max.

Module will be fused and labeled accordingly (see Fuse ratings below)

output Device Voltage: 20.4 - 27.6 vdc (24.0 vdc Nominal)

Fuse and Device Current (Alarm):

No. of KF Aux. Power Supplies	Fuse size per Ckt. Max.	Device Current per Ckt. max.
1	5.0 A.	3.0 A. (1 Ckt. only)
2	5.0 A.	3.0 A.

STANDBY BATTERY CALCULATIONS [Amp hrs. required]

D.A.N. Board	Current (mA.)	24 hrs.	60 hrs.	90 hrs.
1	20 mA.	.48 mA.	1.2 mA.	1.8 mA.
2	40 mA.	.96 mA.	2.4 mA.	3.6 mA.
3	60 mA.	1.44 mA.	3.6 mA.	5.4 mA.
4	80 mA.	1.92 mA.	4.8 mA.	7.2 mA.

COMPATIBILITY WITH POWER SUPPLY

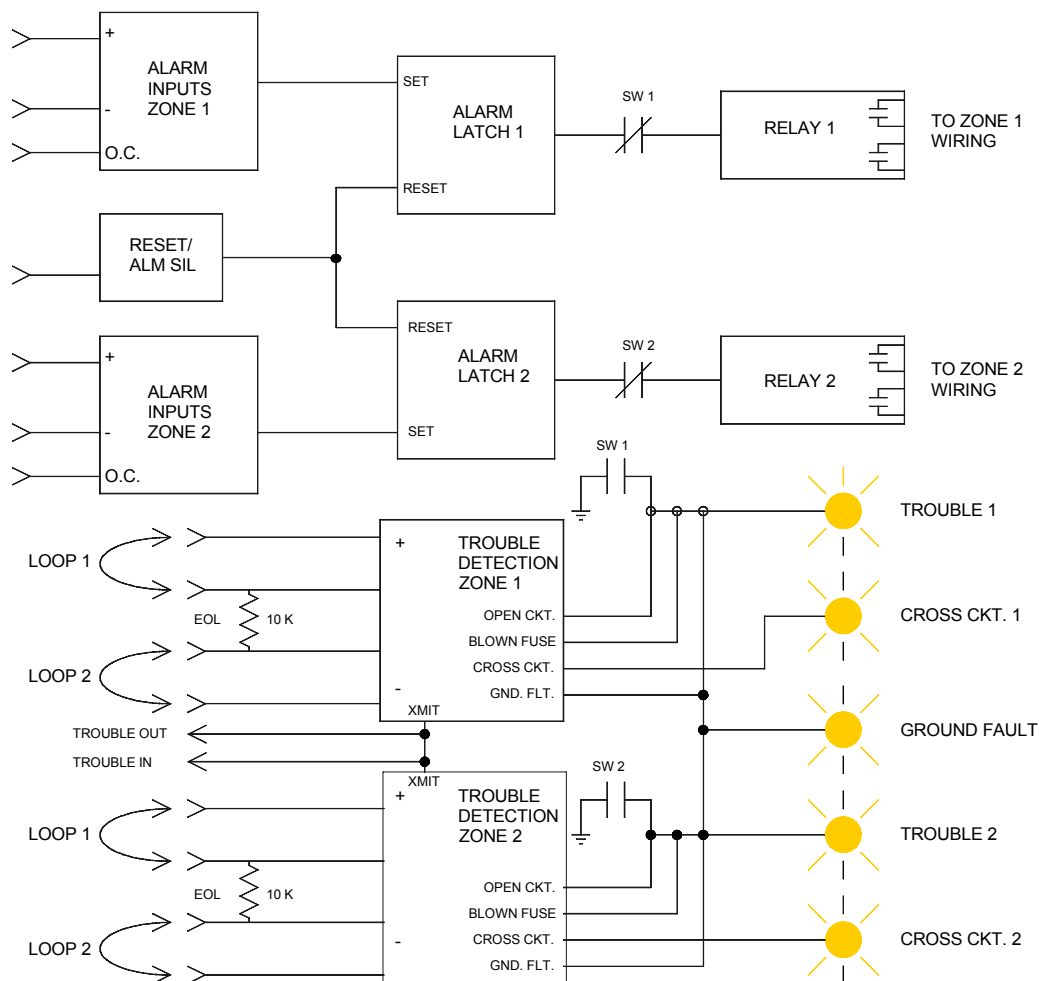
Dan Board: any time it is used for Class “A” operation it must be used with an Aux. Power Supply and new Aux. Power Supply Mother Board. (New isolated version) and an Isolation Transformer.

Dan Board is rearward compatible if tripped by audible circuit.

Dan Board is not rearward compatible if tripped by open collector to TB1-11 or Tb1-12, unless it can be rewired.

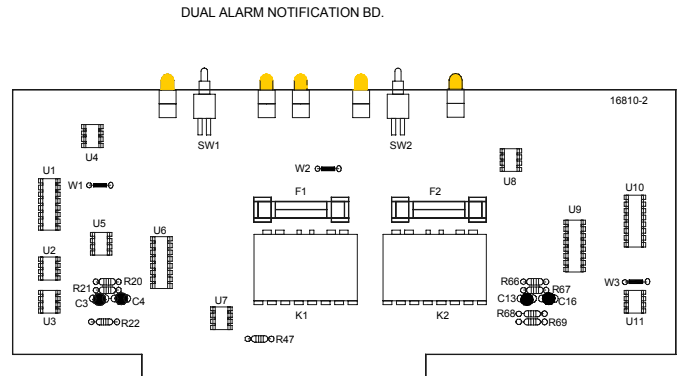
Earlier Dan Boards can not be used with new Aux. Power Supply.

DUAL ALARM NOTIFICATION BOARD BLOCK DIAGRAM

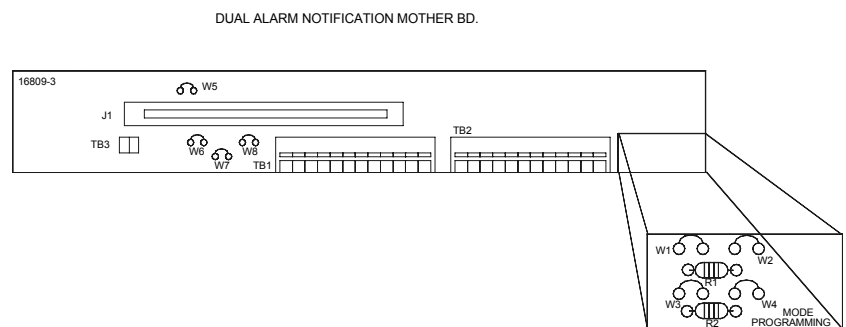


DUAL ALARM NOTIFICATION MODULE SELECTABLE OPTIONS

PCB 16810 ALARM BD.		
FUNCTION	CHANGES(CKT. 1)	CHANGES (CKT. 2)
LATCHED MODE	REMOVE:W1 INSTALL:R4,R18,R19,R20,R45,C2,C3	REMOVE:W3 INSTALL:R64,R65,R66,R67,R82,C14,C15
UNLATCHED MODE	REMOVE:R4,R18,R19,R20,R45,C2,C3 INSTALL JUMPERSIN:W1,C2,C3	REMOVE: R64, R65, R66, R67, R82, C14, C15 INSTALL JUMPERS IN: W3, C14, C15
BYPASS SWITCH	REMOVE ANY JUMPERS IN SW1 INSTALL: SW1	REMOVE ANY JUMPERS IN SW2 INSTALL: SW2
W/O SWITCHES	REMOVE: SW1 INSTALL JUMPERS HERE:	REMOVE: SW2 INSTALL JUMPERS HERE:
KF AUX POWER SUPPLY	REMOVE: W2	REMOVE: W2

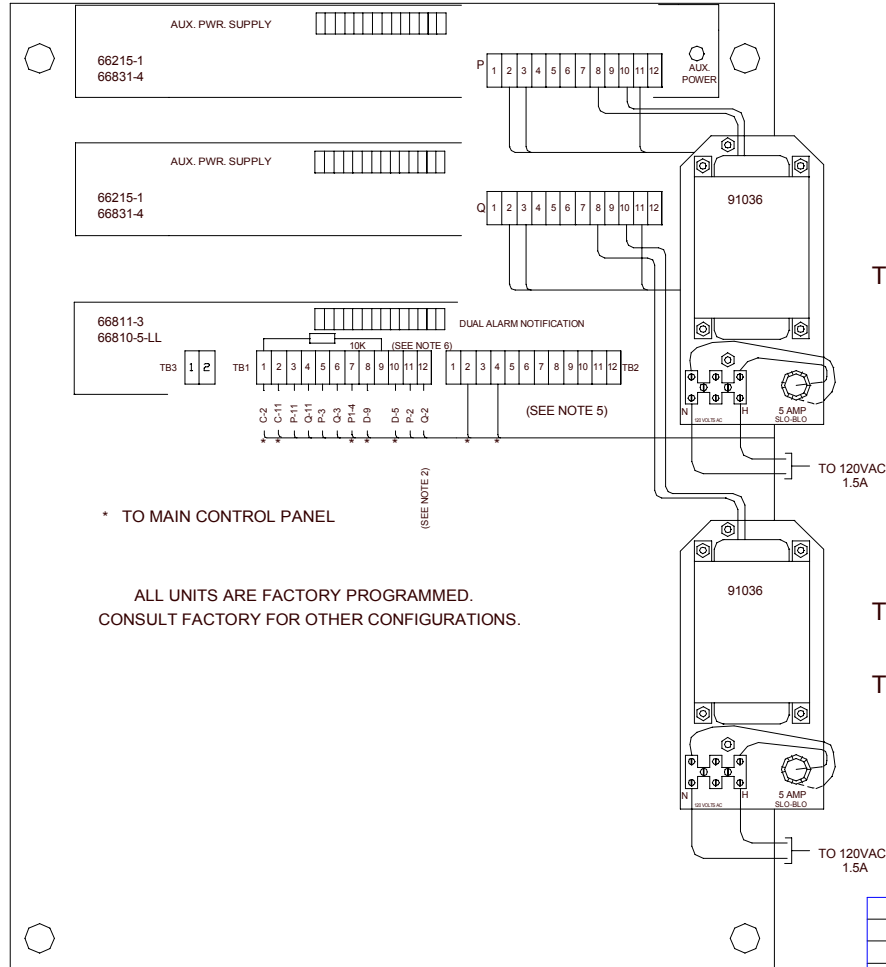


PCB 16809 MOTHER BD.		
FUNCTION	CHANGES (CKT. 1)	CHANGES (CKT. 2)
AUX. POWER SUPPLY	REMOVE: W5 & W8	REMOVE: W5 & W8
SYSTEM SUPPLY ONLY	INSTALL: W5 & W8	INSTALL: W5 & W8
ALARM IN = D1,2,3 or 4 (UNLATCHED MODE)	REMOVE: W6	REMOVE: W7
ALARM IN = O.C. ZONES (LATCHED MODE)	INSTALL: W6 REMOVE: WIRES IN TB2 - 1	INSTALL: W7 REMOVE: WIRES IN TB2 - 3
"CLASS A" WIRING	REMOVE: W1 & W2 INSTALL: R1	REMOVE: W3 & W4 INSTALL: R2
"CLASS B" WIRING	REMOVE: R1 (PLACE AT EOL DEVICE) INSTALL: W1 & W2	REMOVE: R2 (PLACE AT EOL DEVICE) INSTALL: W3 & W4

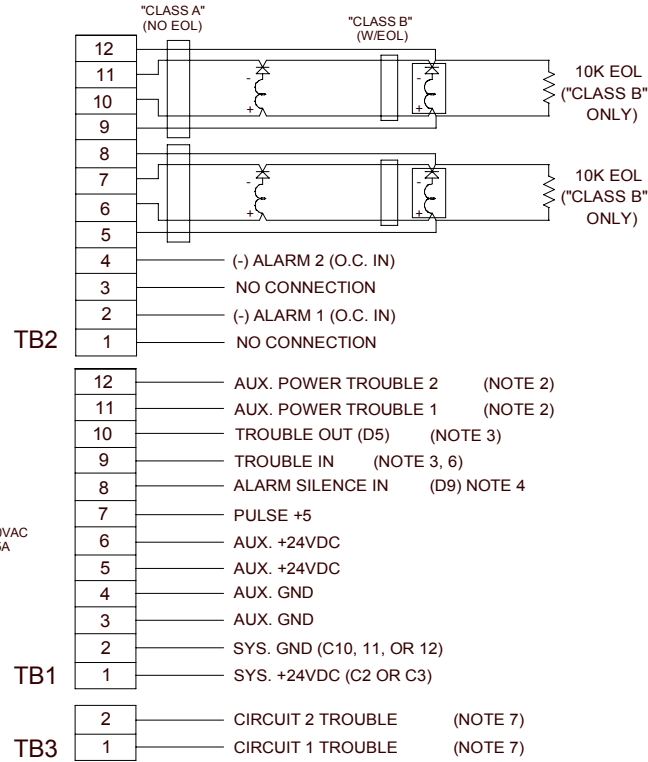


KING - FISHER Company Z350 Foster Ave., Wheeling, IL 60090			
DUAL ALARM NOTIFICATION MODULE SELECTABLE OPTIONS			
DRN: RCB	DATE: 4-17-91	SHT: 01	OF: 01
APPR: DWG	NO. 76984-2		
SCALE: NTS			

TYPICAL DUAL ALARM NOTIFICATION MODULE INTERNAL WIRING



DUAL ALARM NOTIFICATION WIRING

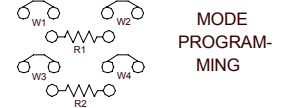


ALARM NOTIFICATION
CIRCUIT 2
NOTE 1, 5

ALARM NOTIFICATION
CIRCUIT 1
NOTE 1, 5

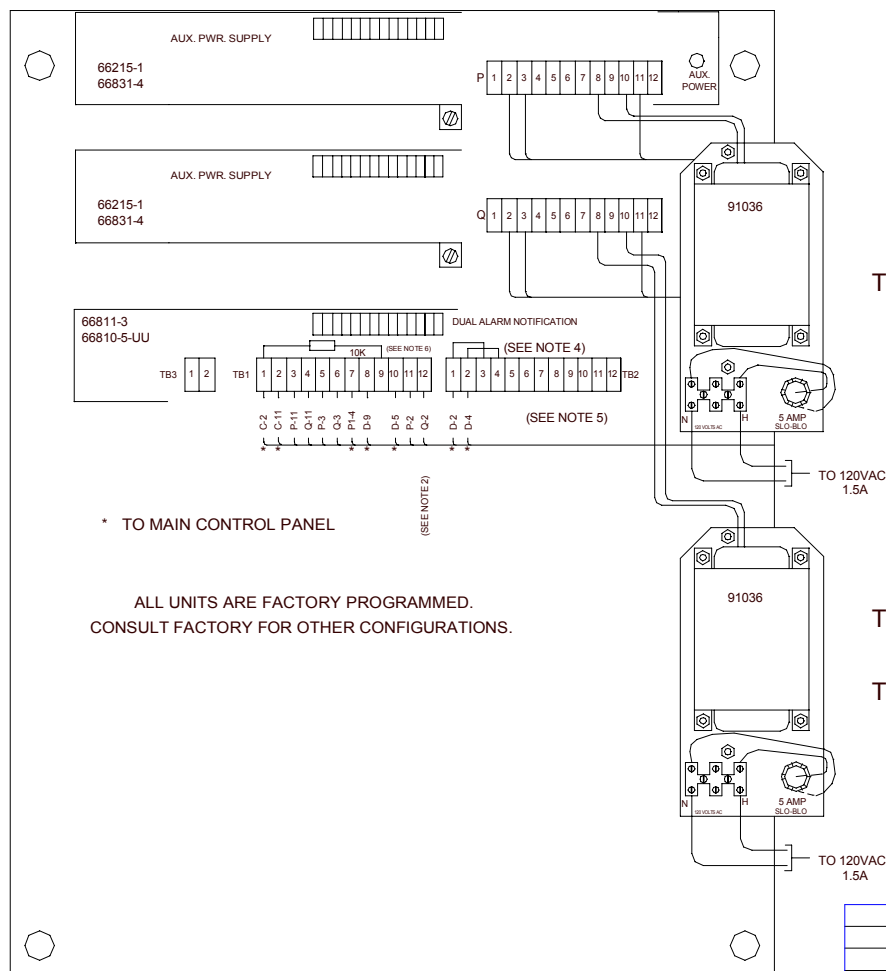
NOTES:

- ALARM NOTIFICATION MUST BE 24VDC WITH SUPERVISION DIODES AS SHOWN EACH CIRCUIT IS RATED FOR UP TO 3 AMPS OF DEVICES.
- IF USING ONLY ONE AUX. POWER SUPPLY TB1-11 AND TB1-12 MUST BE TIED TOGETHER.
- CONNECT TROUBLE OUT TO TERMINAL D5. TROUBLE IN MAY BE LINKED TO OTHER TROUBLE CIRCUITS. (ALSO SEE NOTE 6).
- ALARM SILENCE SWITCH INPUT SHOULD BE INSTALLED WHENEVER THIS MODULE IS CONFIGURED FOR THE LATCH MODE.
- CUT W1, 2, 3, 4 WHEN INSTALLING "CLASS A" WIRING, CUT R1, & R2 WHEN INSTALLING "CLASS B" WIRING. PLACE 10K EOL RESISTOR ACROSS LAST DEVICE AS SHOWN ABOVE.
- EOL RESISTOR (10K) MUST BE REMOVED FROM D5/D6 AND INSTALLED BETWEEN TB1-9 AND TB1-1 OF LAST NOTIFICATION MODULE IN LINE.
- O.C. OUT (.5 AMP MAX @24VDC)
- REFER TO SUPPLEMENTAL INSTALLATION INSTRUCTIONS KF #76107 FOR THE CONNECTION INSTALLATION OF THE ISOLATION TRANSFORMER/S TO 120VAC.

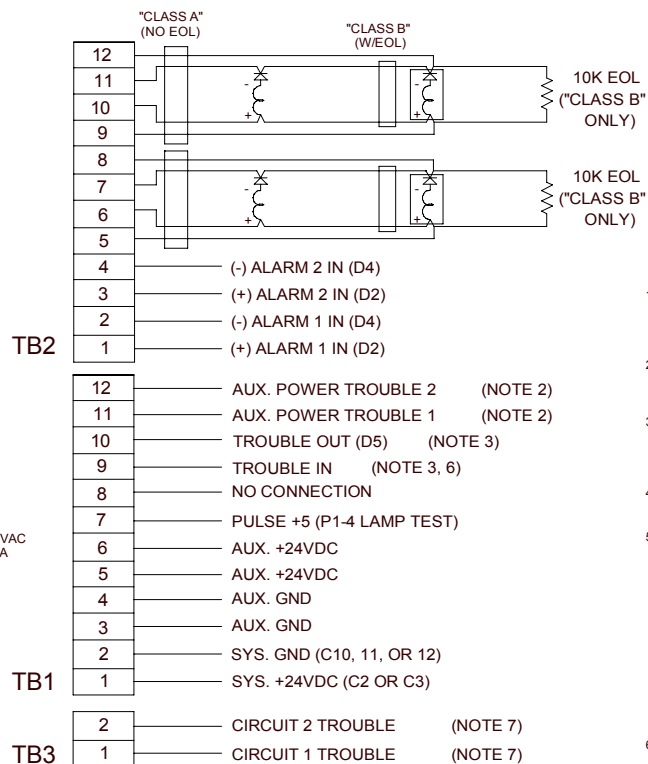


						DWN	JL	KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090 TITLE 66810-5-LL TYPICAL DUAL ALARM NOTIFICATION MODULE WIRING DIAGRAM, LATCHED DWG. NO. 76110
						CHK	DA	
						APPD	DA	
						DATE	9/9/97	
						SCALE	NTS	
153	NEW RELEASE	9/9/97	JL	DA	SHT 1			
REV.	ECO	DESCRIPTION OF CHANGE	DATE	DFT	APR			

TYPICAL DUAL ALARM NOTIFICATION MODULE INTERNAL WIRING



DUAL ALARM NOTIFICATION WIRING



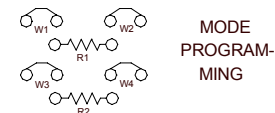
THE SUBPLATE SHOWN DEPICTS A TYPICAL APPLICATION OF THE DUAL ALARM NOTIFICATION MODULE. (UNLATCHED INPUT) CIRCUIT 1&2 WILL ACTIVATE DEVICES UPON ANY ZONE ALARM.

ALARM NOTIFICATION
CIRCUIT 2
NOTE 1, 5

ALARM NOTIFICATION
CIRCUIT 1
NOTE 1, 5

NOTES:

- 1) ALARM NOTIFICATION MUST BE 24VDC WITH SUPERVISION DIODES AS SHOWN EACH CIRCUIT IS RATED FOR UP TO 3 AMPS OF DEVICES.
- 2) IF USING ONLY ONE AUX. POWER SUPPLY TB1-11 AND TB1-12 MUST BE TIED TOGETHER.
- 3) CONNECT TROUBLE OUT TO TERMINAL D5. TROUBLE IN MAY BE LINKED TO OTHER TROUBLE CIRCUITS. (ALSO SEE NOTE 6).
- 4) IF CIRCUITS ARE TO OPERATE INDEPENDENTLY, REMOVE THESE JUMPERS.
- 5) CUT W1, 2, 3, 4 WHEN INSTALLING "CLASS A" WIRING. CUT R1, & R2 WHEN INSTALLING "CUT B1" WIRING. PLACE 10K Ω RESISTOR ACROSS LAST DEVICE AS SHOWN ABOVE.



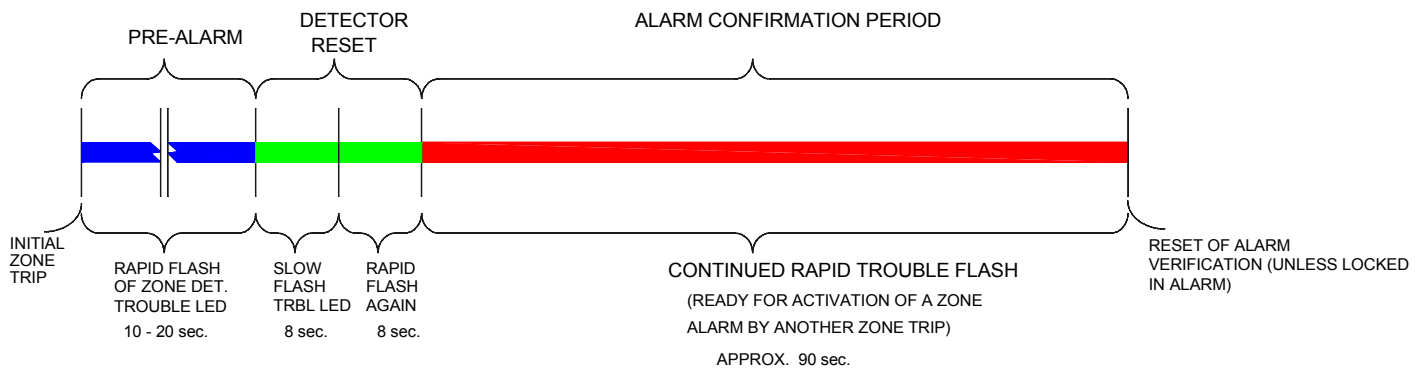
- 6) EOL RESISTOR (10K) MUST BE REMOVED FROM D5/D6 AND INSTALLED BETWEEN TB1-9 AND TB1-1 OF LAST NOTIFICATION MODULE IN LINE.
- 7) O.C. OUT (5 AMP MAX @24VDC)
- 8) REFER TO SUPPLEMENTAL INSTALLATION INSTRUCTIONS KF #76107 FOR THE CONNECTION INSTALLATION OF THE ISOLATION TRANSFORMER/S TO 120VAC.

						DWN	JL	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090 TITLE 66810-5-UU TYPICAL DUAL ALARM NOTIFICATION MODULE WIRING DIAGRAM, UNLATCHED
						CHK	DA	
						APPD	DA	
						DATE	9/5/97	
						SCALE	NONE	
	153	NEW RELEASE	9/9/97	JL	DA	SHT	Ⓕ 1	DWG. NO. 76111
REV.	ECO	DESCRIPTION OF CHANGE	DATE	DFT	APP			

KFRTI-20/52 CLASS "A"

ALARM VERIFICATION BOARD

The alarm verification feature is specifically designed to reduce the effects of migratory smoke transients which cause smoke detectors to inadvertently alarm. Alarm verification reduces false alarms by requiring smoke detectors to alarm twice within a set time period. During a smoke alarm, the verification module confirms the alarm by resetting the smoke detector approximately 30 seconds after the alarm was first activated. The detector circuit must re-alarm within 90 seconds after the "detector reset" period in order to activate an alarm at the panel. If none of the smoke detectors alarm during this confirmation period, then the alarm verification module will reset itself. Holding the panel reset switch up for more than a second may activate the alarm verification board into the pre-alarm mode. The graph below shows the time periods between initial zone activation (trip) and alarm confirmation (2nd trip) necessary to activate a smoke alarm signal.

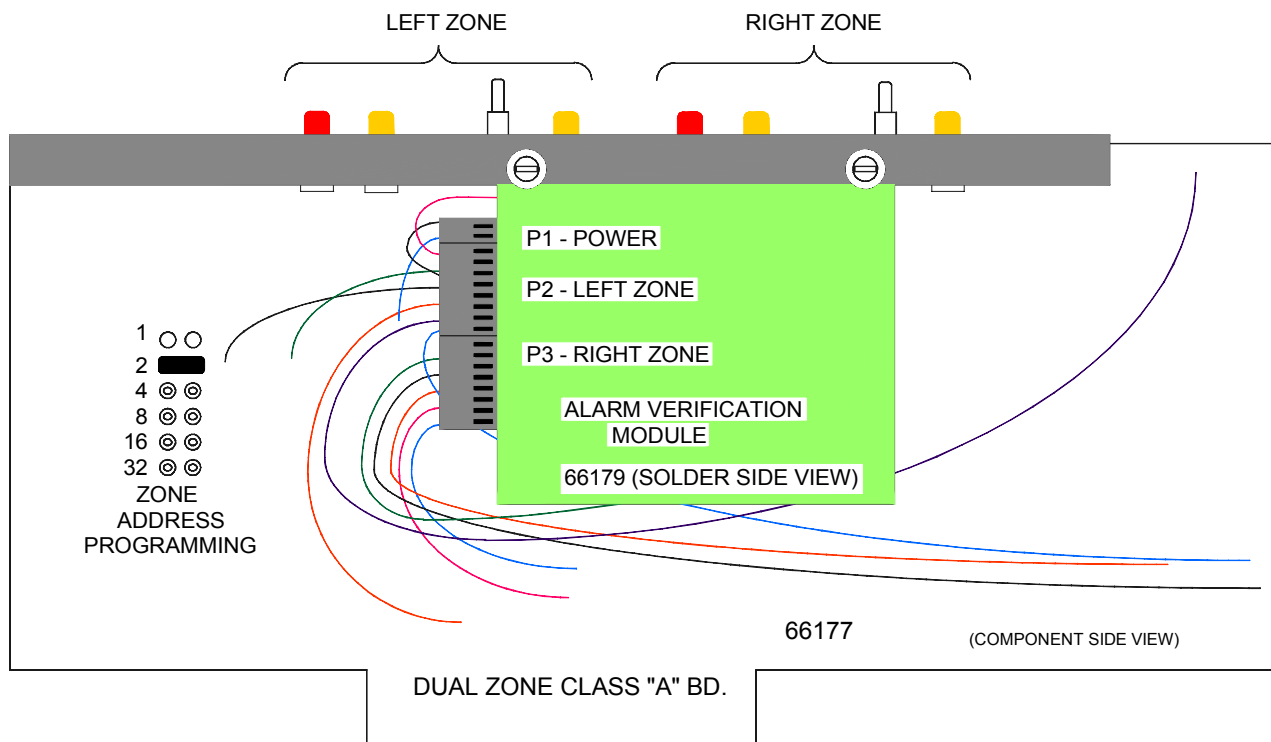


ONLY ZONES WITH SMOKE DETECTORS CAN UTILIZE ALARM VERIFICATION!

SMOKE DETECTORS CONNECTED TO THESE CIRCUITS, MUST NOT EMPLOY THE ALARM VERIFICATION FEATURE THEMSELVES.

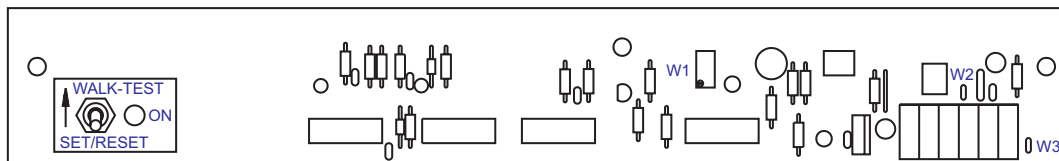
NO CROSS ZONE MATRIX ALLOWED WITH ALARM VERIFICATION MODULES.

A harness connected from the alarm verification module to either the dual class "A" board or single class "A" with release board, allows zone verification of one or two zones respectively of smoke detection devices. If alarm verification is not desired on a particular zone, then terminals P2 (left zone) or P3 (right zone) may be disconnected. Terminal P1 is for module power and must be connected at all times.





OPERATIONAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 **f** 847 • 255 • 1507 **e-mail** sales@kfco.com

WALK TEST INSTALLATION AND OPERATION INSTRUCTIONS

ASSEMBLY 66160-1

The WALK TEST Board is used to allow a one-person test of the fire alarm detection and notification appliance operations.

The WALK TEST board takes one card slot in the KFRTI-20/52 panel. It is mounted the same way as the Zone Mother Boards.

Follow the wiring diagram and check for each optional wiring deviation. (see page 2)

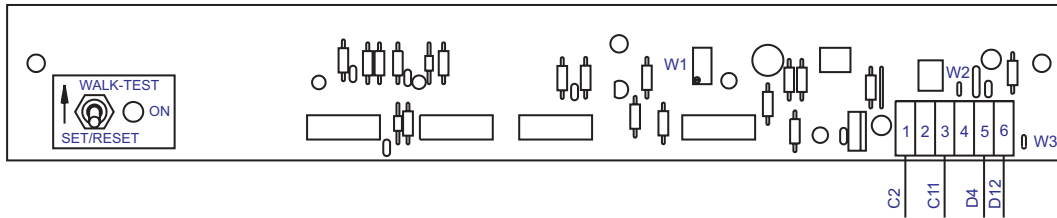
Test the panel for normal operation before Setting the WALK TEST board. The WALK TEST board should be completely invisible to the system when in the Reset (OFF) Mode. The Notification Appliances should sound and flash as normal.

Once the initial testing is complete, press the SET/RESET switch up and release. The Yellow LED will illuminate, indicating the WALK TEST board is active. If the system is set up to operate from the Main Mother Board, test the WALK TEST board by momentarily pressing the DRILL switch. The Notification Appliances will turn on for 1 to 5 seconds depending on the setting of the POT R19. If R19 is not installed, jumper W1 is in its place and the time for ringing is about 1.5 seconds before reset occurs. The resetting of the Notification Appliances is automatic while the WALK TEST board is ON.

The WALK TEST board will reset itself, automatically, if no alarm input is detected for a period of 10 minutes. Each time an input is detected and the alarm reset is initiated, the 10 minute timer is reset. The 10 minute timer is fixed on the board and not field adjustable. Consult Factory if different parameters are required.

The automatic reset feature allows the user to press the SET/RESET switch, test the system, and leave the job site without resetting the panel, if the need arises. It is highly recommended to return the WALK TEST board to its RESET condition before leaving the site by pressing the SET/RESET switch again and observing the ON LED turning off.

The current drain for the WALK TEST board is 6.5 milliamps while RESET and 9 milliamps while SET.



When used with the main power supply and triggered by the Audible Output:

Jumper W1 **or** a 100K POT will be installed depending on the time requirements for ringing the notification devices.

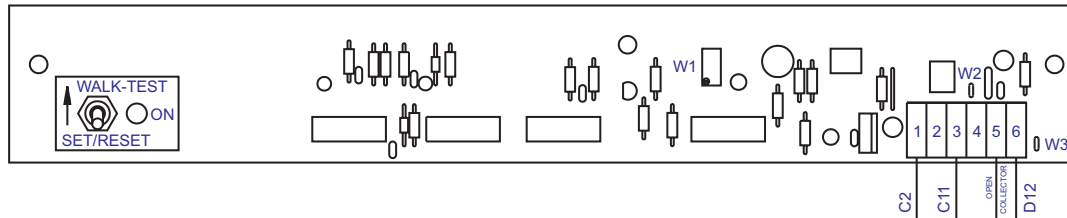
Jumper W2 and W3 will be installed.

TB1-1 goes to C2 on the main mother board (+28vdc.)

TB1-3 goes to C10,11 or 12 on the main mother board (Ground)

TB1-5 goes to D3 or D4 on the main mother board (Audible out)

TB1-6 goes to D12 on the main mother board (Reset)



When used with the main power supply and triggered by the Open Collector:

Jumper W1 **or** a 100K POT will be installed depending on the time requirements for ringing the notification devices.

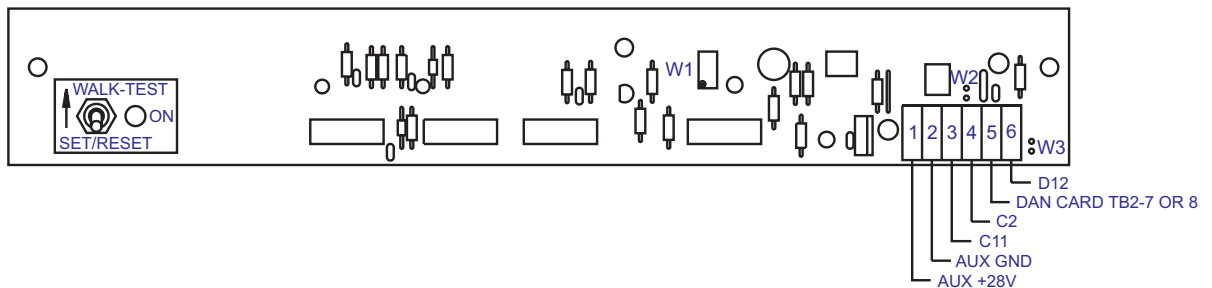
Jumper W2 and W3 will be installed.

TB1-1 goes to C2 on the main mother board (+28vdc.)

TB1-3 goes to C10,11 or 12 on the main mother board (Ground)

TB1-5 goes to an Open Collector such as D7 (Alarm O.C.)

TB1-6 goes to D12 on the main mother board (Reset)



When used with an Auxiliary Power Supply and Dan Board and triggered by the Audible Output:

Jumper W1 **or** a 100K POT will be installed depending on the time requirements for ringing the notification devices.

Jumper W2 and W3 will **not** be installed.

TB1-1 goes to Auxiliary +28vdc.

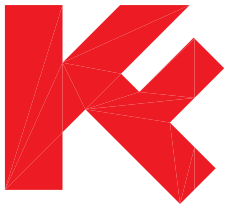
TB1-2 goes to Auxiliary Ground

TB1-3 goes to C10,11 or 12 on the main mother board (Ground)

TB1-4 goes to main mother board +28vdc.

TB1-5 goes to Dan Board TB2-7 or 8; or TB2-11 or 12

TB1-6 goes to D12 on the main mother board (Reset)



KFRTI-20/52 CLASS B

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847•398•7100 f 847•255•1507 e-mail sales@kfco.com Internet www.kfco.com

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATION IN DIRECT SUNLIGHT AND IN RAIN RUNOFF PATHS.
- DO NOT INSTALL CONDUIT INTO THE TOP SURFACE OF THE CABINET.

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR ZONE INPUTS, ANTENNA, AND AC POWER
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AN ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

INSTALLATION OF ENCLOSURE

GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

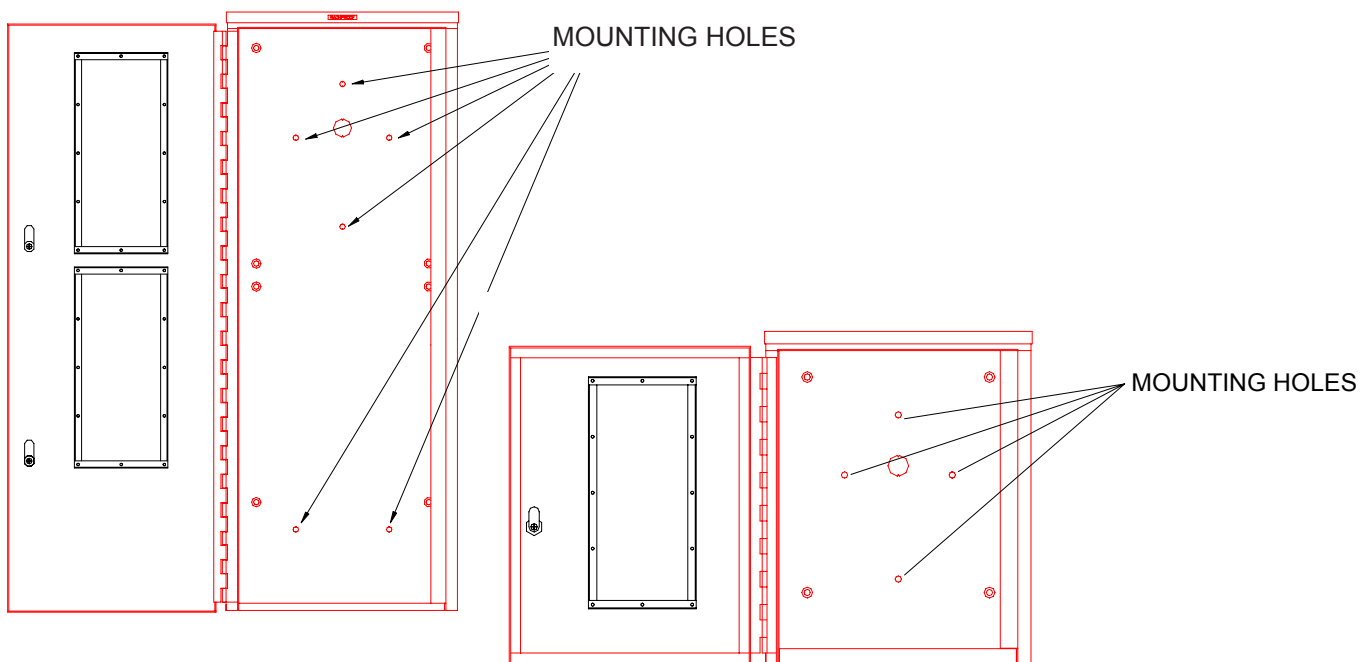
Read all instructions first.

Do not connect batteries or apply power until wiring and installation is complete and checked.

King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, The National Electric Code, the Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.

Locate a suitable position and structure for mounting the enclosure.

1. REMOVE the subplate(s) assembly from the enclosure by removing the four (4) nuts and washers (KFRTI-20) (8) nuts & washers KFRTI-52 panel
2. REMOVE the mouting hole knockouts located at the rear of the enclosure.



3. MOUNT the enclosure on a wall using appropriate hardware shown. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.

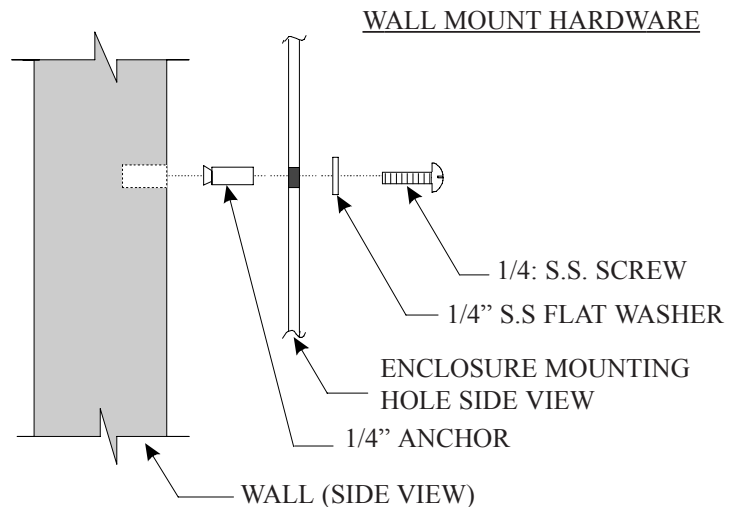
4. Run all conduit necessary to the enclosure.
Conduit must NOT enter through the top of the enclosure. Knockouts are provided on the sides and bottom of the cabinet. DO NOT remove knockouts with sub-plate(s) installed. Attach conduit to the enclosure using water-proof fittings with star locknuts. DO NOT use reducing washers.

These separate conduit runs are required:

AC Power

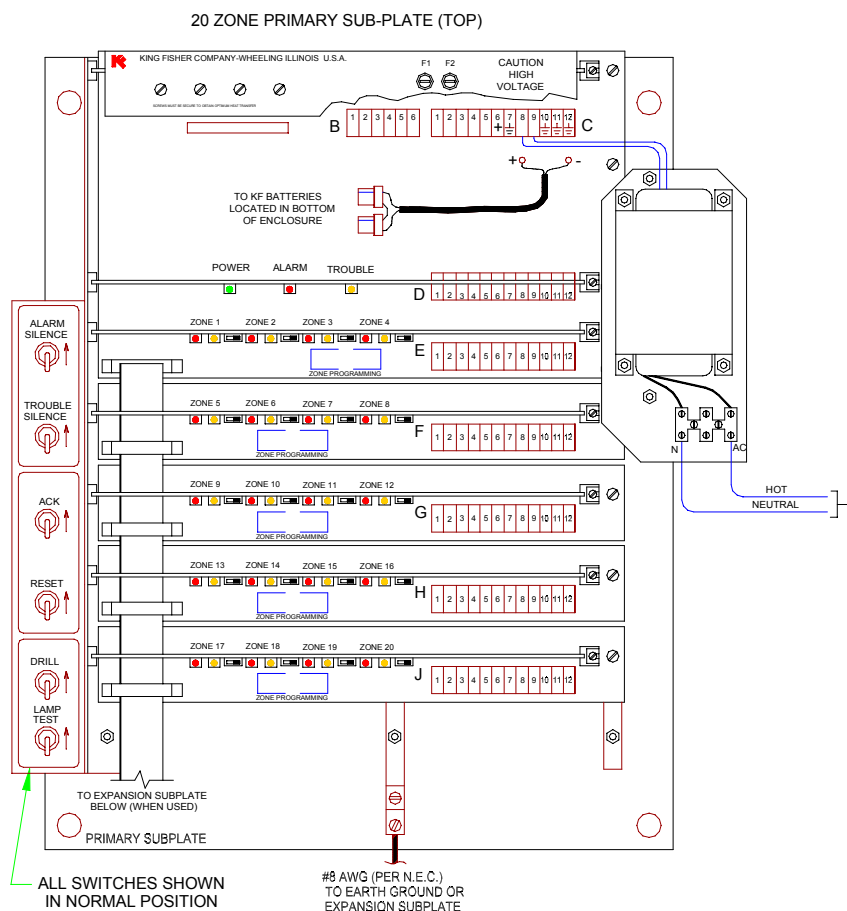
Zone Inputs and Audibles

Antenna Coax Cable



5. Reinstall sub-plate(s) and secure with 4 nuts and washers (8 nuts & washers in KFRTI-52 panel).

6. Remove all PC boards. Slide each circuit board out, one at a time, and lay them down in order on a clean, dry, non-conductive surface. Keep all circuit boards and zone boards in sequence as they are individually coded for proper transmission.



King-Fisher Company

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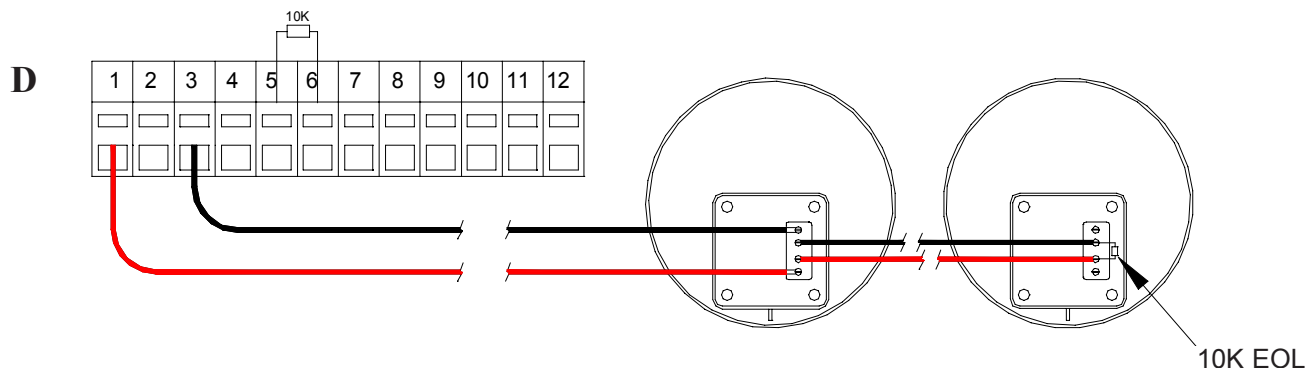
t 847•398•7100 f 847•255•1507 e-mail service@kfco.com Internet: www.kfco.com

PANEL WIRING

All wiring must be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction. Reference drawing 76807, 76810, 76803-1, and 76806-1 while reading the following instructions.

NOTE: Dress field wiring around the bottom and right sides of the enclosure.

7. Pull AC wiring into the cabinet. The KFRTI-20/52 panel operates on 120 VAC. 50/60Hz. single phase power. Connect HOT and NEUTRAL to terminals. This panel requires a 15 Amp/120 VAC Circuit Breaker or fused circuit to be installed external to the panel. Connect Earth ground at the bottom of the sub-plate(s) to the ground lug(s) provided.
8. Pull Alarm Indicating Wiring into the panel. Connect Bell/Horns to terminals D1 and D3 and observe proper polarity. If the alarm indicating circuit (bells, horns, sirens, etc.) wiring is longer than 100 feet from the panel to EOL device, refer to the Audible Circuit Wire Selection Appendix for the minimum gauge wire required.

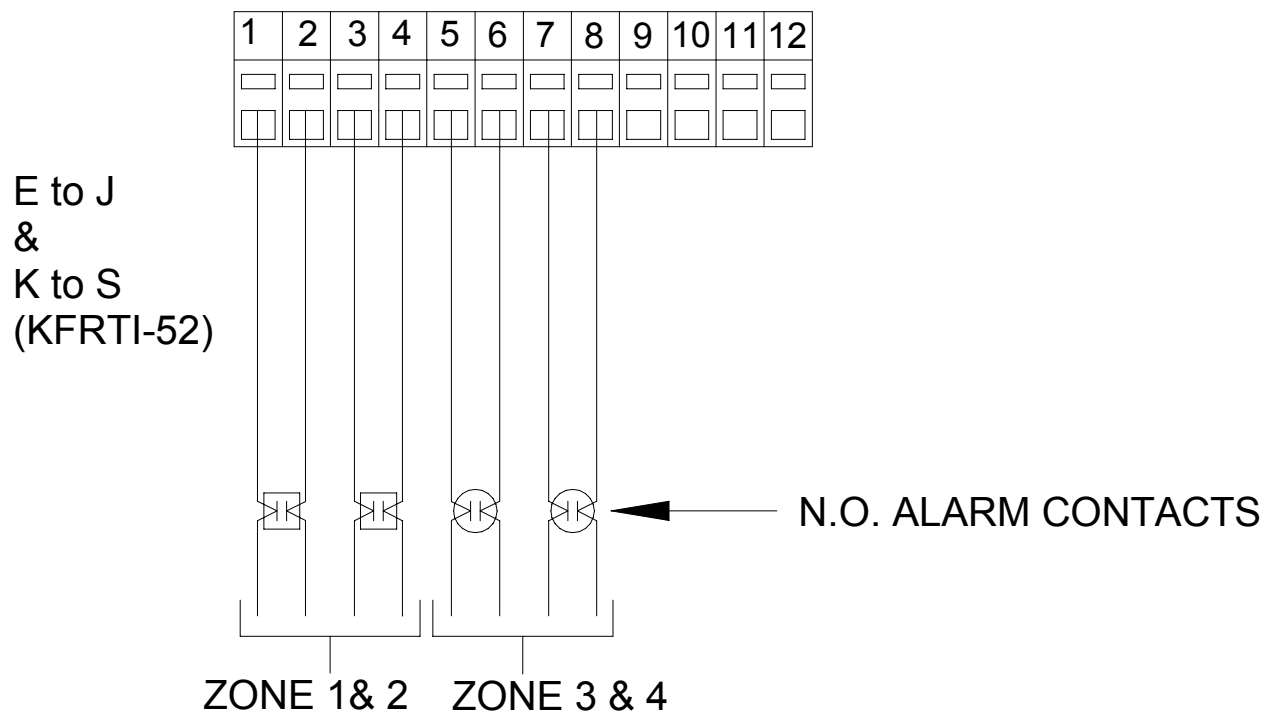


9. Pull all zone wiring into the enclosure. Zone wiring must be connected as per specifications and in accordance with King-Fisher instructions and drawings.

When wiring line powered smoke detectors the positive (+) zone terminal (1&2; 3&4; 5&6; 7&8) must connect to the positive (+) terminal of each detector. A maximum of 500 uA. can be drawn from each zone.

Properly supervised wiring is series-parallel connected with NO separate runs or “T” taps permitted.

The following diagram depicts Class “B” wiring.



10. Install Antenna, Reference drawing 76504 or 76506 depending on the type of antenna being installed.
11. After connection of field wiring, test the panel using the Testing Procedure starting on the following page.

Caution: Do not apply power to the panel, except as directed in the testing procedure.

The tests should be performed by persons who are familiar with King-Fisher radio systems. Refer to the KFRTI-20/52 Class “B” Operations manual if you are unfamiliar with the product.

This procedure only tests the Panel locally. It is highly recommended that all detectors and pull stations be activated before final approval of the system.

VISUALLY INSPECT:

Check Terminal Connections - All wiring should be terminated at a terminal block on one of the Mother-boards. Tug on the wires to be sure they are secure and look for exposed metal wires sticking out of a terminal which might cause a short or later corrode. AC wires should be all the way into the terminal block (No bare metal exposed). Be sure the ribbon cable is properly connected to each mother board and zone mother board (the red stripe is on the left).

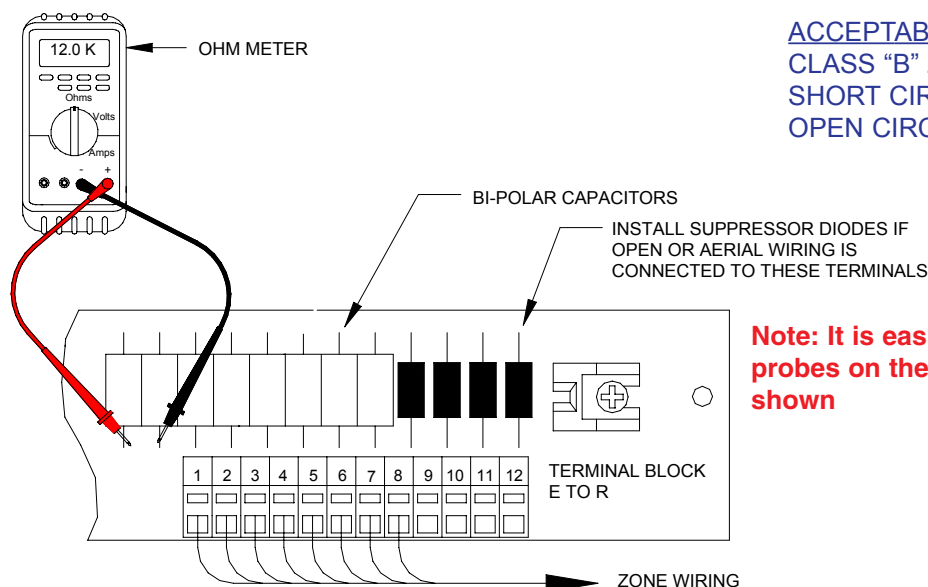
Check BNC Connection - Gently twist connector while holding cable secure. Connector should not rotate or come loose. The center tip should be flush with the outer sheath for good contact with the transmitter connector. Look for shorts between the ground sheath and the center conductor. Use an Ohm Meter to check the connector for shorts (Disconnect the coax from the antenna). Look for strayed ground wires sticking out of the connector.

READ CLASS “B” ZONE WIRING:

Check For Alarm or Open Circuit - Use an ohm meter to check for OPEN CIRCUITS between pins [1 and 2]; [3 and 4]; [5 and 6] and also pins [7 and 8] of terminal blocks E to R. During normal operation, these lines should indicate short circuit. Be sure the zone boards are removed, and the meter leads are making good contact with the zone wires or bi-polar capacitors as shown. There is no need to check the spare zones with no field wiring connected.

Check Zone For Short Circuit - Use the ohm meter to check for SHORT CIRCUITS between pins [1 and 2], [3 and 4], [5 and 6], and [7 and 8] of terminal blocks E to R. These lines should normally indicate 12K resistance.

Check Zone For Ground Fault Condition - Use the ohm meter again to check for open circuit (NO shorts) between chassis ground and each zone wire. Testing between ground and zone wires should indicate open circuit.



ACCEPTABLE LIMITS

CLASS “B” ZONE = 12K ohms $\pm$ 10%

SHORT CIRCUIT = 20 ohms or less

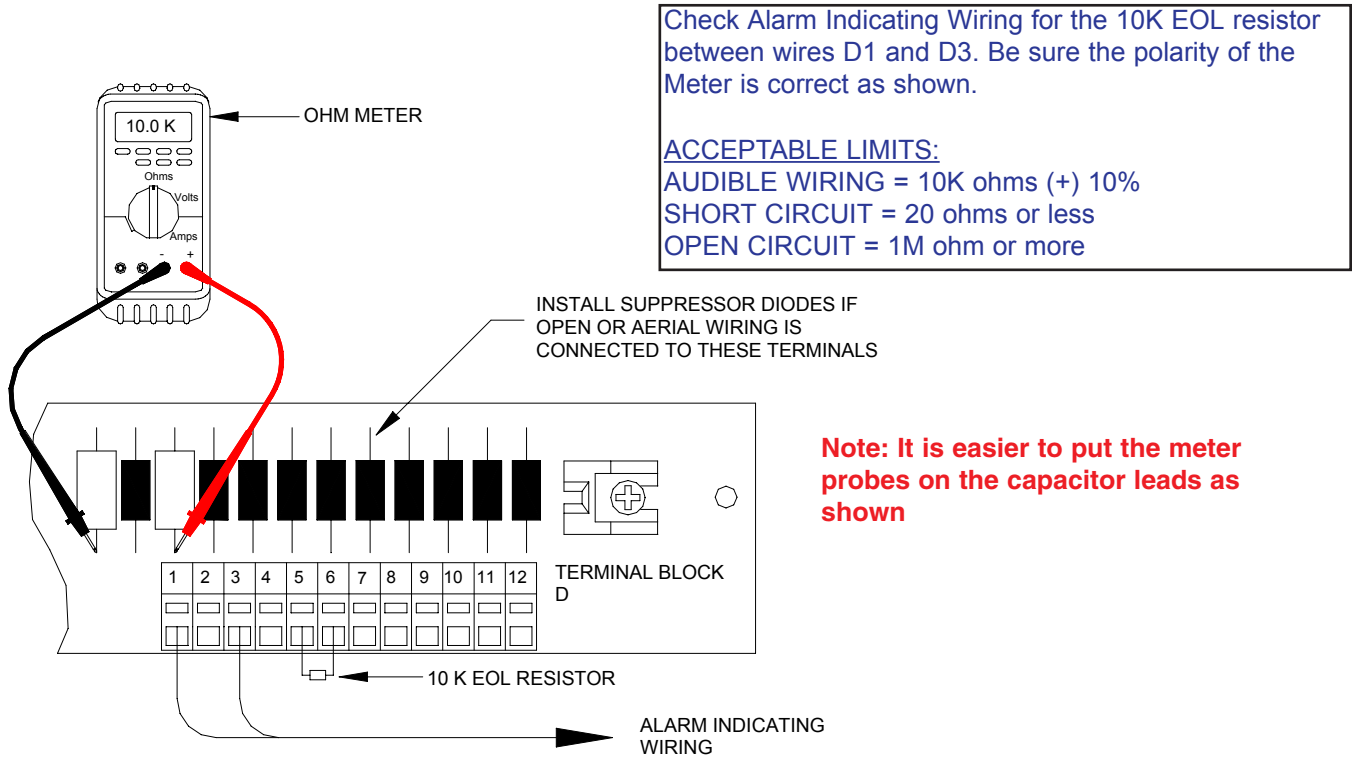
OPEN CIRCUIT = 1M ohms or more

READ ALARM INDICATING WIRING:

Check For Short or Open Circuit - If horns or bells are connected, use a digital ohm meter to check for the 10K EOL resistor across audible terminals D1 and D3. Be sure the Alarm Control Board is removed, and the meter leads are making good contact with the two wires.

Check For Ground Fault Condition - Also check for open circuit (No shorts) between chassis ground and terminals D1 and D3.

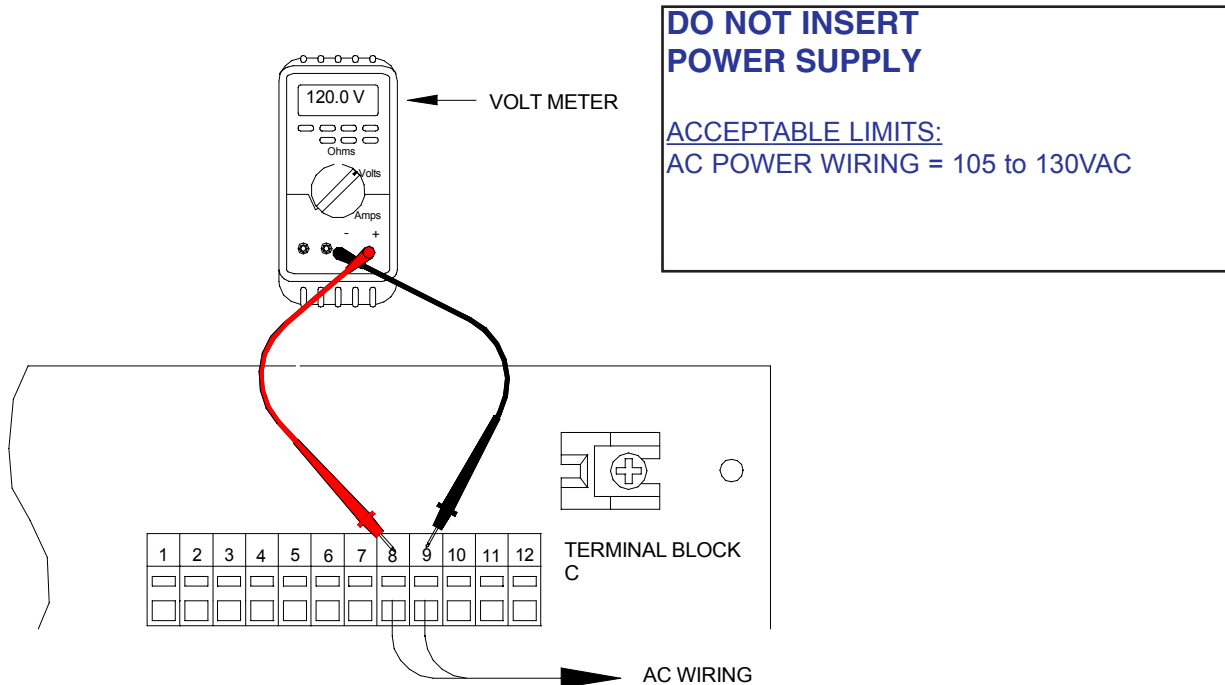
NOTE: Be sure there is a 10K EOL resistor across pins D5 and D6, or the panel will indicate trouble.



APPLY AC POWER TO MOTHER BD:

NOTE: Check the color of the wiring first. Black=Hot, White=Neutral, Green=Ground

Check Polarity - Switch on the AC power going to the Mother Board, and check terminals C8, C9, and C10 which are Hot, Neutral, and Ground respectively. The ground connection should be made at the ground lug on the bottom of each subplate. The AC power connection and polarity must be correct, otherwise the power supply will be severely damaged. Switch off AC power before proceeding.



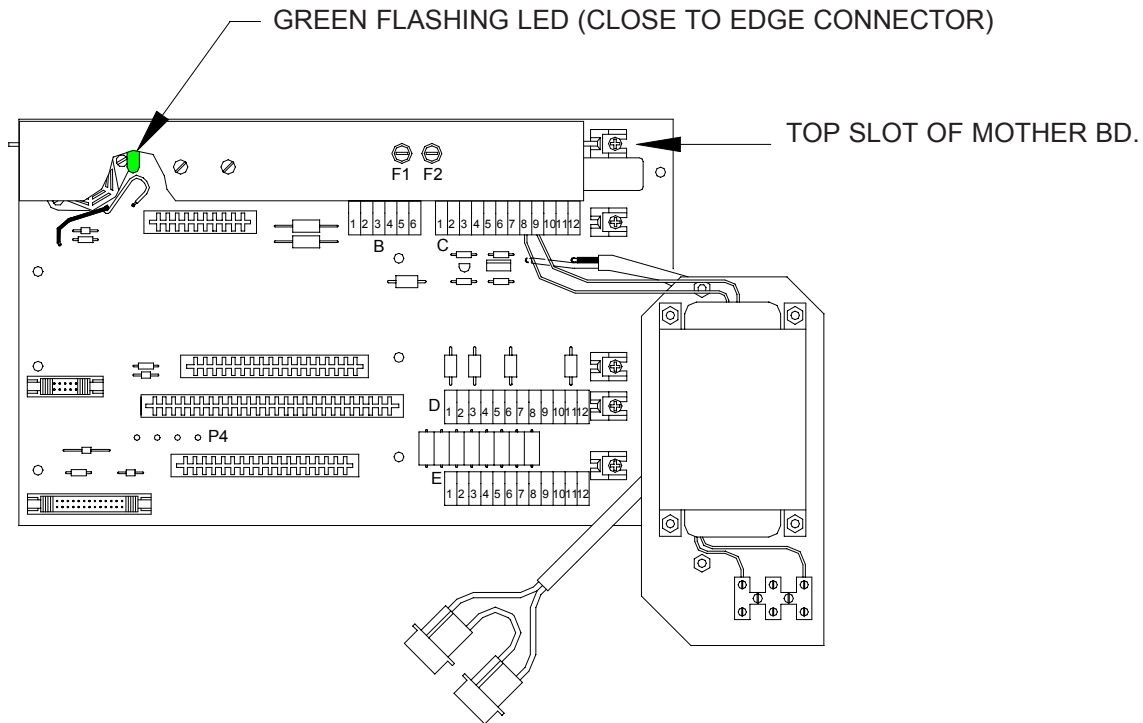
REMOVE POWER AND INSERT POWER SUPPLY:

Remove power at the circuit breaker. Use a flat blade screwdriver to remove both fuses (F1 and F2), and then slide the power supply into the top slot of the Mother Board. The power supply should snap firmly into place.

INSTALL FUSE F2:

F2 is a 120 volt, 3 Amp, slo-blo fuse.

Switch on AC Power - Turn on the power at the circuit breaker. Check For Power “ON” - Inside the Power Supply is a Green LED which will begin flashing whenever AC or Battery Power is applied. It should begin flashing after AC Power is switched on.

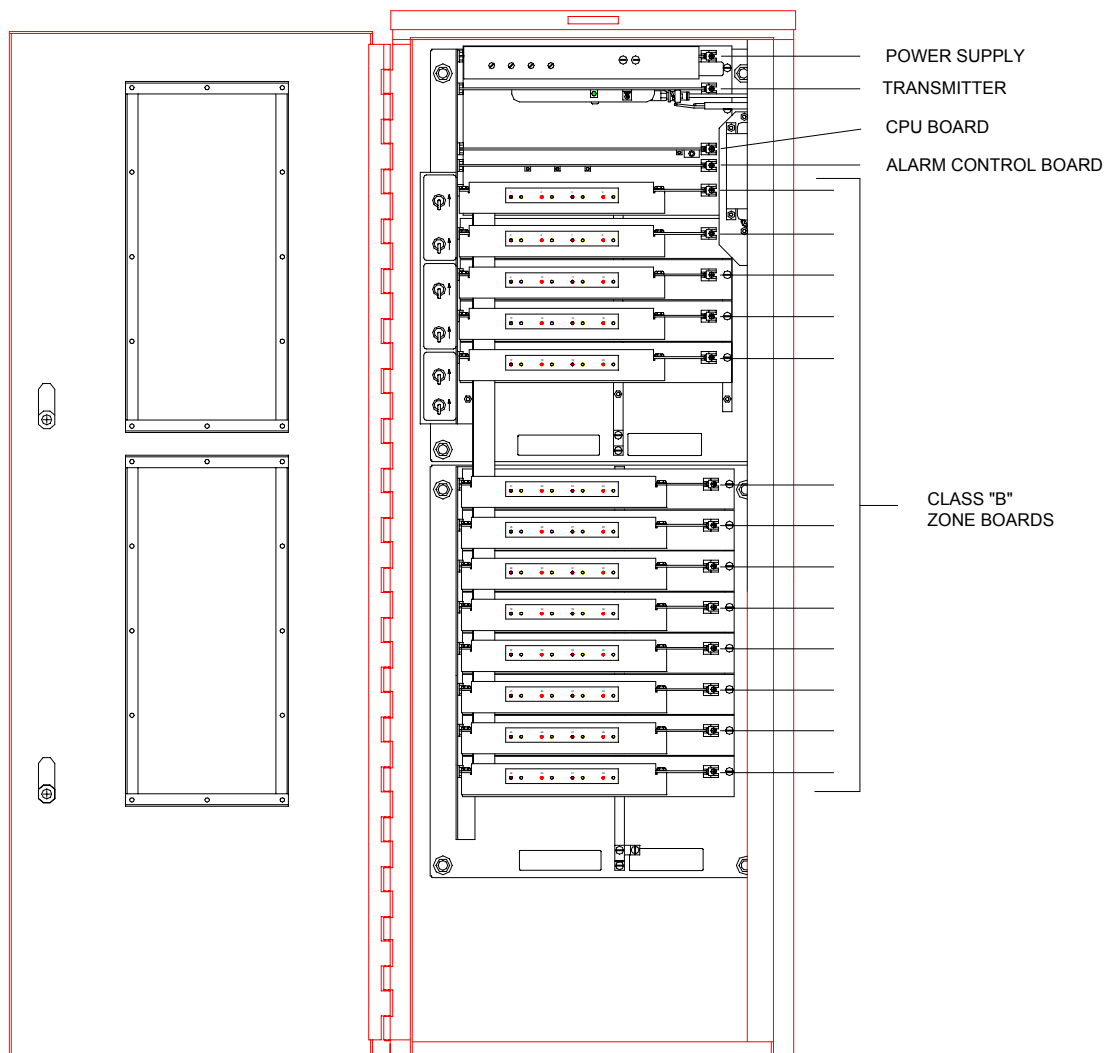


REMOVE FUSE F2:

Check For Power “OFF” - The Power Supply’s flashing LED should turn off after removing fuse F2.

INSERT ALL PCB’S

BE SURE NO POWER IS APPLIED. Slide each Printed Circuit Board (PCB) one at a time into its correct position. Zone Cards are not interchangeable; replace in the same order as removed. Reference the zone card programming sheet at back of manual. Push boards firmly into place for proper seating into the edge connector. Also attach the antenna coax connector to the transmitter (if applicable). Remove the dummy load if it is still attached to the transmitter.



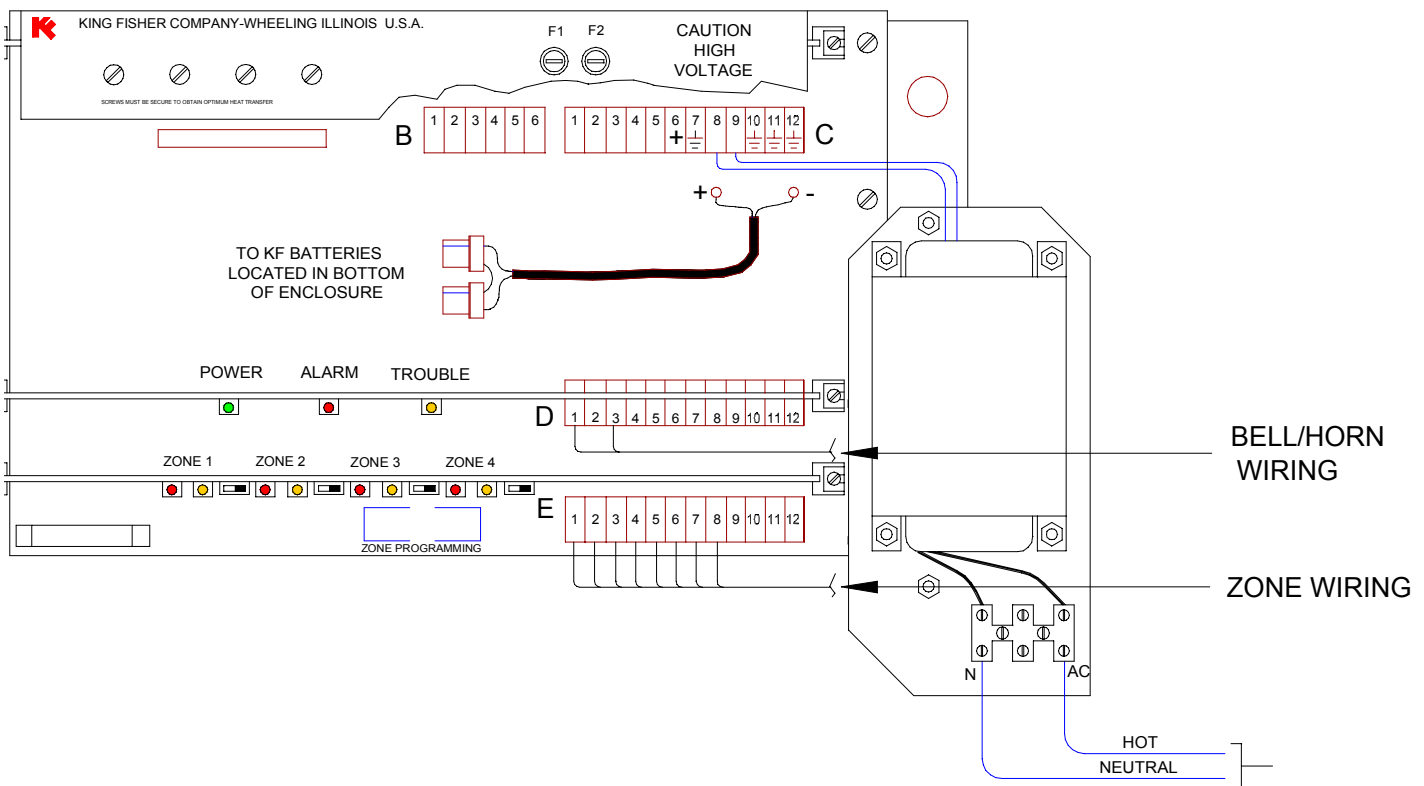
INSTALL AC POWER AND FUSE F2:

Check For Power “ON” - The green AC power LED on the Alarm Control Board should illuminate. The common trouble LED and internal buzzer will be pulsing because the batteries are not connected. Use the “Trouble Silence” switch to silence the buzzer.

INSTALL BATTERIES AND FUSE F1:

The battery connectors are polarized, so do not try and force them together. Fuse F1 is a 28 volt, 3AG, 4 Amp, normal-blow fuse.

Check For Normal Condition - After both batteries are connected, AC Power is applied, and the trouble silence switch is in normal (down) position, the panel should be completely out-of-trouble. Only the AC Power LED is on. This is the “Normal Operating Condition” of the KFRTI-20/52 Panel.



ALARM ALL ZONES:

Trip one zone at a time locally at the panel by shorting the terminals with a 12 inch piece of single strand wire bent in half with both ends stripped. Place the shorting wire across terminals [1 and 2]; [3 and 4] [5 and 6]; [7 and 8] to trip each Class “B” zone. Reset each alarm and check the receiver for the proper reception before going to the next consecutive zone.

Check the LED Condition - The Common Alarm and Each Zone Alarm tripped should flash until acknowledged.

Check that the Alarm Indicating Devices are Operating - Each alarmed zone should operate all horns, bells, etc. connected to the panel.

Check the Transmission (if applicable) - Check the base receiving station and confirm that each alarm tripped was received and processed. Also check that the green transmit LED and the green CPU LED came on during these tests.

OPERATE SWITCHES:

Alarm a zone and check the following switches:

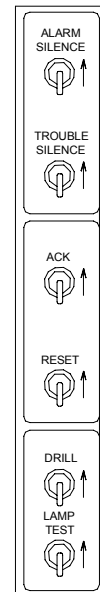
Check “Alarm Silence” Switch - This switch will turn off all audible/visual alarm indicators and the internal buzzer. Subsequent zones alarmed will reactivate these devices.

Check “Acknowledge” Switch - This switch will change all flashing alarm LEDs to a non-flashing steady state.

Check “Reset” Switch - This switch will turn off all alarm LEDs, whose initiating devices are no longer in alarm condition. It will also reset any smoke detectors which are powered by the panel. The panel will continue processing all alarms and troubles loaded into the CPU’s memory.

Check “Drill” Switch - This switch will operate all alarm indicating devices for testing the panel’s bell/horns. No message is transmitted when using the Drill switch.

Check “Lamp Test” Switch - This switch will illuminate all alarm and trouble LED indicators. The CPU and transmitter LEDs will not light during lamp test.



GO TO ANY OF THE DEVICES:

Have the installer open one of the initiating devices (Pull Station, detector, etc.) to access the field wiring.

Check that the Wiring is Correct - There should be two wires coming into the detector box, and two wires going out to the next detector or the panel itself.

Check For Open Circuit Trouble Detection - Disconnect one of the wires and check the panel for zone trouble and the base receiving station for Trouble 2 Message. Trip the alarm with the wire disconnected. Reconnect the wire.

Check For Ground Fault Trouble Detection - Use the shorting wire to short one of the wires to ground. Again, check the panel for trouble and the base receiving station for Trouble 2 Message.

Check For Alarm and Transmission - Trip the initiating device by performing an actual alarm test under normal conditions. e.g. Blow smoke into a smoke detector.

PRESS “TEST” SWITCH:

The “TEST” Switch is located on the right side of the CPU board.

Check For “TEST” transmission to Receiver - Check the base receiving station for the correct message received.

ANTENNA SWR (IF APPLICABLE):

Only perform this section if a SWR meter is available and you know how to use it.

Check the Forward Power - Connect a Bird watt meter in-line between the transmitter and antenna. Turn the slug so that the arrow is pointing forward (towards the antenna). Press the TEST switch. The meter should momentarily read 0.5 to 1.0 watt during transmission.

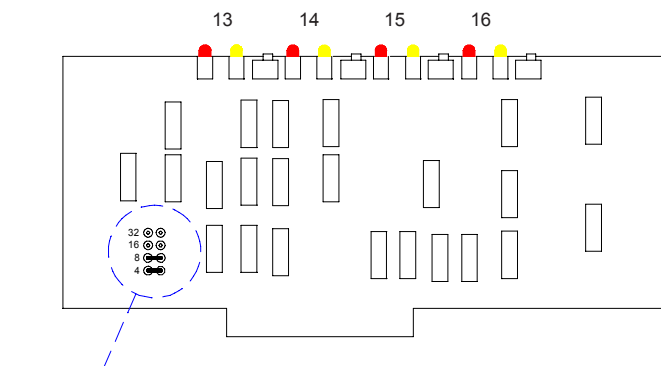
Check the Reflected Power - Turn the slug towards the transmitter. Press the TEST switch again. The meter should read 0 watts if the coax, connectors, and antenna are assembled correctly.

KFRTI-20/52 CLASS "B" ZONE BOARD PROGRAMMING

Remove power (AC and Battery) before removing or installing any of the circuit boards. Zone boards must be coded as shown below in order to operate correctly. Do Not interchange zone board positions. Jumper plugs inserted are additive. The sum of the plug positions (32, 16, 8, & 4) plus one(1) is the first zone number of that card. E.G.:

For zones 13, 14, 15, & 16 plugs should be inserted in positions 4 and 8; $4 + 8 + (1) = 13$.

NOTE: The programming shown below is for a FOUR ZONE board.



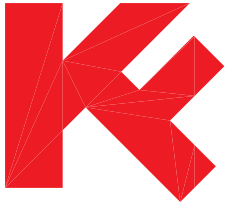
ZONE BOARD PROGRAMMING

ZONES 1 TO 20

FOR ZONES 1 to 4: (NO PLUGS)	32 ☐ ☐ ☐ 16 ☐ ☐ ☐ 8 ☐ ☐ ☐ 4 ☐ ☐ ☐
FOR ZONES 5 to 8:	32 ☐ ☐ ☐ 16 ☐ ☐ ☐ 8 ☐ ☐ ☐ 4 ☒ ☐ ☐
FOR ZONES 9 to 12:	32 ☐ ☐ ☐ 16 ☐ ☐ ☐ 8 ☒ ☐ ☐ 4 ☐ ☐ ☐
FOR ZONES 13 to 16:	32 ☐ ☐ ☐ 16 ☐ ☐ ☐ 8 ☒ ☐ ☐ 4 ☒ ☐ ☐
FOR ZONES 17 to 20:	32 ☐ ☐ ☐ 16 ☒ ☐ ☐ 8 ☐ ☐ ☐ 4 ☐ ☐ ☐

ZONES 21 TO 52 (EXPANSION SUBPLATE ONLY)

FOR ZONES 21 to 24:	32 ☐ ☐ ☐ 16 ☒ ☐ ☐ 8 ☐ ☐ ☐ 4 ☒ ☐ ☐	FOR ZONES 37 to 40:	32 ☒ ☐ ☐ 16 ☐ ☐ ☐ 8 ☐ ☐ ☐ 4 ☒ ☐ ☐
FOR ZONES 25 to 28:	32 ☐ ☐ ☐ 16 ☒ ☐ ☐ 8 ☒ ☐ ☐ 4 ☐ ☐ ☐	FOR ZONES 41 to 44:	32 ☒ ☐ ☐ 16 ☐ ☐ ☐ 8 ☒ ☐ ☐ 4 ☐ ☐ ☐
FOR ZONES 29 to 32:	32 ☐ ☐ ☐ 16 ☒ ☐ ☐ 8 ☒ ☐ ☐ 4 ☒ ☐ ☐	FOR ZONES 45 to 48:	32 ☒ ☐ ☐ 16 ☐ ☐ ☐ 8 ☒ ☐ ☐ 4 ☒ ☐ ☐
FOR ZONES 33 to 36:	32 ☒ ☐ ☐ 16 ☐ ☐ ☐ 8 ☐ ☐ ☐ 4 ☐ ☐ ☐	FOR ZONES 49 to 52:	32 ☒ ☐ ☐ 16 ☒ ☐ ☐ 8 ☐ ☐ ☐ 4 ☐ ☐ ☐



KFRTI-20/52 CLASS "B"

OPERATIONS MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

GENERAL

The KFRTI-20/52 Class “B” Panel is capable of monitoring and transmitting up to 52 zones of detection devices and switch contacts. It also monitors itself for panel trouble and sends a daily test message (when used as a radio transmitter) including the panel’s current status.

This Operations manual is divided into five sections:

CONTROLS AND INDICATORS - Gives a brief description of each switch, LED, and the internal buzzer.

ALARM CONDITION - Describes what happens when the panel detects an alarm.

TEST CONDITIONS - Describes the two types; Manual and Automatic Test.

TROUBLE CONDITIONS - Describes what happens when a panel detects trouble.

SELECTABLE OPTIONS - Describes the programmable options available with Class “B” panels.

CONTROLS AND INDICATORS

Operation of the King-Fisher KFRTI-20/52 Class “B” Panel is simple and free from complicated controls and indicators. The control panel, switches, and LED indicators have been human engineered for ease of operation.

SWITCH CONTROLS

There are nine possible front panel controls which are grouped in four categories; Silencing, Restoration, Disconnect and Testing. Refer to the Illustration on the following page, while reading the descriptions below.

Silencing Switches:

ALARM SILENCE (A1) - Momentary-contact switch which silences all alarm indicating devices (bells, horns, strobes, etc.) and the internal buzzer subsequent to a zone alarm. The indicating devices will be re-triggered by succeeding zone alarms.

TROUBLE SILENCE (A2) - Two-position switch which silences trouble audible devices and the internal pulsing buzzer subsequent to a trouble condition.

Restoration Switches:

ACKNOWLEDGE (A3) - Momentary-contact switch which changes all flashing red LEDs in alarm, to a non-flashing steady-state. Any subsequent alarm will cause the corresponding zone alarm and common alarm LEDs to flash until acknowledged again.

RESET (A4) - Momentary-contact switch which restores all circuits to their normal stand-by condition and resets each zone device unless they are locked in alarm. However, the transmitter will continue sending all

messages which were latched into the CPU's memory, until complete.

Testing Switches:

DRILL (A5) - Momentary-contact switch which operates alarm indicating circuits for testing horns, bells, strobes, and the internal buzzer. No message is transmitted when using the Drill switch.

LAMP TEST (A6) - Momentarily illuminates all control panel LED indicators except for the green transmitter LED and the Green CPU Busy LED.

MANUAL TEST (A7) - Push-button located on the right side of the CPU board, used to interrogate the panel and/or transmit two rounds of test (If applicable).

Disconnect Switches:

Zone Disconnect (B3) - Two-position switch (4 per board) located on the Class "B" Board. This switch will disable all alarm processing yet annunciate an alarm condition for purposes of testing, servicing, or isolating a zone. Placing the switch in the (disconnect) position will cause the trouble LED to illuminate until the switch is restored to the normal position.

LED INDICATORS

There are eight (8) possible types of LED indicators located on the boards listed below. Refer to the illustration on the following page while reading the descriptions below.

Class "B" Zone Boards LEDs:

ZONE ALARM LED (B1) - Red LEDs which pulse when a zone has an alarm condition caused by a short placed across the zone wiring. Steadies when acknowledged.

ZONE TROUBLE LED (B2) - Amber LEDs which illuminate when a zone has a trouble condition caused by a ground fault or broken wire. The LED will stay lit until the trouble is corrected. When a zone trouble condition is detected, the corresponding zone trouble LED and common trouble LED will:

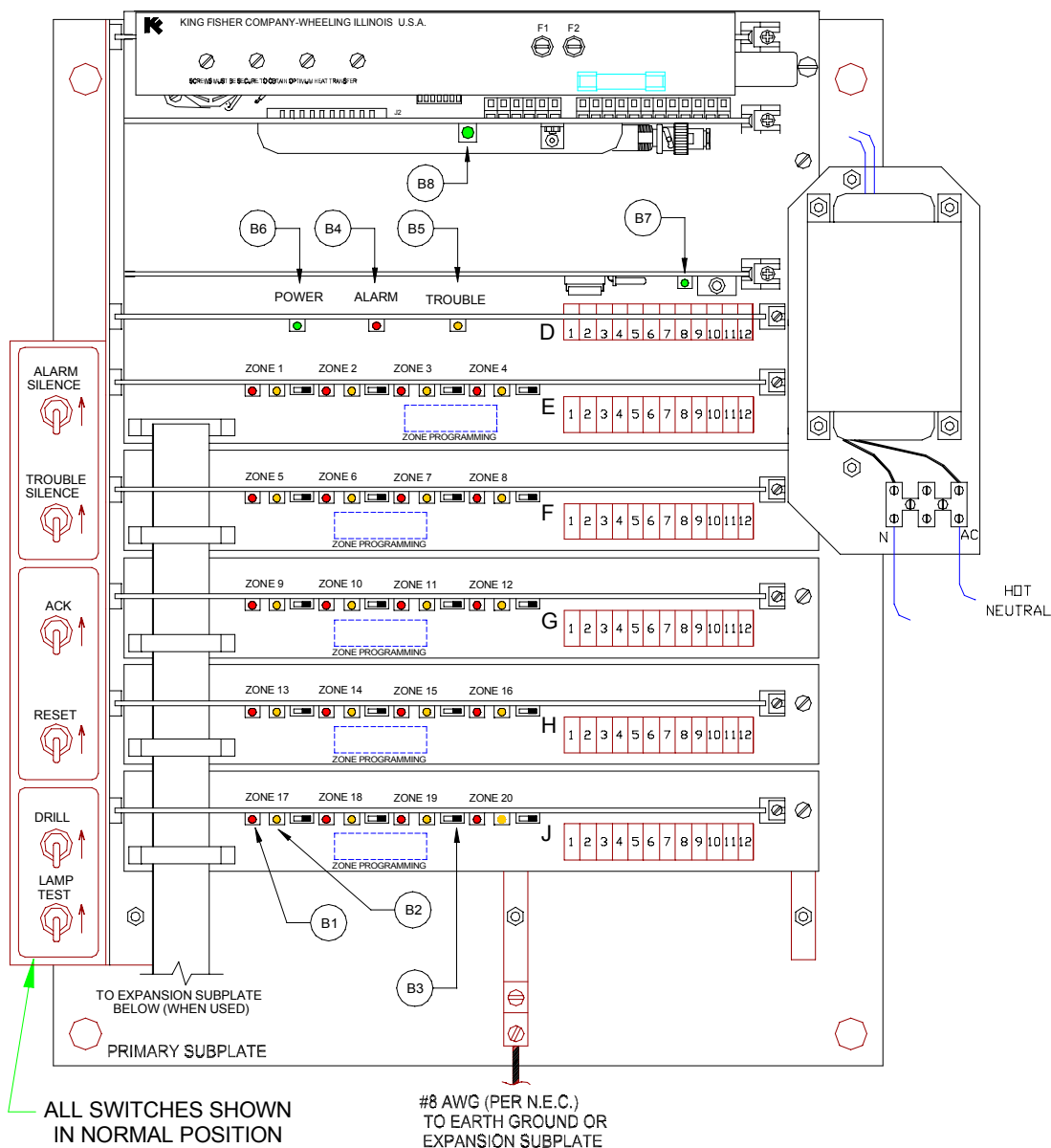
- a. Flash in-phase for an open circuit (broken wire) condition.
- b. Flash out-of-phase for a ground fault condition.
- c. Be steady for both trouble conditions.

Alarm Control Board LEDs:

COMMON ALARM (B4) - Red LED which pulses when one or more zones are in alarm. Steadies when acknowledged. Also flashes if re-triggered by a new alarm.

COMMON TROUBLE (B5) - Amber LED which pulses when there is; one or more zones in trouble, a low or no battery condition, loss of primary power, a board failure, or a board not seated properly. The LED will flash until the trouble is corrected.

AC POWER (B6) - Green LED which is lit while primary ac power is on. This LED will not be



B1 - ZONE ALARM LED (TYPICAL)

B5 - COMMON TROUBLE LED

B2 - ZONE TROUBLE LED (TYPICAL)

B6 - AC POWER LED

B3 - ZONE DISCONNECT SWITCH

B7 - CPU BUSY LED

B4 - COMMON ALARM LED

B8 - TRANSMIT LED

illuminated while on secondary or battery power only.

CPU Board LEDs (If Applicable):

CPU BUSY (B7) - Green LED which lights while the CPU is processing instructions. Waits until all messages have been sent and panel has timed out before it clears.

Transmitter LEDs (If Applicable):

TRANSMIT (B8) - Green LED which lights while the transmitter is sending a message. Lights momentarily for all three message rounds sent.

SINGLE TONE BUZZER

The internal buzzer is located on the mother board and will sound when one of the following conditions occur.

ALARM - A constant buzzer sound when a zone alarm is tripped or while pressing Drill. Can only be turned off by flipping the alarm silence switch or by resetting the panel.

TROUBLE - A pulsing buzzer sound when a zone or panel is in trouble. Can only be turned off by putting the trouble silence switch in the up position or by correcting the problem.

TRANSMIT - A momentary buzzer sound during a transmission of a message (if applicable).

ALARM CONDITION

An Alarm condition will occur when a detection device or pull station has imposed a short across the zone's field wiring. The alarm detection devices may be a smoke detector, flow switch, heat detector, etc., depending on the system specifications.

INITIAL ALARM CONDITIONS

When an alarm condition exists on one of the zones, the panel will latch into alarm and indicate the following:

1. The respective RED Zone Alarm LED will begin flashing.
2. The RED Common Alarm LED will begin flashing.
3. The Audible Alarm Device(s) will operate (horns, bells, strobes, etc.).
4. The Transmit LED (if applicable) will momentarily light during the three rounds of emergency message transmission.

OPERATOR ACKNOWLEDGMENT

Upon arrival at the panel of an alarm message, the panel operator should perform the following tasks:

1. Observe all annunciated status indicators and record their current states.
2. Press the Acknowledge switch to steady the Alarm LEDs. The common alarm LED will begin flashing again if any other zone alarm is tripped and the alarm indicating devices will be switched on again.
3. If desired, silence the alarm indicating devices by switching the Alarm Silence switch momentarily up.
4. Reset the Panel once all zones are cleared of alarm and the panel has stopped transmitting.

NOTE: All Alarm LEDs can be turned off by pressing the Reset Switch. Any zone whose field devices are locked in alarm will cause these zones to re-alarm.

TEST CONDITIONS

MANUAL TEST

The KFRTI-20/52 Class “B” Panel has a test push-button located on the CPU board which when pressed will transmit two rounds of test plus all current panel status (alarms and troubles) to the base receiving station. The internal buzzer will momentarily sound during each message transmitted, but none of the external alarm indicating devices will operate.

AUTOMATIC TEST

The KFRTI-20/52 Class “B” Panel will automatically transmit two rounds of test plus current panel status each day to show that it is operating correctly. The exact time automatic daily test is sent depends upon the time the panel’s internal clock was reset. The test clock can be reset by operating ACKNOWLEDGE and LAMP TEST switches simultaneously. Once the internal clock is reset, the panel will send TEST after 12 hours, and then TEST every 24 hours thereafter.

The KFRTI-20/52 Class “B” Panel is normally programmed to send three kinds of trouble messages (1, 2, or 3). Trouble message #1 is sent when the panel has a problem with a: PC Board, switch, audible device, power. Trouble message #2 is sent when the panel has a zone or disconnect switch in trouble. Trouble message #3 is sent prior to the panel shutting down due to a low battery voltage being detected while on battery backup. This signal (#3) indicates that the panel will be non-operational at the end of this message.

ZONE TROUBLE

A zone trouble condition occurs when the zone's field wiring, disconnect switch or zone device has an open state or a ground fault, possibly causing the zone to be inoperative. Whenever a trouble condition does exist on one of the zones, the following will occur:

1. The respective AMBER Zone or Trouble LED will illuminate on the Zone Board.
2. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
3. The Audible Trouble Device(s) and Internal Buzzer will pulse.
4. The Transmitter will send three rounds of TROUBLE message #2 (if applicable).

AUDIBLE TROUBLE

The KFRTI-20/52 Panel monitors all alarm indicating devices. When there is a trouble condition on the alarm indicating wiring, the following will happen to the panel:

1. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of TROUBLE message #1 (if applicable).

PC BOARD TROUBLE

PC Board trouble is when a circuit board is out of place, malfunctioning, or loses its power. The following will occur when there is a board trouble:

1. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of TROUBLE message #1 (if applicable).

SWITCH PANEL TROUBLE

Switch panel trouble can occur when one or more of the panel's switches are out of position or a wire is broken leading to the switches. The following will happen when there is switch trouble:

1. The AMBER Common Trouble LED will pulse on the Alarm Control Board.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of TROUBLE message #1 (if applicable).

POWER TROUBLE

Power trouble can occur at any time, and is probably the most critical supervisory feature of the KFRTI-20/52 Class "B" panel. The following will happen if primary AC power is lost:

1. The AC Power LED will go off.
2. After a 70 second time delay, the AMBER Common Trouble LED will pulse.
3. The Panel's Internal Buzzer will pulse.
4. The Panel will Transmit three rounds of TROUBLE message #1 (if applicable).
5. If the battery voltage drops below the 24.0 volt Low Battery Threshold, the panel will send three rounds of TROUBLE message #3 (if applicable) with LOW BATTERY message (LB).
6. If the battery voltage drops down to 22.3 volts, the panel will send four to six rounds of TROUBLE message #3 (if applicable) with LOW BATTERY message (LB) and then shut off all power completely until the batteries are replaced and/or the AC power is re-applied.

SELECTABLE OPTIONS

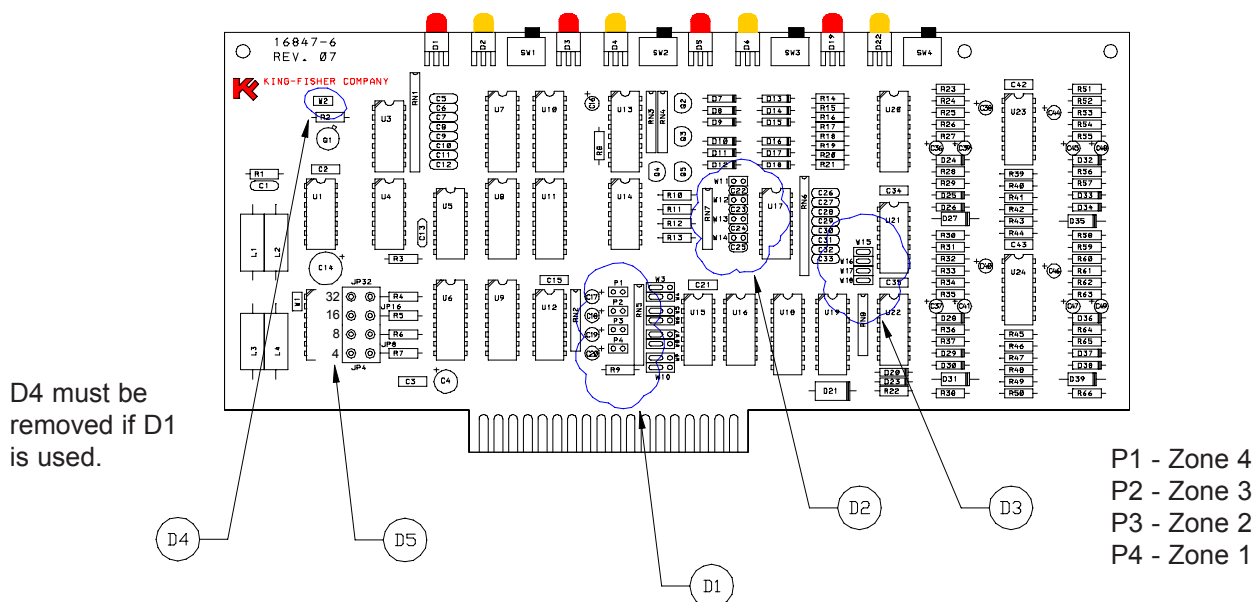
Reference the selectable options in the illustrations below while reading the the descriptions of each. Some of the options are to be factory programmed only.

ZONE ADDRESS PROGRAMMING (D5)

Class “B” zone input boards have to be individually programmed with the correct zone numbers. Jumpers are used to symbolize the first zone number location of each class “B” board. To program any board, use the tables in the KFRTI-20/52 Class “B” Zone Card Programming Appendix.

NON-AUDIBLE SELECTION (D1)

Class “B” zone input boards have the capability of not sounding the audible horns and bells during an alarm. The non-audible mode can be selected for any zone by simply inserting a jumper plug in the positions shown. The numbers 1 and 2 next to the socket refer to either the left or right zone respectively on each zone card.

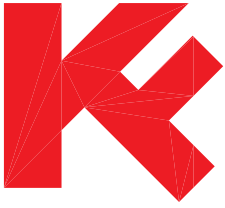


NON-TRANSMIT SELECTION (D2)

Class “B” boards have the capability of not transmitting alarm signals to the receiver. The non-transmit mode can be selected for one zone or all 4 zones. To do so, consult the factory.

NON-LATCHING/AUTOMATIC RESET SELECTION (D3)

Class “B” boards have the capability of not latching into alarm. The auto reset mode can be selected for one zone or all 4 zones. To do so, consult the factory.



KFRTI-20/52 CLASS "B"

MAINTENANCE MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

CAUTION -

RISK OF ELECTRICAL SHOCK

Only Qualified Service Technicians should attempt repairs to KFRTI-20/52 Panels.

Chassis Must be connected to earth ground. Hot and Neutral polarity MUST be observed when connecting AC Power.

All Test and Service areas should be equipped with 120 VAC to 120 VAC isolated transformers and ground fault detecting circuit breakers, if possible.

DO NOT Remove or install any circuit boards or field wiring while the panel is under power.

Refer to King-Fisher KFRTI-20/52 Operations Manual #75810-1 for correct operating procedure of the panel.

Use special tool (K-F part #22155 or #22158) for removing and installing wires into terminals.

<u>Power-Down Procedure:</u>	<u>Power-Up Procedure:</u>
1. Unplug either battery at battery connector.	1. Install fuse F2 into power supply.
2. Turn off AC Power at the circuit breaker or fuse connected to the panel.	2. Turn on the Circuit breaker or install fuse.
3. Remove fuse F2 from Power Supply using a small flat blade screwdriver.	3. Connect battery(s) and observe green AC Power LED on Alarm Control Board.

ROUTINE TESTING

KFRTI-20/52 Panels should be tested on a regular basis. It is recommended that each panel be tested every 3 to 6 months or whenever user maintenance programs require. The following should be checked:

- A. TRIP each zone by activating alarm initiating devices. Confirm their transmission at the base receiving station.
- B. OPERATE each switch. Trip a zone into alarm. Acknowledge the alarm (steady the LEDs) by momentarily placing the "ACK" switch in the up position. Silence the alarm audibles. Reset the alarm circuits and devices.
- C. PRESS the test switch and check for two rounds of test at the console receiver.
- D. DISCONNECT the batteries and check the voltage of each (approx. 13 to 14 vdc.).
- E. REMOVE AC power and check the operation of panel on battery backup for a few minutes.

RETURN ALL SWITCHES AND DEVICES TO NORMAL BEFORE LEAVING THE PANEL

POWER PROBLEMS

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. PANEL IS DEAD, OR GREEN AC POWER LED IS OFF	1. Circuit Breaker	Reset AC Breaker to the "on" position
	2. AC Wiring	Check for 120 VAC on terminals C8 and C9 of the Mother Bd. Replace AC wiring
	3. Main Mother Board	Check for 120 VAC on Pins 13 & 14 of edge connector J1 on mother bd. Replace Mother board
	4. AC Power Fuse F2	Main AC Fuse F2 (in power supply) is blown. Replace with same type
	5. Power Supply	Green AC power LED should be on inside Power Supply with AC power and/or battery power applied. Replace Power Supply and check for green LED on
B. AC POWER IS OK BUT NO BATTERY BACKUP POWER	1. Defective Batteries	Each battery should have at least 12 volts across terminals when disconnected. Replace battery(s)
	2. Battery Cable	Remove AC power and check battery voltage at Mother board. Voltage should be between 24-28 vdc. Replace cable if necessary
	3. Battery Fuse F1	Battery fuse F1 inside Power Supply may be blown. Replace fuse F1 with same type
	4. Power Supply	With only battery power applied, check green LED is on inside Power Supply. Replace Power Supply
C. PANEL IS HUNG-UP (CPU LED STUCK ON)	1. Power Supply	If the CPU LED stays illuminated for more than 2 minutes, power down and then power up
	2. CPU Board	Replace CPU board if power down sequence doesn't work
D. PANEL IS HUNG-UP (TRANSMIT LED STUCK ON)	1. Power Supply	If Transmitter LED stays on for more than 1/2 sec per message sent, power down and then power up
	2. Transmitter	Replace Transmitter if power down sequence doesn't work

TRANSMISSION PROBLEMS

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. PANEL INDICATES ZONE ALARM BUT DOES NOT TRANSMIT	1. Alarm Control Board	The red common alarm LED should be flashing. Replace the alarm control board
	2. CPU Board	The CPU LED should illuminate for only 10 to 40 seconds per alarm activation. If not, replace CPU board - swap ID chip
	3. Transmitter	The transmit LED should turn on for 1/2 sec per message sent. If not, replace Transmitter
B. PANEL'S LEDs LIGHT BUT ISN'T RECEIVED BY CONSOLE	1. Transmitter ID Chip	Was the CPU Bd and/or address chip (U20) recently changed? Replace ID chip
	2. Console ID Numbers	Check the console receiver to be sure the transmitter's address number is programmed into the console, by pressing Memory Erase and then Memory Read (KFRA). Either program console board 4C, or replace IC U20 on CPU board with a valid number
	3. Transmitter	Check for RF output with SWR meter
C. WEAK SIGNAL (SOME SIGNALS NOT RECEIVED BY CONSOLE)	1. Weak Transmitter	Press the TEST button and check that each message sent by the Transmitter is received by the console. If the message periodically misses, try another Transmitter board
	2. BNC Connector	The connector should be securely fastened to the coax. Gently twist the connector. Look for rotation of improperly installed connectors. Be sure tip isn't pushed in
	3. Antenna Connector	Check for good tight connection of antenna coax connector, and shorts between ground and center conductor
	4. Antenna Location	Problems may result from recent structures built too close to transmitter antenna (6 ft from conductive elements) or trees and shrubs which have substantially grown over the years. Check with local listings

ZONE PROBLEMS

SYMPTON	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. CONSTANT ZONE ALARM	1. Detection Device	Find Device and clear it's alarm
	2. Zone Wiring	Check zone wiring for proper EOL resistance. Replace zone wiring if necessary
	3. Zone Board	Try swapping Zone board with one of the same type
	4. Zone Mother Board	Check for the correct operation of Acknowledge and Reset. Replace Mother board
	5. Reset Switch	Check the operation of Reset switch. Replace switch, Switch Panel or Alarm Control Board
B.CONSTANT ZONE TRBL (SENDS TROUBLE MESSAGE #2)	1. No EOL Device	Check for 12K EOL resistor across zone wires (with Zone board removed). If open, install EOL
	2. Zone Wire Grounded	Check zone wiring for a short to ground (with Zone board removed). Replace wiring if necessary
	3. Zone Board	If steps 1 and 2 above don't fix the problem, try replacing the Zone board
	4. Fuse F1 (Mother Bd)	If all zones are in trouble, replace FUSE F1 located on the Mother board below the Power Supply.
C. ZONE(S) WILL NOT ALARM	1. Zone wiring	Create an Alarm at the panel by placing short across zone terminals. This should cause an alarm condition. If not, replace Zone board
	2. Zone Board	Try another Zone board in it's place. If this doesn't work, replace Alarm Control Board

COMMON (PANEL) TROUBLE

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. PANEL'S COMMON TROUBLE LED IS FLASHING BUT NO ZONE LED'S ARE ON (PANEL SENDS TROUBLE MESSAGE #1)	1. Switch Out of Position	Flip all switches up then down. This might clear out a defective or dirty switch contact
	2. Switch Panel's Ribbon Cable	Be sure cable is securely connected to Mother board connector. Plug a known working Switch Panel into Mother board. See Switch Trouble section
	3. Battery Problems	Check FUSE F1 in Power Supply. Unplug batteries, check for 13 to 15 volts across each battery, and then plug them back in. Recheck voltages while they are being charged (approx. 14.5vdc.).
	4. AC Power Off	AC Power LED on Alarm Control board should be illuminated. Restore proper power. See Power Problems section.
	5. Zone Ribbon Cable	Check for good tight connection on all Mother board connectors. Push on ribbon cable connectors. Be sure they are seated properly. Check ribbon cable connector for broken or bent pins. Replace Zone Mother board, Mother board, or ribbon cable. (Red stripe on left side)
	6. Board Not Seated	Check to be sure all circuit boards are in their correct positions and not slanted or loose. Firmly push all circuit boards into Mother board connector
	7. Bell/Horn Circuit	Check for 10K EOL resistor across terminals D1& D3. Look for shorts, ground faults, and open circuits. Also, check audible devices to see if they are all operated on 24vdc. They must have Diode installed properly
	8. Trouble Input Circuit	Be sure a 10K EOL resistor is between terminals D5 & D6
	9. Fuse F1	Check FUSE F1 on Alarm Control board for open circuit. Replace FUSE F1 with same type

COMMON (PANEL) TROUBLE (CONT.)

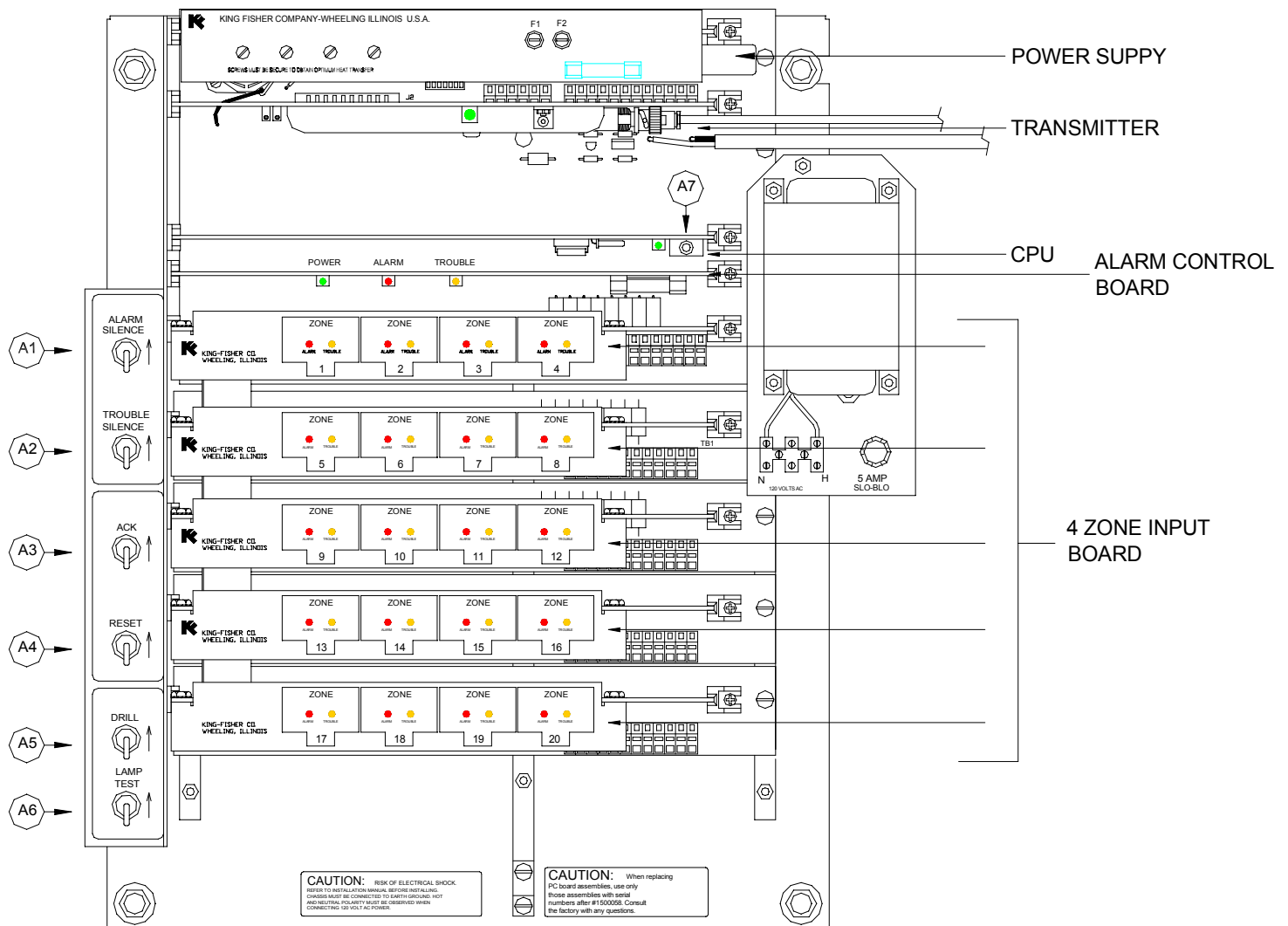
SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
B. IF NONE OF THE PREVIOUS STEPS (1 TO 9) REPAIR THE PANEL TROUBLE, TRY STEPS 10 TO 17	10. Extension Zone Boards	Disconnect the ribbon cable from the main Mother board to isolate the Extension Zone boards from the first Zone board. Trouble cleared? If trouble clears, install ribbon cable and one Zone board at a time until trouble reappears. Replace bad Zone board or Zone mother board. If not, continue with steps 11 through 17 below
	11. First Zone Board	Swap first Zone board. If trouble is corrected, replace Zone board
	12. Alarm Control Board	Swap Alarm Control Board. If trouble is corrected, replace Alarm Control board
	13. CPU Board	Swap CPU board. If trouble is corrected, replace CPU board
	14. Transmitter Board	Swap Transmitter. If trouble is corrected, replace Transmitter
	15. Power Supply	Swap Power Supply. If trouble is corrected, replace Power Supply
	16. Mother Board	Try a new Mother board
	17. Switch Trouble	Swap Switch Panel. If trouble is corrected, then see Switch Trouble section

SWITCH TROUBLE

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. ONE OF THE SWITCHES DOESN'T WORK	1. Switch Panel Ribbon Cable	Check continuity between Mother board and Switch Panel
	2. Defective Switch	Check contact closure of all switches with an ohm meter. Replace Switch Panel
	3. Alarm Control Board	Change the Alarm Control board
	4. Main Mother Board	Change Main Mother board
B. ACK DOESN'T WORK	1. Zone Board	If alarms do not acknowledge (steady) on a particular Zone board. Replace the board
C. RESET DOESN'T WORK	1. Mother Board	If Smoke Detectors are connected to panel, replace Mother board
	2. Zone Board	Replace Zone board which won't Reset
D. DRILL DOESN'T WORK	1. Bell/Horn Wiring	Check audible wiring by Zone Alarm testing
	2. Alarm Control Board	Change the Alarm Control board
E. LAMP TEST DOESN'T WORK	1. Zone Board	If a particular Zone board's LED(s) do not turn-on during Lamp Test, then replace that board
	2. Alarm Control Board	Change Alarm Control board

REPLACEMENT PARTS LIST

CIRCUIT BOARDS	REPLACEABLE PARTS	PART #
A. 30V POWER SUPPLY		66115-12
	Fuse F1 (3AG, 4 Amp, Norm-Blo)	30004
	Fuse F2 (3AG, 3 Amp, Slo-Blo)	30013
	LED, Green (Inside Power Supply)	19015
B. AM TRANSMITTER-HIGH BAND		66120-5
	LED, Green (Ultrabrite)	19060
C. AM TRANSMITTER-LOW BAND		66121-2
	LED, Green (Ultrabrite)	19060
D. CPU BOARD		66150-3
	LED, Green (w/90 Mount)	19090
E. ALARM CONTROL BOARD		66156-4
	Fuse F1 (3AG, 2 Amp, Fas-Blo)	30012
	LED1, Green (w/90 Mount)	19090
	LED2, Red (w/90 Mount)	19092
	LED3, Amber (w/90 Mount)	19091
F. 4 ZONE INPUT CLASS "B" BOARD		66163-4
	Jumper Plugs (Zone Address)	22091
	LED, Red (w/90 Mount)	19092
	LED, Amber (w/90 Mount)	19091
G. MAIN MOTHER BOARD		66099-2
	Fuse F1 (3AG, 2 Amp, Fas-Blo)	30012
H. ZONE MOTHER BOARD		66107-0
	EOL Res., Zone (12K, 1/4W)	53022
I. SWITCH PANEL ASSEMBLY		66111-1
J. SINGLE ZONE W/RELEASE		66167-8
	Jumper Plugs (Zone Address)	22091
	Fuse F1 (2 amp, Norm-Blo, 2AG)	30017
	LED, Red (w/90 Mount)	19092
	LED, Amber (w/90 Mount)	19091
K. MISCELLANEOUS PARTS		17014
	12V/5AH Battery	
	12V/12.5AH Battery	17012
	Wire Insertion Tool (Large)	22155



SWITCH CONTROLS

A1 - ALARM SILENCE SWITCH

A6 - LAMP TEST SWITCH

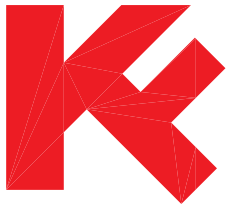
A2 - TROUBLE SILENCE SWITCH

A7 - TEST SWITCH

A3 - ACKNOWLEDGE SWITCH

A4 - RESET SWITCH

A5 - DRILL SWITCH



RADIO TRANSMITTERS (CALL BOXES)



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com



Contemporary Shell Model KF1 and Model KF2: Options include multiple functions and choice of colors are Red or Lime Yellow.

RADIO ALARM TRANSMITTERS

GAIN VITAL SECONDS - ELECTRONICALLY!

King-Fisher's "RADIO EMERGENCY ALARM MONITORING SYSTEM" provides the most up to date answer to FIRE, ROAD AID, MEDICAL and POLICE emergency response.

Total reliability and flexibility are combined in our "RADIO EMERGENCY ALARM MONITORING SYSTEM" to meet the protection and safety requirements of any government facility or community. King-Fisher offers all of the functions of



Cottage Shell Model KF3 and Model KF4: Options include Quick Action Door, multiple functions and lighted lower compartment. Choice of colors include Red or Lime Yellow.

other conventional systems PLUS a choice of AM or FM FSK signal transmissions backed by King-Fisher's exclusive C-MOS solid state circuitry and proven circuit design.

All King-Fisher street boxes contain unitized electronic circuitry housing. This housing is interchangeable between contemporary or cottage shell boxes which greatly simplifies field maintenance.

DESCRIPTION

The solid state electronic circuitry modules are interchangeable between all King-Fisher call box transmitter housings, including the King-Fisher combination transmitter/interface enclosure.

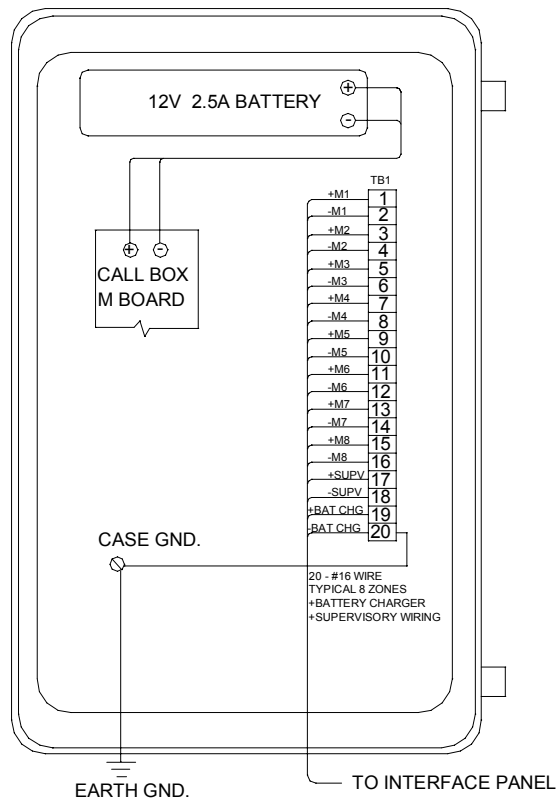
All King-Fisher radio box transmitters are capable of transmitting FIRE, POLICE, ROAD AID, MEDICAL AID, etc. As many as ten (10) different types of messages, including a test message, are available. The specific emergency message to be transmitted can be either through selection of a push button labeled with that particular emergency (Fire, Police, Medical Aid, etc.) and/or automatically through the King-Fisher radio master box circuitry which is programmed to automatically transmit any pre-programmed message. A wide variety of specific emergencies can be transmitted when the King-Fisher radio call box transmitter is connected to a King-Fisher radio interface panel.

The King-Fisher radio call box transmitter automatically transmits a low battery signal when the battery voltage in the call box (measured under transmission) drops below a specified limit. The average remaining life of the battery charge after a low battery signal is received is approximately two weeks.

The battery should be recharged every six months or less depending on climatic conditions. Recharging the radio call box transmitter is reduced to once a year when wired to King-Fisher radio interface panel. The interface panel has a built-in battery charger that is capable of maintaining a charge on the call box battery.

Available as an option, a built-in 12 volt D.C. battery pack charger can be provided for the radio call box transmitter battery. A local 115 volt A.C. source is required to operate the battery pack charger.

The test message as a minimum is transmitted daily to verify that the King-Fisher radio call box transmitter is operational. The King-Fisher radio call box transmitter automatically transmits tamper/knock-down signals in the event of any abnormal tilting or knockdown of the call box. The tamper signal circuitry is dampened to eliminate false signals.



REMOTE (SLAVE) BOXES

King-Fisher's remote (slave) boxes are available where remote activation is required. Each remote (slave) box contains auxiliary Push buttons, activating devices with hermetically sealed, normally opened contacts, wired to a terminal block. Active electronics are not included with the remote (slave) box.

FEATURES

- Self contained long-life 12V rechargeable sealed lead acid batteries
- Meets and exceeds N.F.P.A. 72 and 1221
- F.C.C. Type Accepted
- One-Piece Weatherproof Cast Metal Housing
- Automatic Self-Testing
- AM Tone
- FM-FSK
- Number Assignment Capacity Up to 6 Digits for 1,000,000 Box Numbers
- C-MOS Components and 100% Solid State Circuitry
- All Electronics Interchangeable
- Tamper/ Knockdown Feature
- Adjustable Automatic Low-Battery Signal
- Adjustable Automatic Low Battery Shut-off
- Clock-Set Button/Test Button
- Operating Temperature Range -40-F to +140F (-40-C to +60-C)
- Transmitter Frequency Range: 72-76 MHZ
138-174 MHZ (Government Use Only)

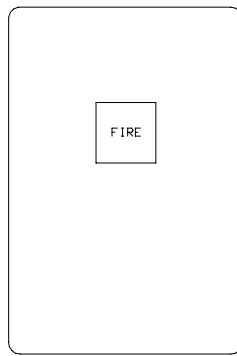
KFCIT - KING-FISHER CORROSION INHIBITOR

Each King-Fisher Radio Transmitter enclosure contains a corrosion inhibiting tape which releases a chemical combination that vaporizes and then condenses on all surfaces within the transmitter housing. The vapor is invisible, odorless, and cannot be felt by the human hand. The inhibitor tape is installed at the top of the housing where the vapor film from the inhibitor tape is continuously renewed, neutralizing most corrosive elements.

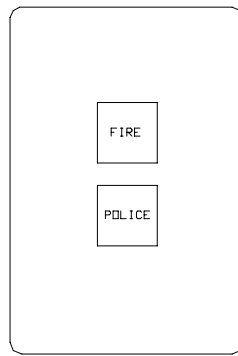
Complete enclosure protection is accomplished within 48 hours, and the inhibiting tape's long lasting chemical is effective for one to two years depending on the installation and severity of local conditions.

APPROVALS

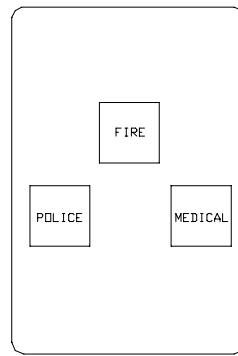
All King Fisher Radio Transmitters are F.C.C. type accepted, and approved by Factory Mutual Research. The King Fisher Radio Transmitter Auxilliary trip device is listed with Underwriter's Laboratory. The King Fisher Radio Transmitters are also listed with the California Fire Marshal's approving authority.



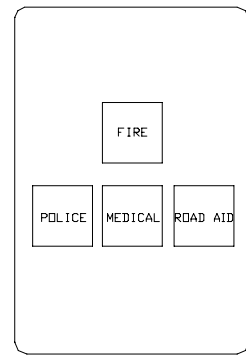
KF1-1X or KF2-1X



KF1-2X or KF2-2X

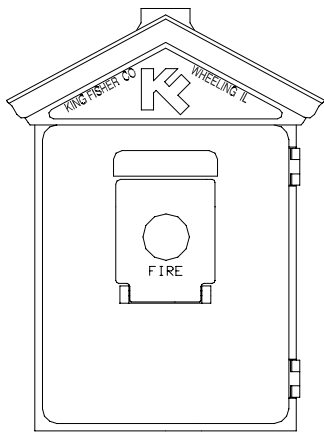


KF1-3X or KF2-3X

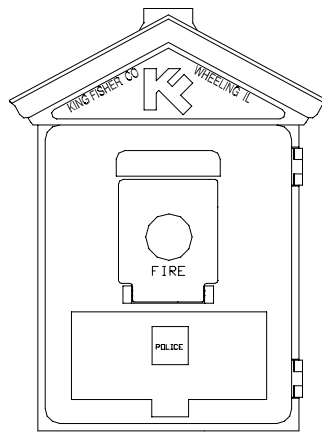


KF1-4X or KF2-4X

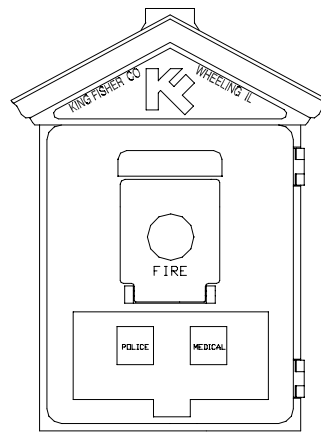
KF1 and KF2 RADIO ALARM TRANSMITTERS
(Contemporary Style)



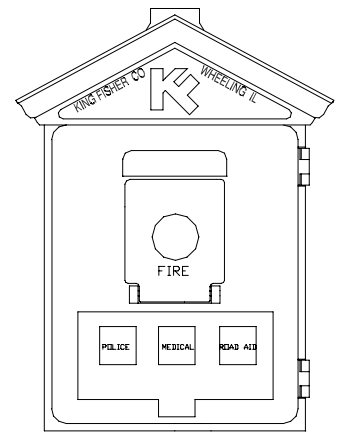
KF3-1X or KF4-1X



KF3-2X or KF4-2X



KF3-3X or KF4-3X



KF3-4X or KF4-4X

KF3 and KF4 RADIO ALARM TRANSMITTERS
(Cottage Shell Style)

NOTE:

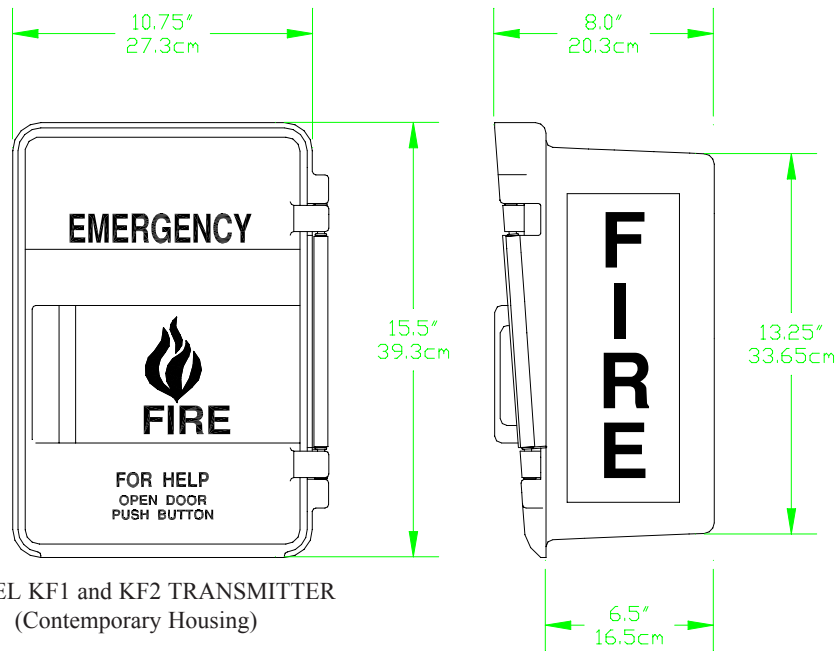
1. KF1 and KF3 designates AM tone operation.
2. KF2 and KF4 designates FM-FSK operation.
3. (X) digit specifies number of auxiliary functions.
4. Each radio alarm transmitter includes test (both automatic and manual) and tamper message functions.
5. Remote (slave) boxes provide remote/auxiliary actuation positions, configured like and for inter-connection to the standard KF transmitters. Units do not incorporate active electronics, but include actuating devices (N.O. contacts) wired to a terminal block.

6. Cottage shell type boxes are available in the quick action configuration.

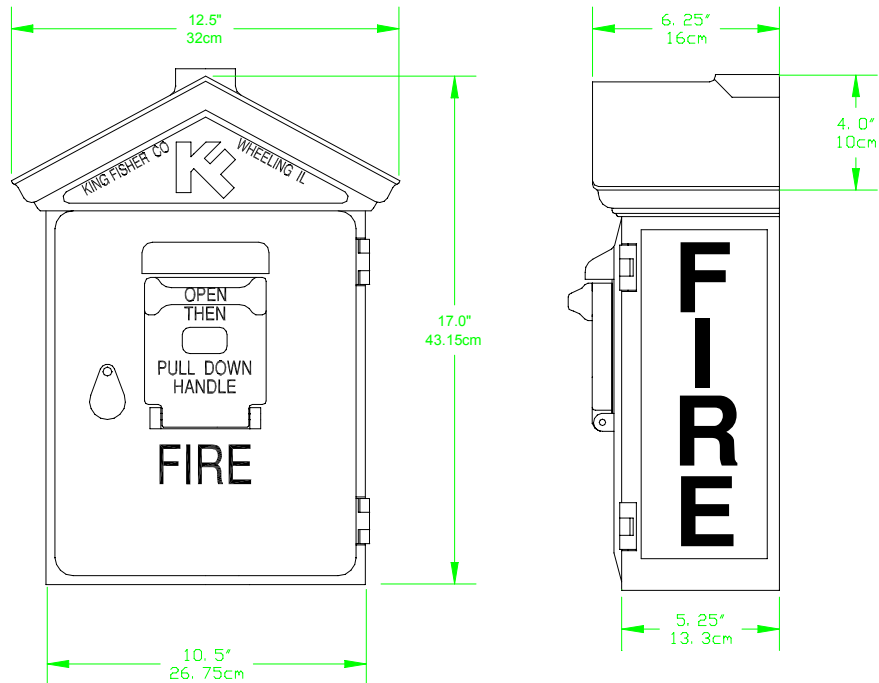
When ordering, specify number and function of push buttons, number of terminal positions, type of shell and color. (Red or Lime Yellow).

Other special buttons and configuration are available. Consult the factory for additional information.

7. An optional built-in 12 volt D.C. battery pack charger, Model KF 66009-1, is available. A 115 volt A.C. source is required to operate the battery pack charger.



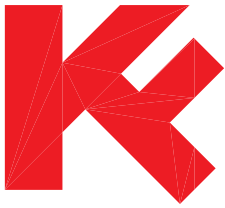
MODEL KF1 and KF2 TRANSMITTER
(Contemporary Housing)



MODEL KF3 and KF4 TRANSMITTER
(Cottage Shell Housing)

SHIPPING INFORMATION

MODEL	SHIPPING WEIGHT		SHIPPING CUBE	
KF1	20 lbs	9.04 Kg.	2.0 ft. ³	.062 m ³
KF2	20 lbs	9.04 Kg.	2.0 ft. ³	.062 m ³
KF3	20 lbs	9.04 Kg.	2.0 ft. ³	.062 m ³
KF4	20 lbs	9.04 Kg.	2.0 ft. ³	.062 m ³



KF1 & KF3 CALL BOX

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

RADIO CALL BOX TRANSMITTER

The solid state electronic circuitry modules are interchangeable between all King-Fisher call box transmitter housings, including the King-Fisher combination transmitter/interface enclosure.

All King-Fisher radio box transmitters are capable of transmitting FIRE, POLICE, ROAD AID, MEDICAL AID, etc. As many as ten (10) different types of messages, including a test message, are possible. The specific emergency message to be transmitted can be either through selection of the push button labeled with that particular emergency (Fire, Police, Medical Aid, etc.) and/or automatically through the King-Fisher radio master box circuitry which is programmed to automatically transmit any pre-programmed message. A wide variety of specific emergencies can be transmitted when the King-Fisher radio call box transmitter is connected to a King-Fisher radio interface panel.

The King-Fisher radio call box transmitter automatically transmits a low battery signal when the battery voltage in the call box (measured under transmission) drops below a specified limit. The average remaining life of the battery charge after a low battery signal is received is approximately two weeks.

The test message as a minimum is transmitted daily to verify that the King-Fisher radio call box transmitter is operational. The King-Fisher radio call box transmitter automatically transmits tamper/ knockdown signals in the event of any abnormal tilting or knockdown of the call box. The tamper signal circuitry is dampened to eliminate false signals.

The battery should be recharged every six months or less depending on climatic conditions. There are three available options for maintaining a charge on the battery. One is when wired to a King-Fisher Interface Panel. The interface panel has a built-in battery charger that is capable of maintaining a charge on the call box battery. Another is a built-in 12 volt D.C. battery pack charger (91011) that can be provided for the radio call box transmitter battery. A local 115 volt A.C. source is required to operate the battery pack charger. Another option is a solar cell (79009). All of these options will extend the time between replacing and recharging the battery.

Another option available is a red location light. There are two versions, wall mount (81001) and pole mount (81002). A local 115vac source is required to operate the light.

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATION IN DIRECT SUNLIGHT AND IN RAIN RUNOFF

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR ZONE INPUTS, ANTENNA, AND AC POWER
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AND ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

King-Fisher Company

2350 Foster Ave., Wheeling, IL. 60090-6574

Manual 75112 02/99

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail service@kfco.com Internet: www.kfco.com

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INSTALLATION OF ENCLOSURE

GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

Read all instructions first.

Do not connect batteries or apply power until wiring and installation is complete and checked.

King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, National Electric Code, Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.

Locate a suitable position and structure for mounting the enclosure.

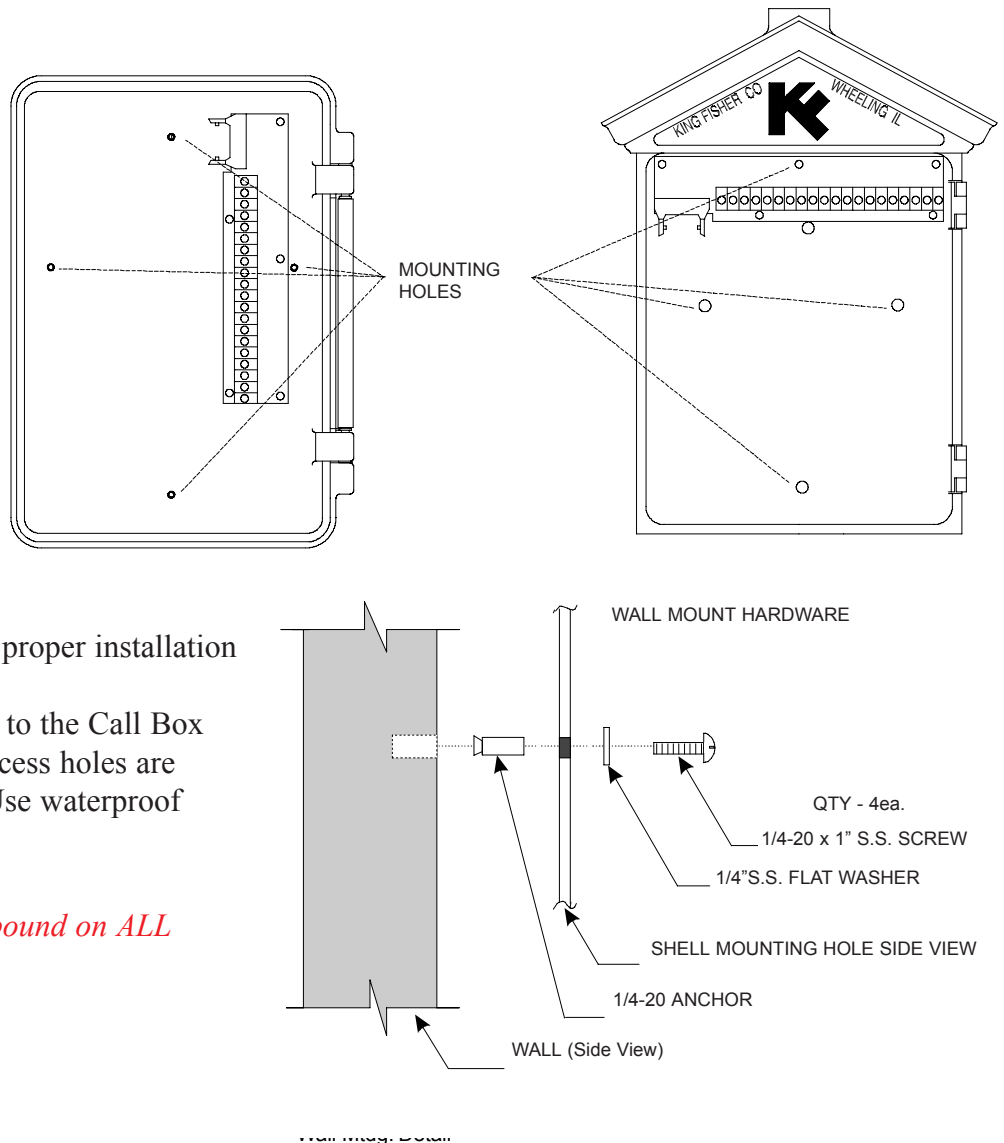
WALL MOUNTING

1. REMOVE the electronics assembly from the Call Box shell by removing the three screws from the cottage style shell or by unlocking the electronics in the contemporary style shell.

2. MOUNT the shell plumb to a wall using appropriate hardware. For pole mounting refer to the illustrations on the following pages. Use Stainless Steel hardware for mounting the enclosure in accordance with proper installation requirements.

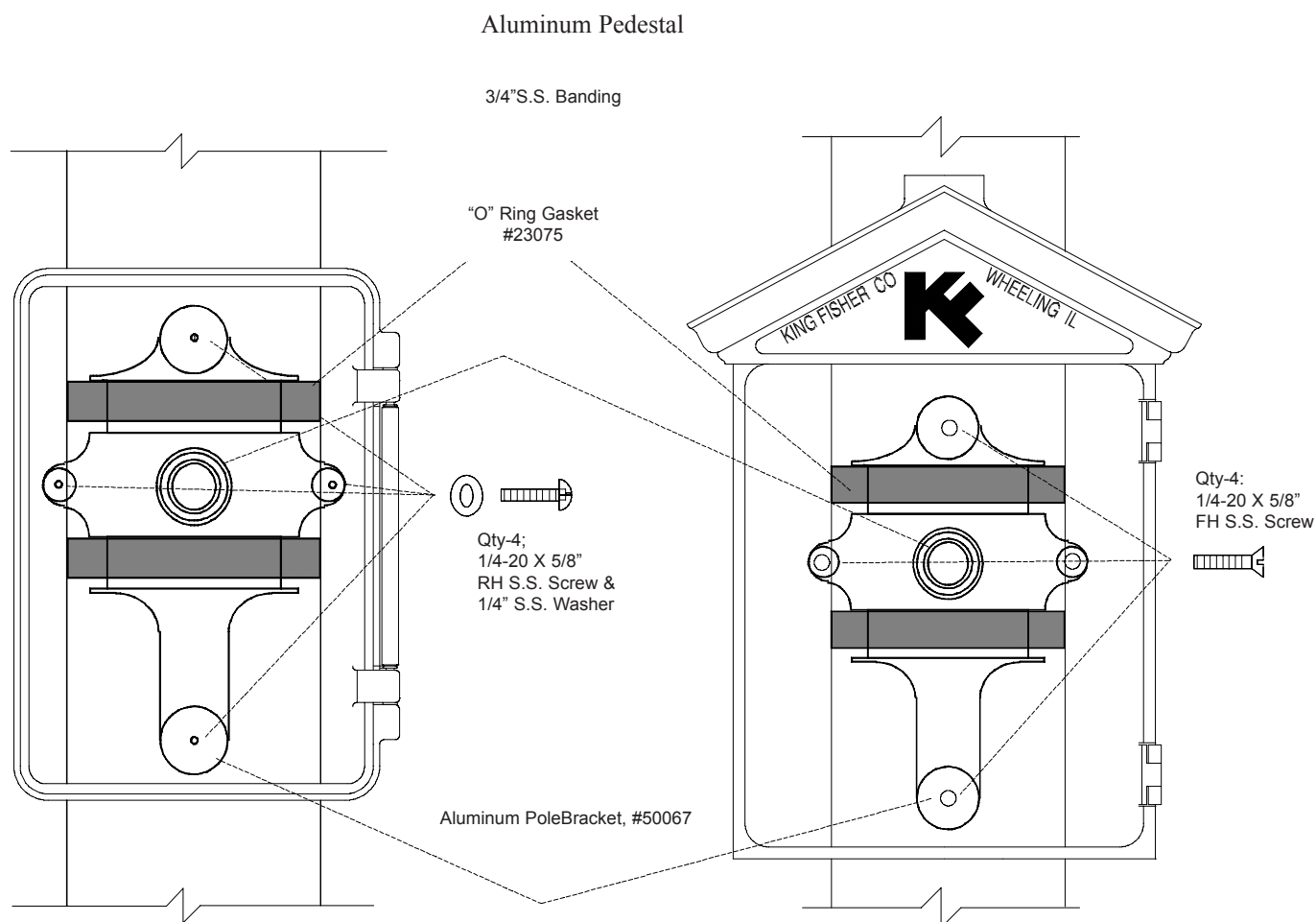
3. RUN all necessary conduit to the Call Box shell. Threaded 1" conduit access holes are provided in each enclosure. Use waterproof conduit fittings.

NOTE: Use pipe thread compound on ALL conduit and fittings.



ALUMINUM POLE MOUNTING

- REMOVE the electronics assembly from the Call Box shell by removing the three screws from the cottage style shell or by unlocking the electronics in the contemporary style shell.
- LOCATE a position on the pole where the bracket is to be mounted and mark the center hole position with a scratch awl or pencil.
- DRILL a 1-5/8" hole using a hole saw. File any burrs or sharp edges.
- STRAP the bracket to the pole using 3/4" S.S. banding and clamps.
- ATTACH the shell to the bracket using the supplied hardware and "O" Ring Gasket shown.
- TIGHTEN all screws securely.



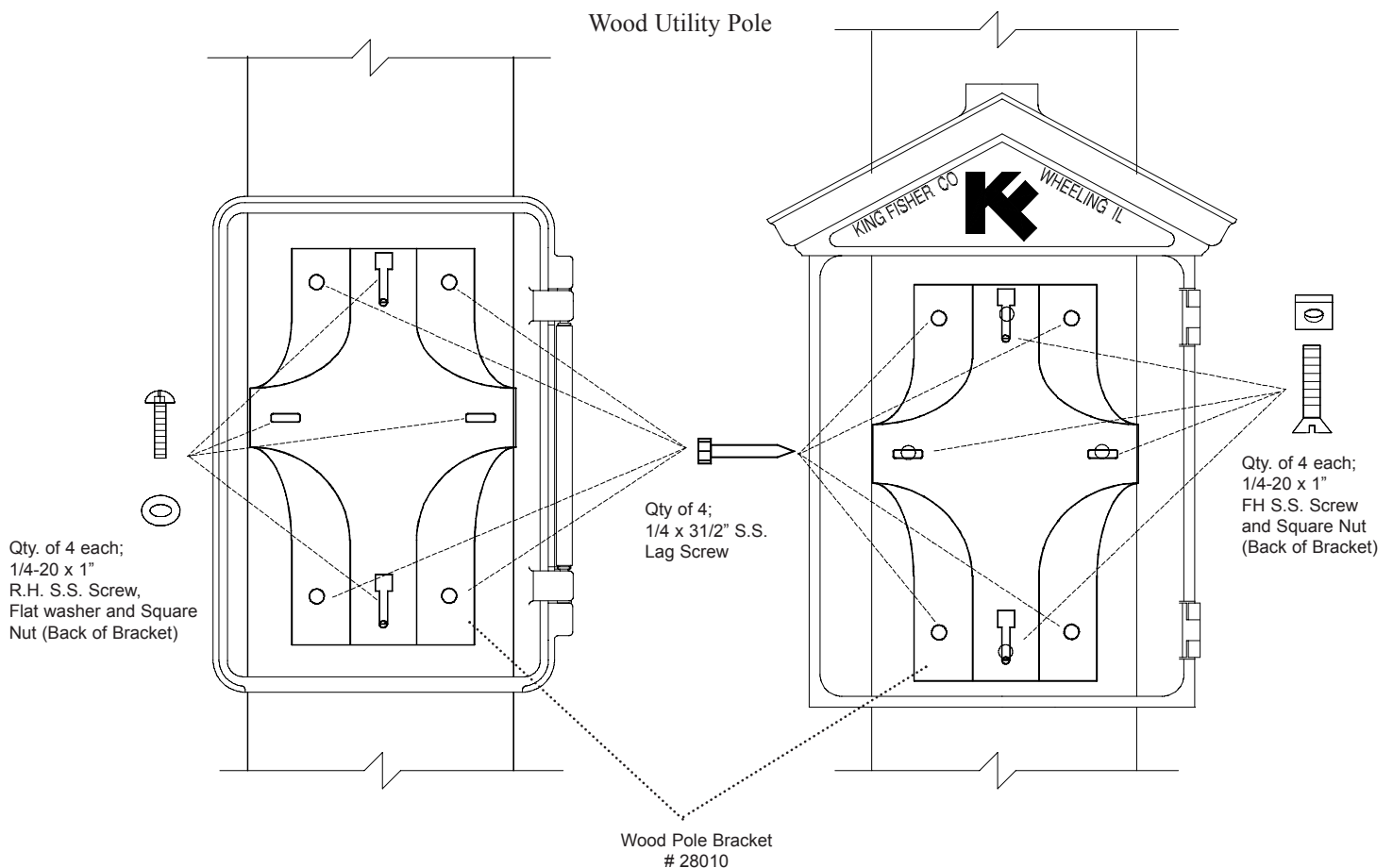
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WOOD POLE MOUNTING

- REMOVE the electronics assembly from the Call Box shell by removing the three screws from the cottage style shell or by unlocking the electronics in the contemporary style shell.
- LOCATE a position on the pole where the bracket is to be mounted and mark the four corner holes.
- DRILL the holes for the four (4) Lag Screws.
- SCREW bracket to the pole using lag screws. Tighten securely.
- INSERT upper and lower screws through shell mounting holes and loosely attach the nuts.
- LIFT enclosure and fit square nuts through keyed holes in the mounting bracket. Let shell slide down into position.
- INSTALL the two remaining screws through enclosure and bracket. Tighten all screws securely.



FINAL ASSEMBLY

4. CONNECT a #8 AWG ground wire to the ground lug provided on the inside, back wall of the Call Box shell. Connect the other end to an approved Ground (ie. Ground Rod)
5. INSTALL any applicable devices required such as:
 - KFRI-4/6 Interface Panel
 - Red Location Light Assembly
 - Solar Cell Battery Charger Assembly
 - AC Auxiliary Battery Charger Assembly
 - Antenna
 - RG58/U Coax with PL-259 Connectors
6. COMPLETE the Call Box wiring. Refer to optional device wiring diagrams.
7. INSTALL electronics assembly.

OPERATIONS

GENERAL

KF1 & KF3 Call Box can transmit up to ten (10) Emergency, Supervisory and Test messages to any compatible King-Fisher Radio Receiving Console. Exact operational procedure of King-Fisher Call Boxes is dependent upon the housing style and the number of push buttons supplied. A brief description of the operational differences between the contemporary and cottage style housings is discussed below.

1. KF1 Contemporary Style housing: Access can be gained to all operator controls by opening the door, which exposes the push-button controls.
2. KF3 Cottage Style housing: Access to the fire hook is available thru a “Quick Action Door”.

Quick Action Door - Simply pull down door and activate fire hook by pulling down. Other functions which may be included with the cottage style enclosure, are push-button type switches located under a lift door just below the fire hook.

FRONT PANEL ACCESS CONTROLS

Front Panel Access Controls are push-buttons and pull-hooks located on the front panel of the call box. There can be up to four alarm switches for each box including such messages as: **FIRE, MEDICAL AID, ROADSERVICE, POLICE, SECURITY or WASHDOWN.**

SECURED MAINTENANCE CONTROLS

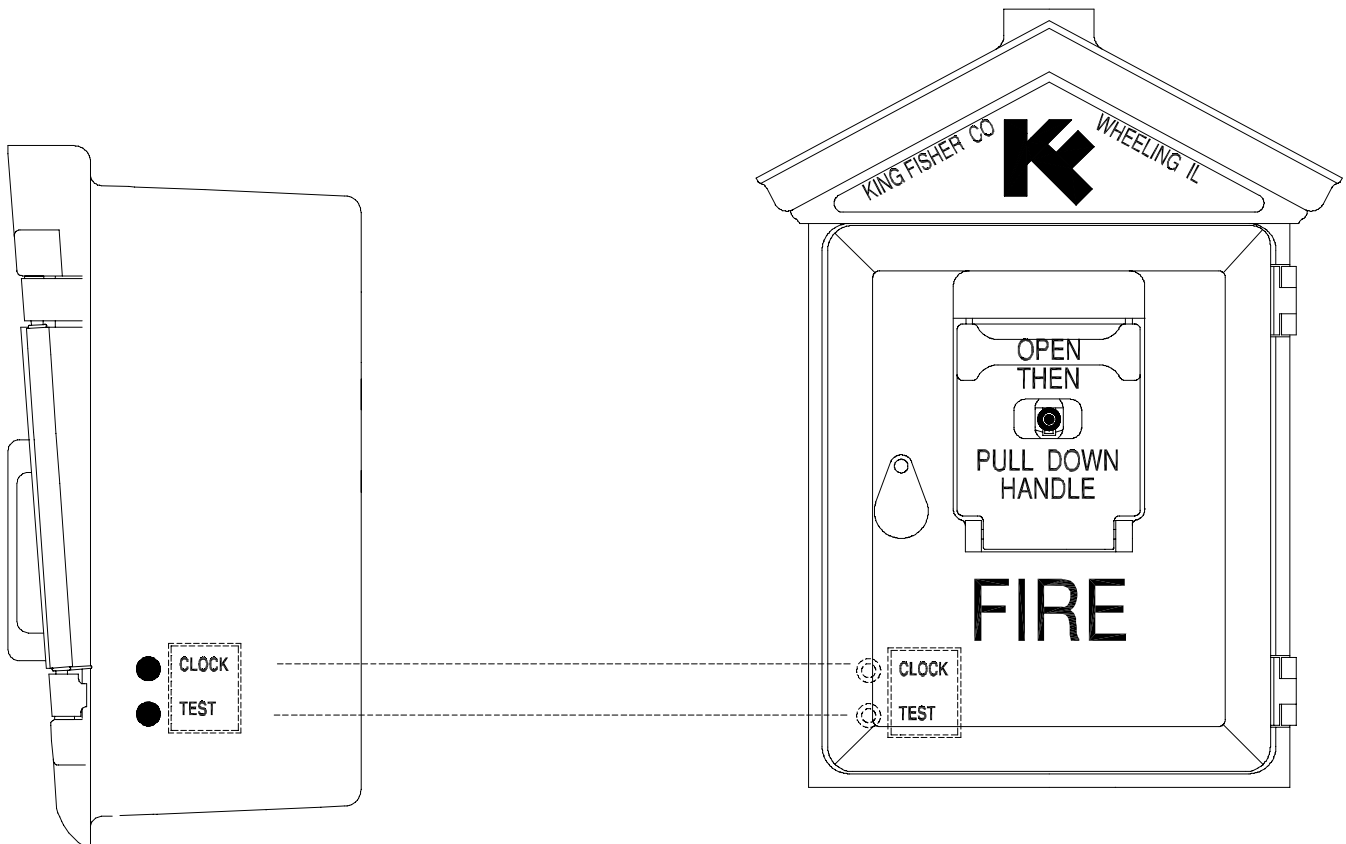
Maintenance controls are push-button switches used to test and set the internal clock functions of the Call Box. Maintenance controls for KF1 Contemporary Style Call Box are located on the right side of the inner gold can and may be accessed by opening the front door, unlocking the electronics and titling the Call Box forward.

Maintenance controls for KF3 Cottage Style Call Box are located on the front of the gold can and may be accessed by unlocking the front door of the enclosure.

<u>NAME</u>	<u>TYPE</u>	<u>FUNCTION</u>
CLOCK	Red Push-Button	This button resets the call box's internal clock. The call box will send TEST after 12 hours and then TEST every 24 hours thereafter.
TEST	Black Push-Button	Pressing this button causes the call box to send three rounds of TEST to the Base Receiving Console.

CONTEMPORARY STYLE

COTTAGE STYLE



<u>TYPE</u>	<u>OPTIONS</u>	<u>FUNCTION</u>
FIRE	KF1: Push Button KF3: Pull Hook	Transmits a message requesting fire assistance.
POLICE	Push Button Only	Transmits a message requesting police assistance.
MEDICAL AID	Push Button Only	Transmits a message requesting medical assistance.
ROAD SERVICE	Push Button Only	Transmits a message requesting road assistance.
WASH DOWN	Push Button Only	Transmits a message requesting a chemical wash down.

NOTE: Other push-button titles are available with a maximum of four functions per call box.

AUDIBLE ANNUNCIATOR

The internal buzzer sounds each time the Call Box transmits, giving an audible indication that messages are being transmitted to the Base Receiving Console.

MASTER BOX OPERATION

KFRI Interface panels may be connected to the Call Box. Interface panels may contain up to 6 additional alarm circuits operated by remote wiring from FACP's, Pull Stations or any Normally Open "Dry" contacts. When an alarm occurs on one of the zone circuits a "Fire Master" or "Master" message is sent to the Base Receiving Console. Refer to KFRI Interface Panel Manual #75111 for more details.

CODING CALL BOX BOARD 2R (KF66003-2)

First, determine the Call Box number needed and verify that this number is programmed into the Base Receiving Console.

- A. Access address board 2R by removing the gold electronics assembly from the Call Box shell. Board 2R's address plugs are shown in illustrations on page 8.
- B. Numbers are address digits. "M" & "0" plugs are the message code. As with example 2 below:

0-0-3-2-1 is the address code, and M-0 is the message code.
- C. Program the Call Box's address code. For the Call Box in example 2, five address plugs are required in the first five digit positions.

NOTE: Not all of the digit positions will necessarily be filled as in example 1.

- D. Now, program the Call Box's message code. Insert one plug in the "M" position for Single Message Function and two plugs in the "M" and "0" positions for Dual Message Functions.
- E. Check the new number by pressing TEST and see if it is properly received and processed by the console. If the message and address digits programmed do not match the Base Receiving Console's memory, the entire message will be rejected.

EXAMPLE 1

Single Message Function,

3 Address Digits, Box #321

ADDRESS	3	=	Digit 1
CODE	2	=	Digit 2
	1	=	Digit 3
MESSAGE	M	=	Digit 4
CODE		=	Digit 5
		=	Digit 6
		=	Digit 7

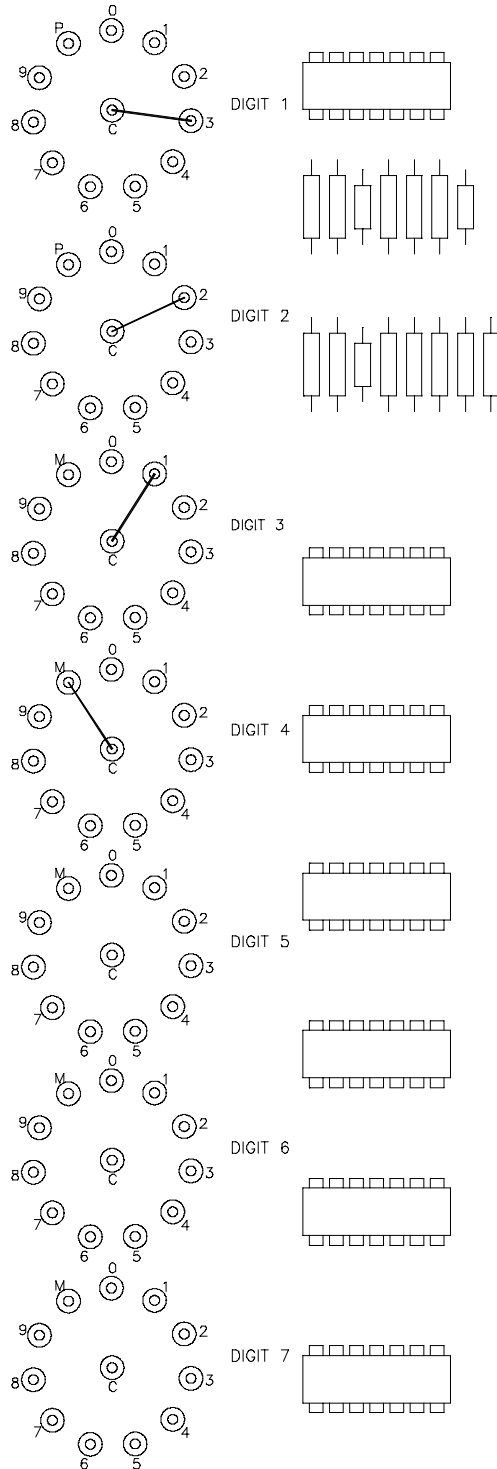
EXAMPLE 2

Dual Message Function,

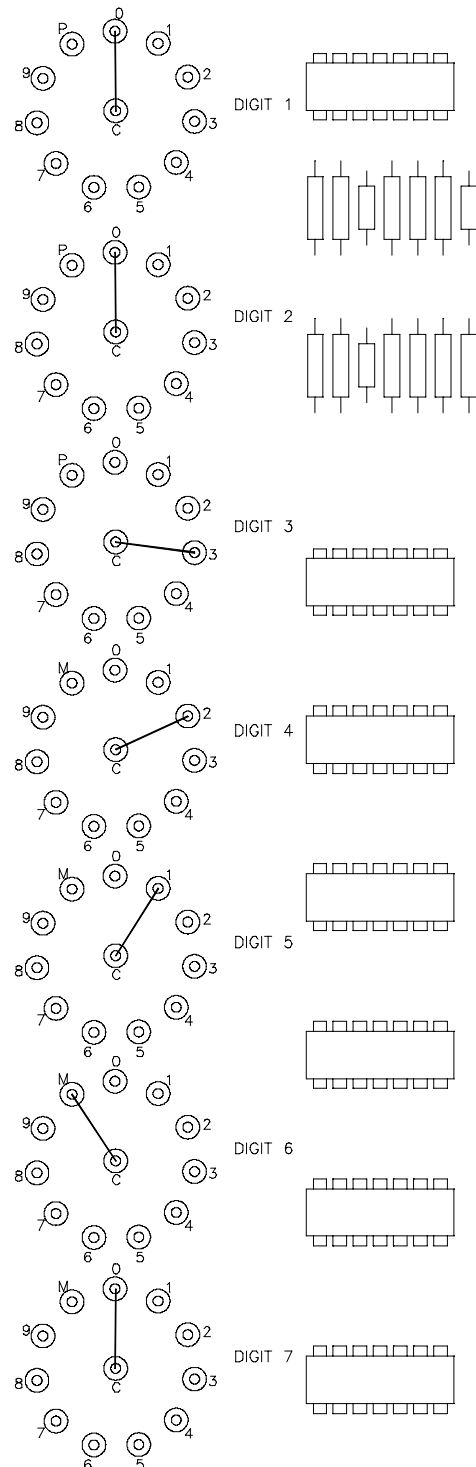
5 Address Digits, Box #321

ADDRESS	0	=	Digit 1
ADDRESS	0	=	Digit 2
CODE	3	=	Digit 3
	2	=	Digit 4
	1	=	Digit 5
MESSAGE	M	=	Digit 6
CODE	0	=	Digit 7

Example 1



Example 2



PCB 2R

POWER-UP/POWER-DOWN PROCEDURE

The following procedures **MUST** be performed in the correct order or damage to the Call Box electronics may result. Remember, ABC to power-up and CBA to power-down.

JUMPER JK7

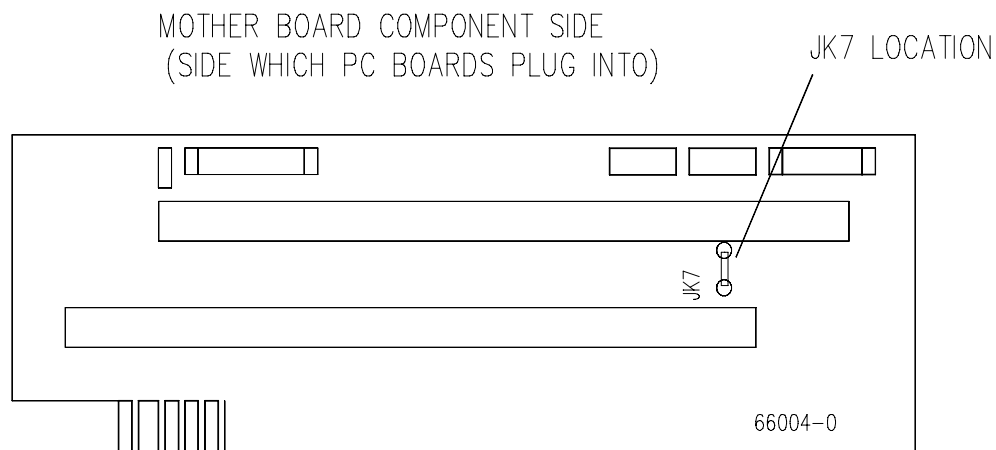
- A. KF1 & KF3 “STREET BOX” (NO KFRI INTERFACE)- If the Call Box is used as a Street Box, jumper JK7 must be removed from circuit board KF66004-0 (Motherboard) by performing the following steps:

1. Remove Call Box power by following power-down (CBA) procedure.
2. Remove Call Box electronics and then remove boards 1R and 2R. If JK7 is installed, remove it. Refer to the figure below.

- B. KF1 & KF3 “MASTER BOX” (WITH KFRI INTERFACE)- If the Call Box is used with a KFRI Interface panel, jumper JK7 must be installed on circuit board KF66004-0 (Motherboard) by performing the following steps:

1. Remove Call Box power by following power-down (CBA) procedure.
2. Remove Call Box electronics and then remove boards 1R & 2R. If JK7 is not installed, solder a jumper wire in place.

NOTE: FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS WILL RESULT IN A SHORTENED CALL BOX BATTERY LIFE OR AN UNSUPERVISED INTERFACE.



SYSTEM CHECKOUT

GENERAL

Power-Up Sequence:

- * Antenna coax
- * Battery connector
- * Cable, ribbon

Power-Down Sequence:

- * Cable, ribbon
- * Battery connector
- * Antenna coax

Initial Call Box system checkout is performed following installation. The tests should include actuation of all message buttons and zones connected to each Call Box. To facilitate system checkout, it is recommended that hand held portable radios be used at the Base Receiving Consoles and the Call Box. In this manner, Call Box alarms can be activated and immediately verified at the Base Receiving Consoles.

PREPARATION FOR SYSTEM TESTS

These tests should be performed only by those who are knowledgeable in the installation, operations, and maintenance of King-Fisher equipment.

NOTE: Whenever the following procedure produces a transmission, wait at least one minute after the third round is transmitted before proceeding to the next step.

Check the following items before powering and testing the Call Box.

- * Be sure all field wiring is correctly connected in accordance with the installation manual(s)
- * Code the Call Box I.D. number. Refer to pages 7-8.
- * Be sure JK7 is removed for Street Box application or installed for Master Box application. See page 9.
- * Check the battery voltage. It should be between 12 and 15 VDC.

SYSTEM TESTS

1. TILT Electronics forward to check the TAMPER function. Verify that three rounds of "TAMPER" message have been received at the Base Receiving Console.
2. PRESS the black TEST button on side or front of the Call Box electronics. Verify that three rounds of "TEST" message have been received at the Base Receiving Console.
3. PRESS all emergency message buttons/levers on the Call Box front panel one at a time to check each function installed. Verify that three rounds of the appropriate message have been received at the Base Receiving Console. (e.g. FIRE, MEDICAL AID, SECURITY, etc.).
4. TRIP all zones, one at a time, on the KFRI Interface panel (if applicable). Verify reception of the appropriate messages at the Base Receiving Console.

5. PRESS the red CLOCK button to reset automatic test clock. The Call Box will send “TEST” after 12 hours, and then “TEST” every 24 hours thereafter. To prevent overlapping “TEST” signals, space Call Boxes at least 2-1/2 to 3 minutes apart. Call Boxes should also be spaced so that a “TEST” signal is transmitted at least every 60 minutes.

TROUBLESHOOTING

GENERAL

Alignment procedures: let the Factory do it!

Watch for water in the bottom of the box. Make sure conduit entering the top is sealed or caulked.

Since Board 2 (#66003-2) is matched and tuned to the RF module, always replace Board 2 and the RF module as a pair. For temporary testing and diagnosis only, a different Board 2 can be tried. For long-term use, Board 2 must be aligned with the RF module.

SHORT BATTERY LIFE

Check JK7 jumper on the Call Box mother board - clip if required. Call Box with JK7 cut-out draws 300-500 uA.. With JK7 installed and the Call Box not connected to a KFRI Interface panel, the current draw is 23ma.

Check battery voltage, a fresh battery should be 12.9 vdc. or more under load.

High temperatures cause more battery self-discharge.

Check for corrosion on PC boards and terminal strips.

Check Low Battery adjustment points. Call Factory for Manual 75031

CALL BOX SHOWS UP ON MEMORY READ AS NOT WORKING.

Check internal fuse on Board 1 (KF66002-4).

Check battery voltage under load, it should be above 11.2 vdc.

If Call Box “buzzes” analyze signal by listening & watching Signal Meter on Console.

Check test time on Console printer tape; avoid other Call Box auto test times.

Check antenna connector and perform SWR and Power test.

Check Address Code Plugs for proper address; compare with another Call Box.

Substitute electronics from another “working” Call Box.

Try a different address code.

IF CALL BOX ONLY BUZZES ONCE, OR TWICE, OR STAYS TURNED ON, TRY A DIFFERENT BOARD 1 (KF66002-4).

Call Box has a Fuse-blowing problem (1/4 amp, 250 vac, LITTLEFUSE).

Check Console tape for “LB” normal battery shut-down.

Check Power-Up procedure (antenna, battery, cable).

Check antenna connections and perform SWR test. High RF energy in the area may be the cause - Consult Factory

Replace Board 1 (KF66002-4).

Check battery voltage under load, it should be above 11.2 vdc.

PREVENTATIVE MAINTENANCE

GENERAL

When changing the batteries every six (6) months do a complete investigation of the Call Box. Look for corrosion, water or dirt inside and run the Call Box through all it's functions.

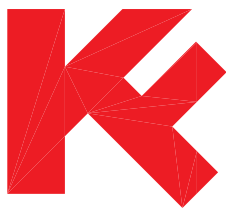
SPARE PARTS

10% complete units plus additional fuses

REPLACEMENT PARTS

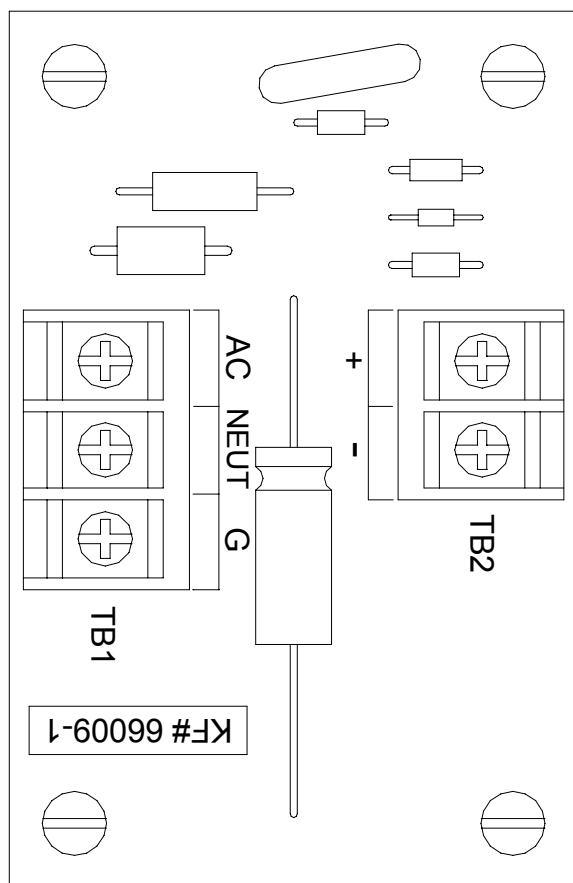
The following parts are listed for possible replacement during maintenance operations.

KF NUMBER	DESCRIPTION
17007	12 Volt, 2.5Ah Rechargeable Lead-Acid Battery
30001	Fuse, 1/4 Amp, Norm-Blo
66002-4	Board 1R (Assembled and Tested)
66003-2	Board 2R (Assembled and Tested)
69060-0	AM LO-BAND RF Module (Assembled and Tuned)
69070-0	AM HI-BAND RF Module (Assembled and Tuned)
66004-0	Board 3R Mother Board
66005-1	Terminal Board (w/Hardware)
57060	Ribbon Cable Assembly
22178 & 22177	PL-259 Connector (Solder-On Replacement)
22179	PL-259 Connector (Crimp-On Replacement)



AUXILLARY CHARGER (91011)

INSTALLATION MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

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PRECAUTIONS:

RISK OF ELECTRICAL SHOCK

- *READ THIS INSTALLATION MANUAL completely before installing or servicing.
- *REVIEW CALL BOX INSTALLATION/MAINTENANCE and OPERATION (75112) MANUALS..
- *DOUBLE-CHECK all connections before applying power.

INSTALLATION INSTRUCTIONS:

Remove Call Box electronics assembly and place in a safe location. Power Down in the correct order:

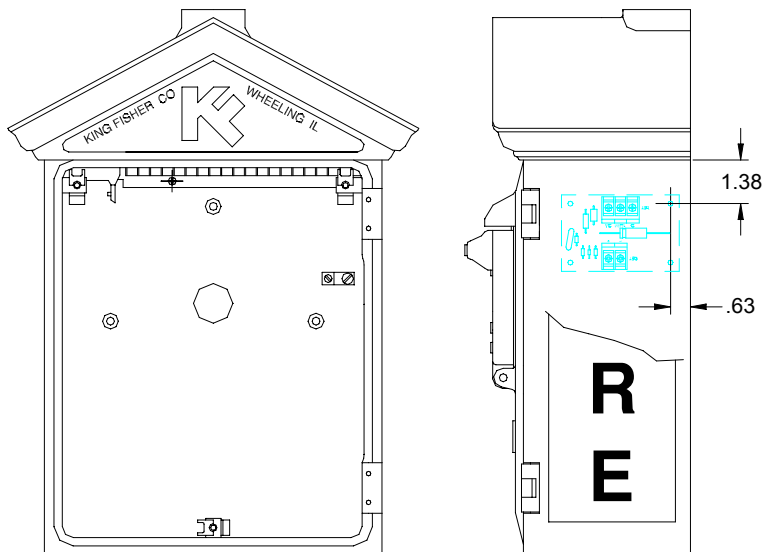
- *Ribbon Cable
- *Battery
- *Antenna

Position the charger as shown below in one of the two types of Call Box Shells.

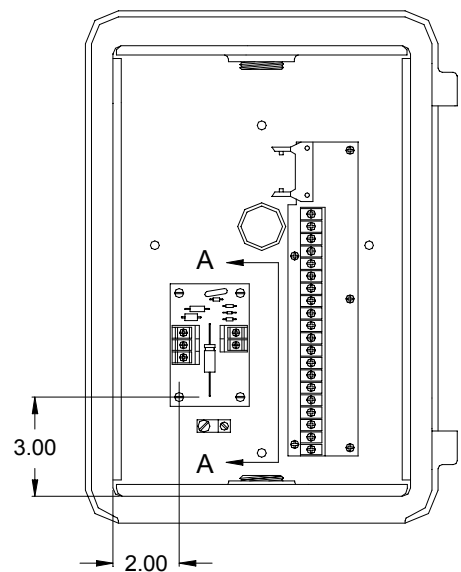
KF3 Cottage Style Enclosure – UPPER RIGHT SIDE PANEL.

KF1 Contemporary Style Enclosure – Lower left back panel.

KF3 Cottage Style Enclosure



KF1 Contemporary Style Enclosure

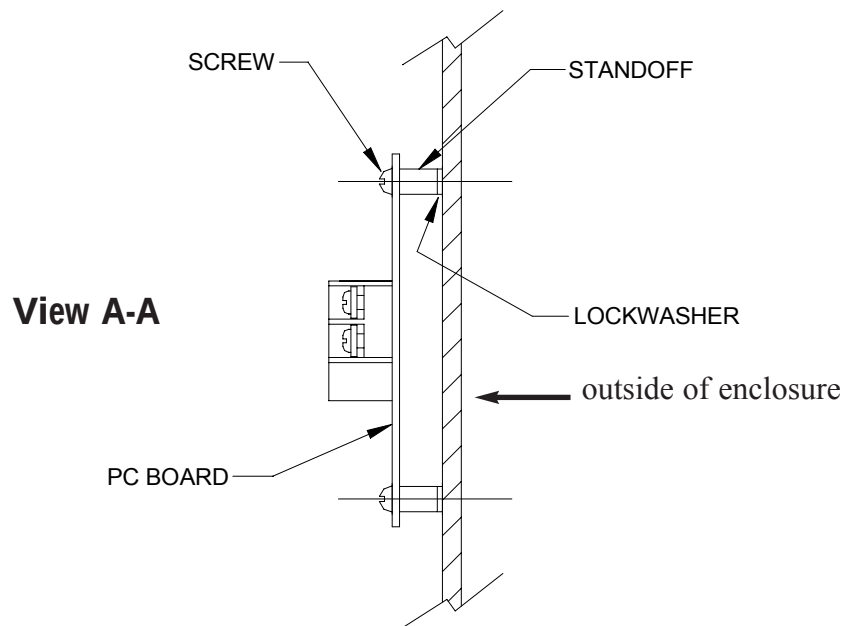


Mark the mounting hole positions.

Use a #36 (.1065 Dia.) drill bit and drill the pilot holes. Use a #6-32 tap and tap the four (4) mounting holes. Remove all rework debris.

Screw the four (4) spacers into the tapped holes. Assemble the four (4) standoffs and lockwashers as shown in view A-A (page 3).

Mount the charger board using four (4) screws provided per view A-A (page 2).

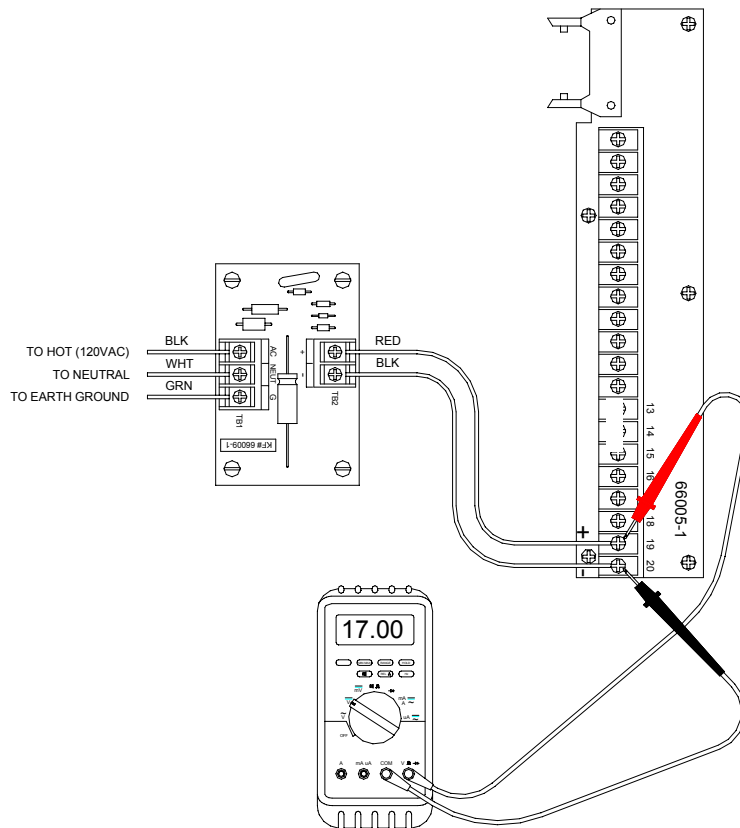


WIRING INSTRUCTIONS

Pull 120 VAC lines, #12 or 14 AWG, into the enclosure.

Connect the 120 VAC wires to terminal block “TB1” per the illustration below.

Connect #14 or #16 AWG wiring from terminal block “TB2” of the auxiliary charger (66009-1) to the Call Box terminal strip board (66005-1) as shown.



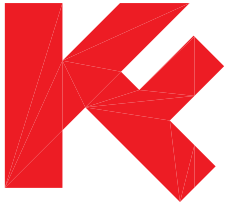
TESTING

Measure the Charger voltage, approximately + 17 volts, at the Call Box terminal strip (66005-1) with 120 VAC to the charger board. Positive (+) meter probe to pin 19 (marked charger +) and negative (-) meter probe to pin 20 (marked charger -). Make sure both voltage and polarity are correct.

Reinstall call box electronics in the correct order or damage may result.

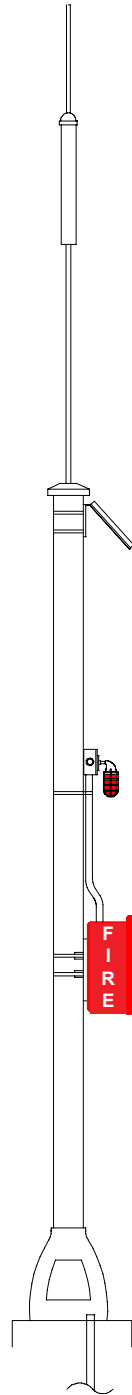
Connect:

- *Antenna coax
- *Battery connector
- *Cable, ribbon



BELL BASE PEDESTAL

INSTALLATION MANUAL



KING-FISHER Company

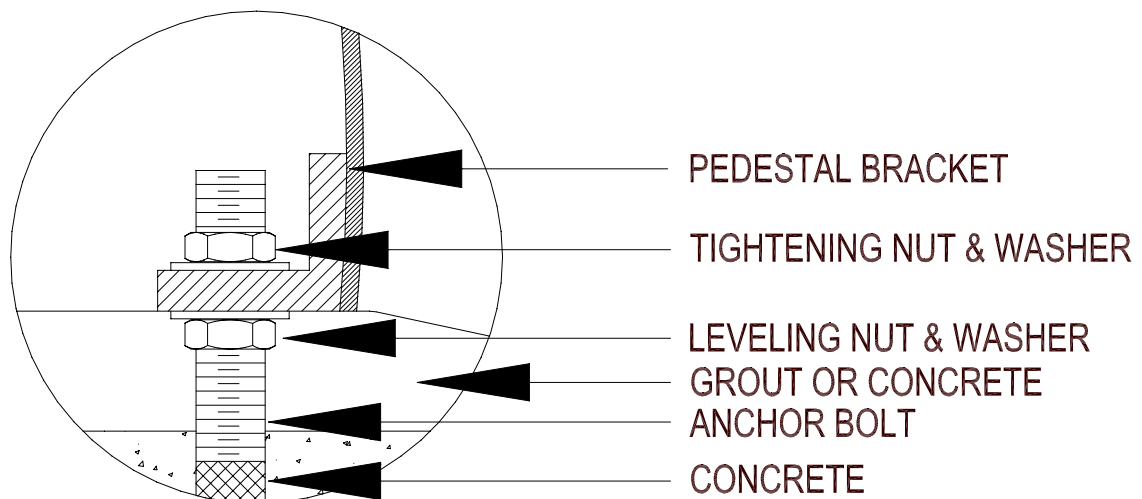
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BELL BASE PEDESTAL INSTALLATION

1. LOCATE THE PEDESTAL SITE AS DETERMINED BY THE RADIO RECEPTION SITE TEST, TRAFFIC PATTERNS, LOCATION DRAWINGS AND/OR SPECIFICATIONS.
2. DIG A HOLE FOR THE PEDESTAL'S CONCRETE BASE. THE HOLE SHOULD BE AT LEAST 18" WIDE AND 24" DEEP, DEPENDING ON LOCAL FROST, SOIL CONDITIONS, AND APPLICABLE CODES.
3. DRIVE GROUND ROD (IF REQUIRED) IN THE CENTER OF HOLE LEAVING 3" PROTRUDING ABOVE CONCRETE LEVEL.
4. POUR CONCRETE (300 PSI MIN.) AND INSERT ANCHOR BOLT CAGE ASSEMBLY LEAVING THE TOP 2 ½" TO 3" OF THREAD EXPOSED ON EACH ANCHOR BOLT AS SHOWN IN THE DETAIL BELOW. TAPE THREADS TO PROTECT FROM CONCRETE SPLASH.

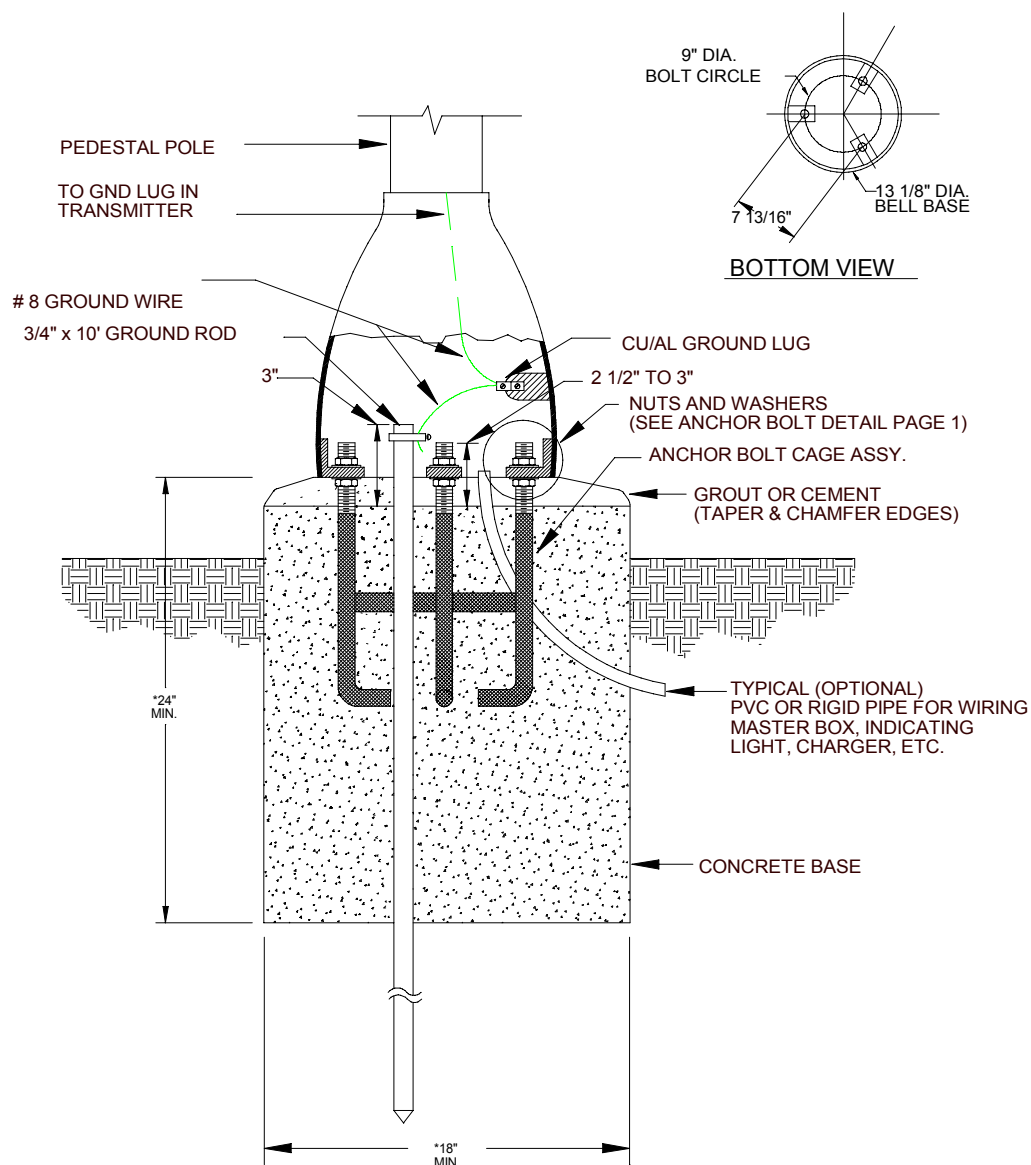
ANCHOR BOLT DETAIL



5. LEVEL THE CONCRETE SURFACE AND THEN LEVEL THE TOPS OF ALL THREE ANCHOR BOLTS. MAKE CERTAIN ANCHOR BOLTS ARE CENTERED IN RESPECT TO THE BASE.
6. ALLOW THE CONCRETE TO HARDEN FOR 5-10 DAYS (DEPENDING ON CLIMATIC CONDITIONS).
7. PLACE LEVELING NUTS AND WASHERS ON EACH ANCHOR BOLT, AND LEVEL BETWEEN WASHER SURFACES.

NOTE: THE PEDESTAL MUST BE PLUMP FOR THE RADIO EQUIPMENT TO FUNCTION PROPERLY!

8. INSTALL ANTENNA ON TOP OF PEDESTAL BEFORE SETTING ON ANCHOR BOLTS. SEE ANTENNA INSTALLATION INSTRUCTIONS FOR MOUNTING ANTENNA. POSITION PEDESTAL ON TOP OF LEVELING NUTS AND WASHERS.
9. PLACE TIGHTENING WASHER AND NUT ON EACH ANCHOR BOLT. ACCESS ANCHOR BOLTS BY REMOVING BELL BASE HAND HOLE COVER. MAKE FINAL ADJUSTMENTS AS NECESSARY TO PLUMB PEDESTAL. TIGHTEN ALL THREE NUTS SECURELY.
10. GROUT OR CEMENT THE SPACE BETWEEN PEDESTAL BASE AND CONCRETE. SMOOTH TOP SURFACE FLUSH WITH PEDESTAL BASE. NOTE TAPER AND CHAMFER OF GROUT EDGES AS SHOWN ON DRAWINGS.
11. ATTACH # 8 AWG GROUND WIRE TO GROUND ROD AND GROUND LUG AS SHOWN.

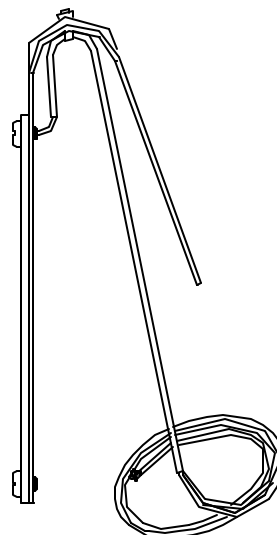
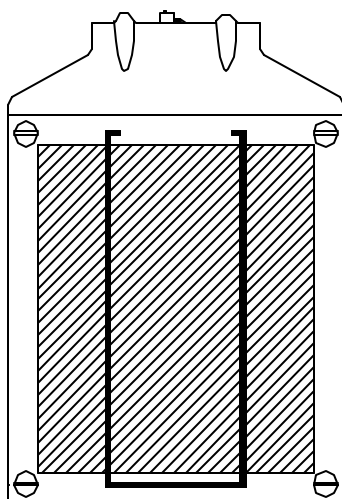


* DEPENDING ON FROST LEVEL, SOIL CONDITIONS, AND APPLICABLE CODES.



SOLAR CELL (79009)

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfcn.com

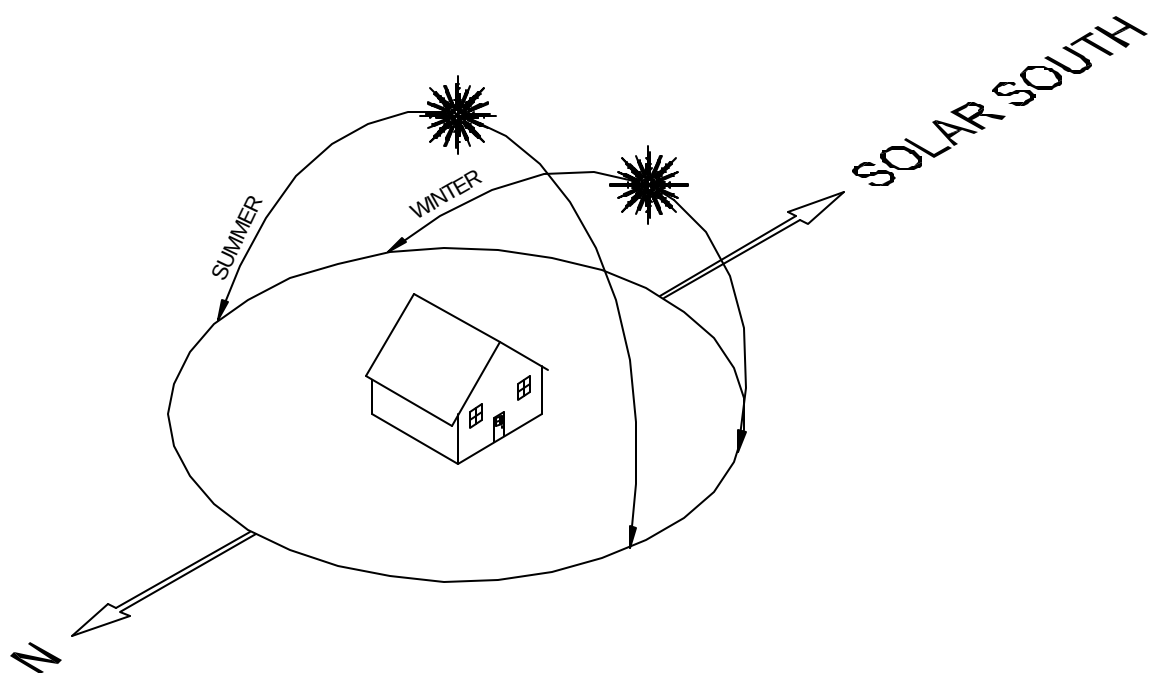
Internet www.kfcn.com

THE SUN & SOLAR POWER:

The intensity of the sun's radiation changes with the hours of the day, time of the year and weather conditions. The most productive hours of sunlight are from 9:00 a.m. to 3:00 p.m..

In most locations in the United States winter produces the least sunlight because of shorter days and increased cloud cover, as well as the sun's lower position in the sky.

The diagram below illustrates the path of the sun over varying seasons. Remember when selecting a site for your solar panel pick a spot that is clear of shade. A limb from a tree will substantially reduce power output.



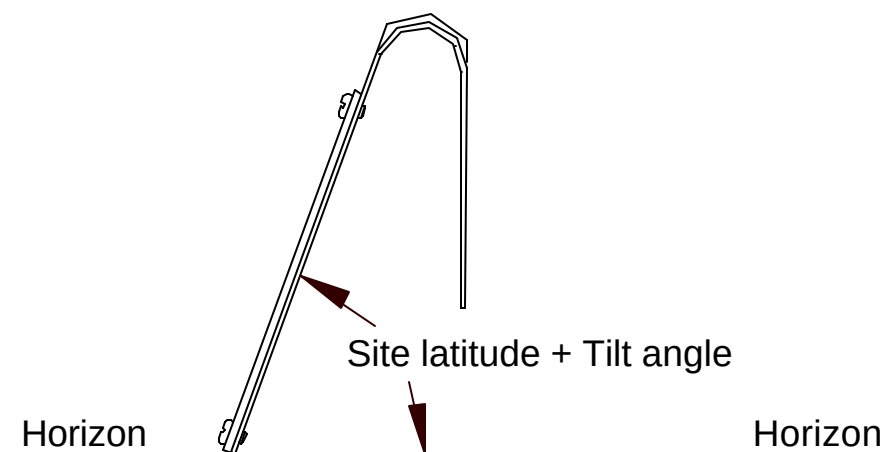
ORIENTATION / SOLAR SOUTH:

Orientation of a solar panel is best at solar south. Solar south is slightly different than magnetic or compass south. A quick way to determine solar south is to divide the span of time between sunrise and sunset in half. The position of the sun at the resulting time would be true solar south for your area.

MODULE TILT ANGLE:

Solar panels produce the most power when they are pointed directly at the sun. For installations where the solar panel is mounted to a permanent structure, the solar panel should be tilted for optimum winter performance. As a rule, if the solar panel power is adequate in the winter, it will be satisfactory during the rest of the year. The approximate tilt angle may be chosen from the following table

Site Latitude Degrees	Tilt angle above horizontal in Degrees
0-4	10
5-20	Site latitude + 5 degrees
21-45	Site latitude + 10 degrees
46-65	Site latitude + 15 degrees
66-75	80 degrees



PRECAUTIONS:

READ THIS INSTALLATION MANUAL completely before installing or servicing.

HANDLE SOLAR CELL CAREFULLY, as it can easily be damaged.

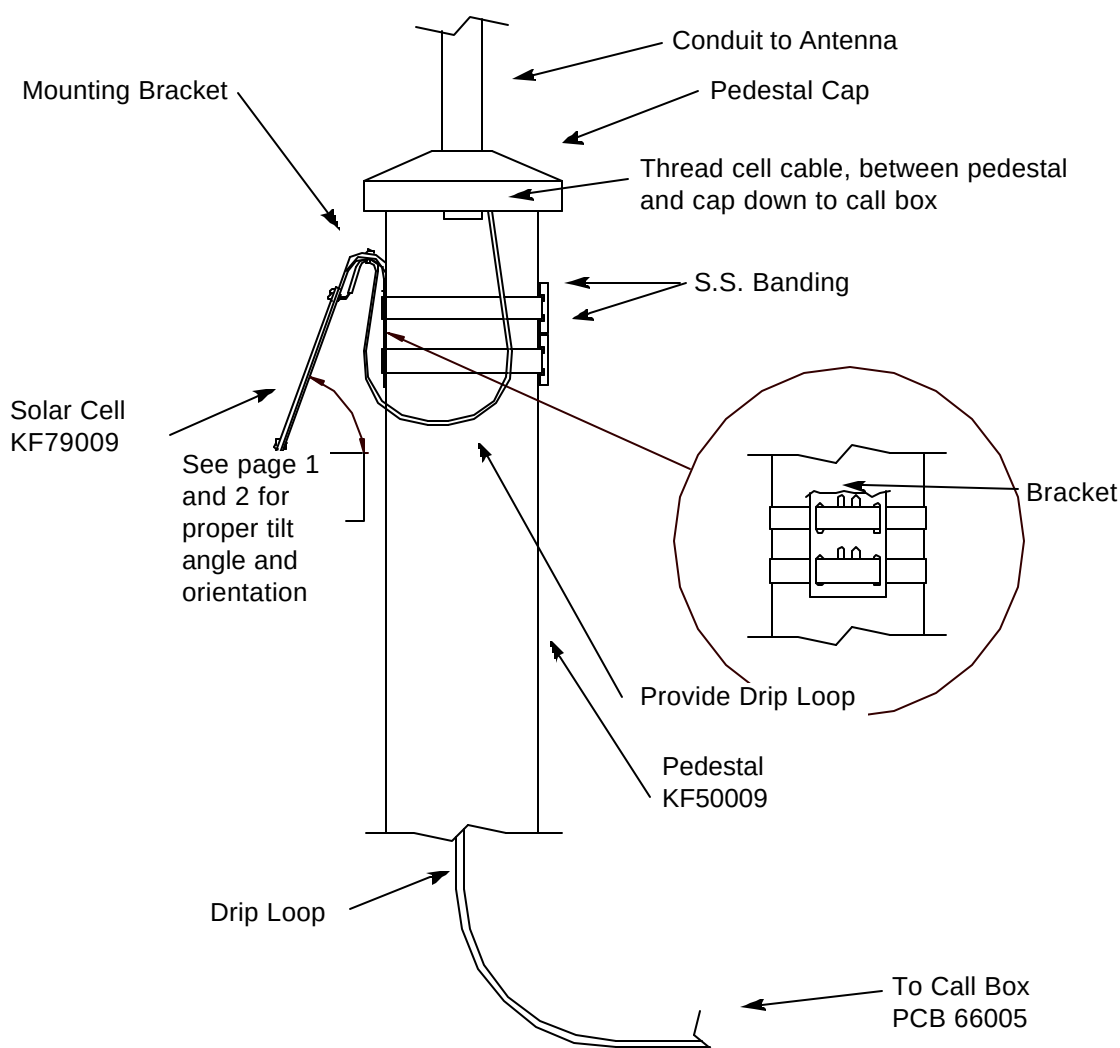
DO NOT cut cable on or before shrink tube splice.

SITE SELECTION

Locate a position on a pedestal, wall, wood pole, or conduit where the solar cell will face Solar South (in Northern Hemisphere) and will be high enough to deter vandalism. (See page 1 and 2 to help you in your selection).

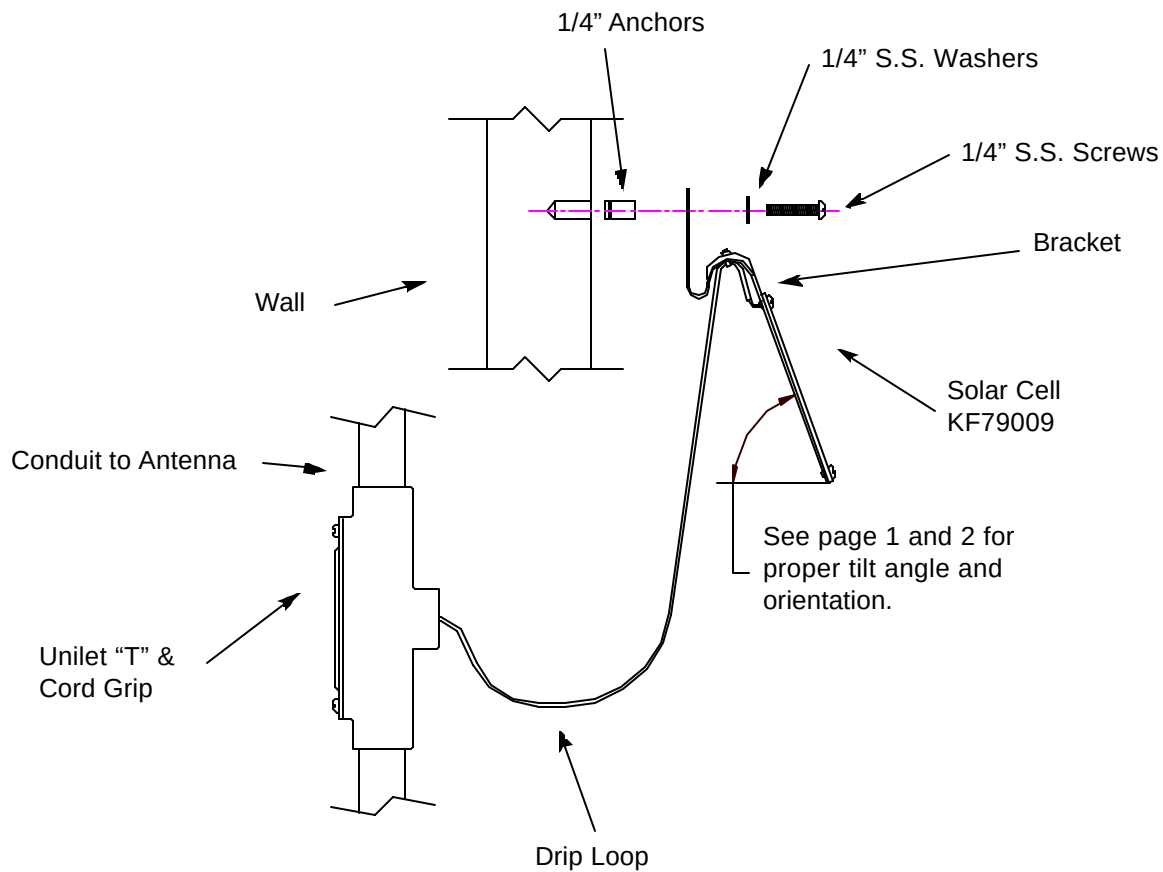
PEDESTAL MOUNT INSTALLATION

1. MOUNT SOLAR CELL to KF50009 Pedestal using $\frac{3}{4}$ " Stainless Steel Banding and Buckles. Route banding through two outer slots of mounting bracket.
2. ROUTE wires up through pedestal cap, and down to call box enclosure.
3. It may be necessary to bend the bracket to obtain the proper tilt angle, if so, care must be taken.



WALL OR WOOD POLE INSTALLATION

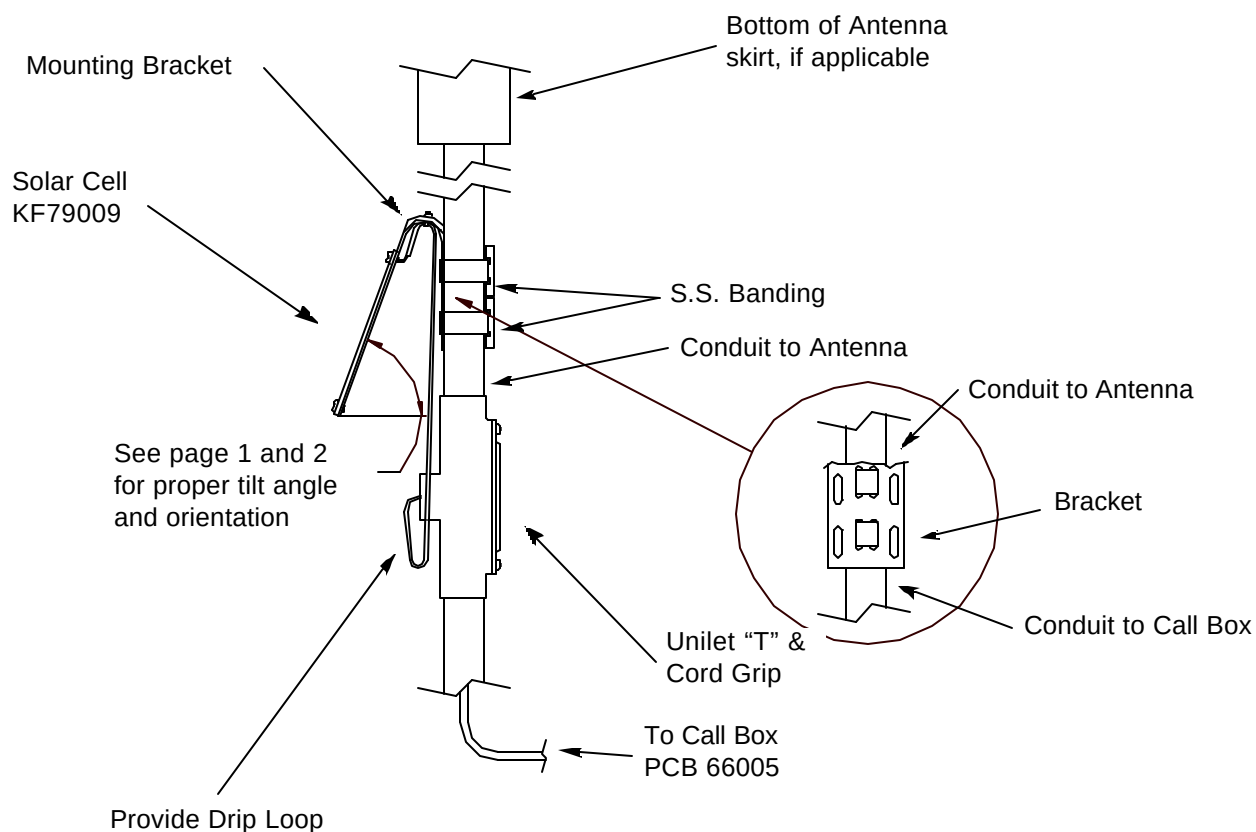
1. To mount to a wall or wood pole, the bracket must be bent as shown in illustration.
2. MOUNT solar cell using stainless steel hardware.
3. RUN conduit from the call box to a Unilet "T" mounted next to the solar cell and possibly up to the antenna.
4. It may be necessary to bend the bracket to obtain the proper tilt angle, if so, care must be taken.



Note: For wood pole mounting use #10 x 2" long stainless steel lag screws with washers.

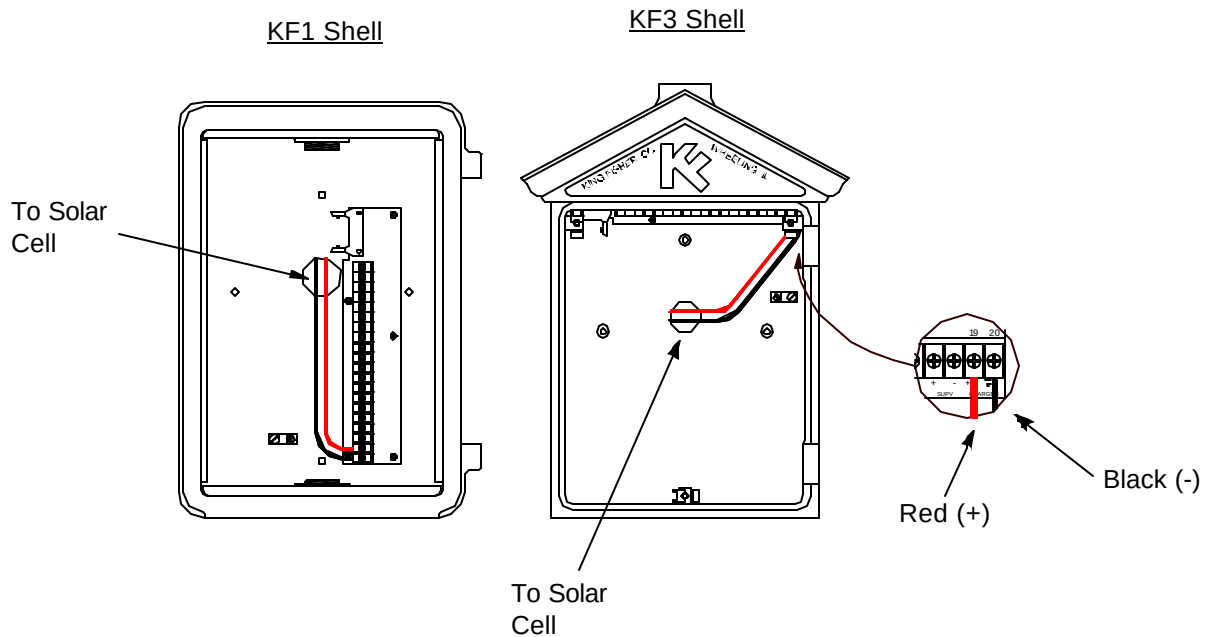
CONDUIT MOUNT INSTALLATION

1. INSTALL a Unilet "T" just below the position where the Solar Cell is to be mounted.
2. ATTACH Solar Cell to Conduit Support pipe using $\frac{3}{4}$ " Stainless Steel Banding or S.S. Hose Clamps.
3. Route Banding through inner slots of Mounting Bracket.
4. It may be necessary to bend the bracket to obtain the proper tilt angle, if so, care must be taken.



WIRING SOLAR CELL

1. ROUTE the Red and Black wires from Solar Cell to Call Box Shell. If the wires are not long enough, splice two (2) #16 AWG wires (Red and Black) in the Unilet "T". DO NOT cut black shrink-wrap coming out of Solar Cell.
2. CONNECT wires to Terminal Board 66005-1 inside Call Box Shell. Red wire connects to Pin-19



(Charger +). Black wire connects to Pin-20 (Charger -).

TESTING SOLAR CELL

Disconnect Call Box Ribbon Cable from terminal board 66005-1.

Measure the DC Voltage and check polarity across pins 19 (Charger +) and 20 (Charger -). This should be 15 to 18 Volts depending on solar intensity.

Measure the DC current across pins 19 and 20. This should be approximately 40 to 60 mA on a sunny day and 1 to 9 mA on a cloudy day, depending on solar intensity, cleanliness of glass, and wire length.

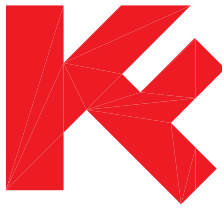
CONNECT Ribbon cable to 66005-1.

MAINTAINING SOLAR CELL

Clean Solar Cell face with a damp cotton cloth.

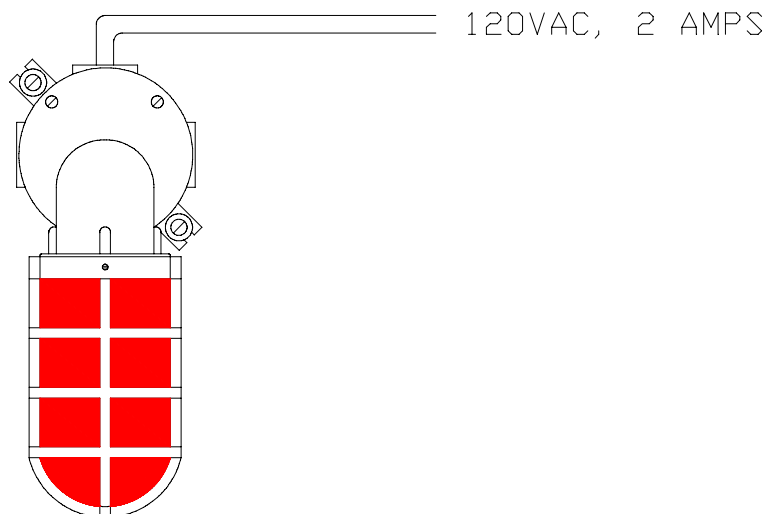
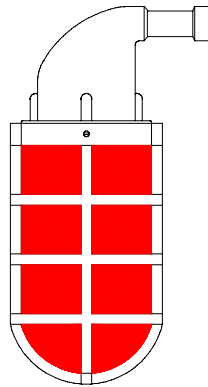
Visually check Solar Cell and Wires for any possible problems.

Perform the above TEST Procedure to verify proper operation.



RED LOCATION LIGHT

INSTALLATION MANUAL



KING-FISHER Company

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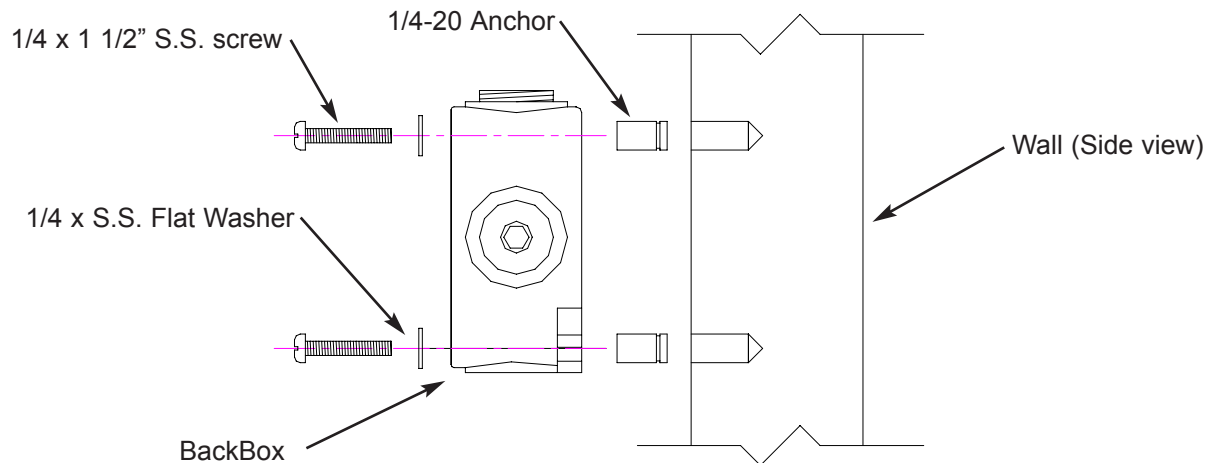
t 847•398•7100 *f* 847•255•1507 *e-mail* sales@kfco.com *Internet* www.kfco.com

KF 81001 WALL MOUNT INSTRUCTIONS

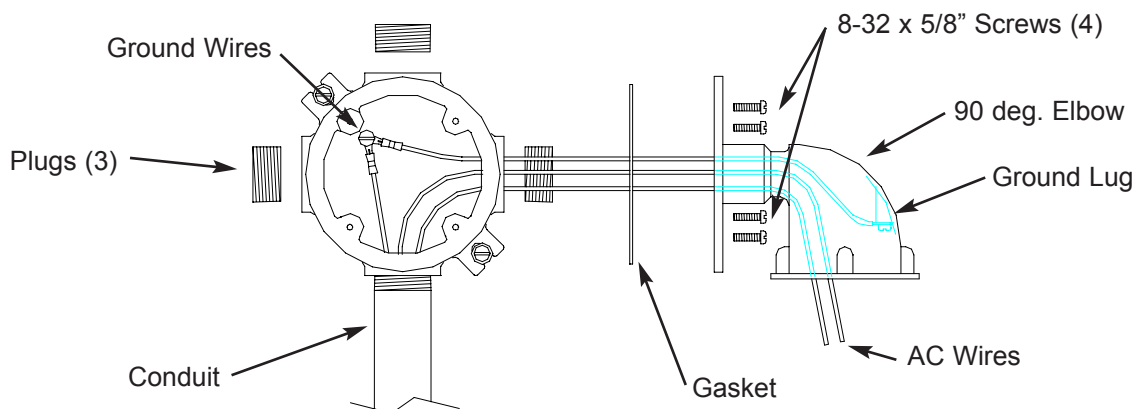
1. DISASSEMBLE the entire Red Light Assembly KF81001. There are six major components excluding the screws and gaskets:

Back Box	90° Elbow
Fixture Box	Porcelain Socket
Red Globe	Globe Guard

2. ATTACH Back Box to wall using 1/4" stainless steel hardware (not supplied) as shown below.



3. RUN rigid conduit to Back Box for AC wiring. Plug unused holes with the plugs provided. Use pipe thread compound in all four holes to seal openings.
4. PULL AC and Ground wiring into Back Box. Connect ground wire to green lug in Back Box and green lug in elbow.
5. THREAD AC wires through Gasket and Elbow. Attach Elbow and Gasket to Back Box using four 8-32 X 5/8" screws provided.
6. Connect AC wires to the porcelain socket.

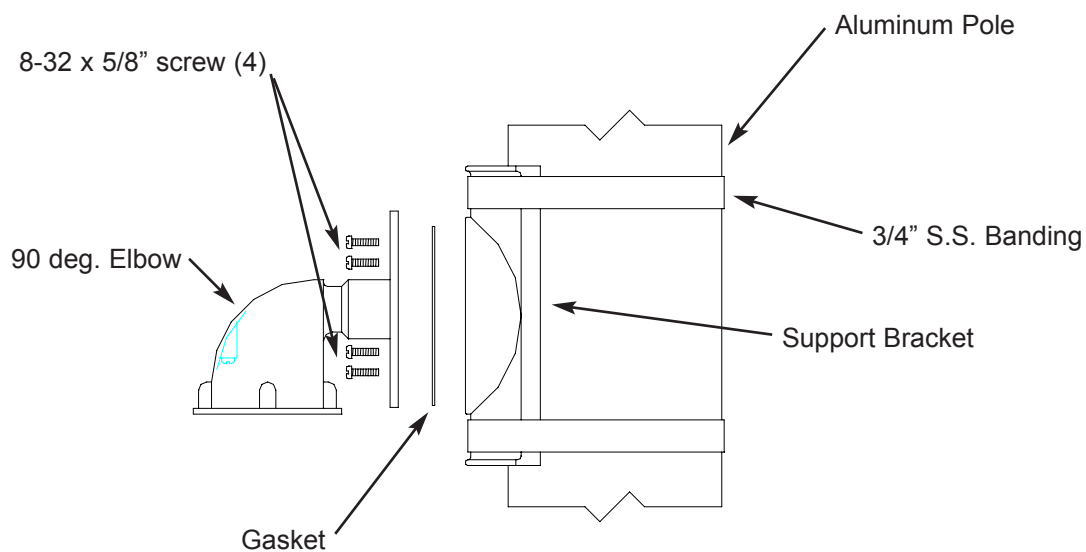


KF 81002 POLE MOUNT INSTUCTIONS

1. DISASSEMBLE the entire Red Light Assembly KF81002. There are six major components excluding the screws and gaskets:

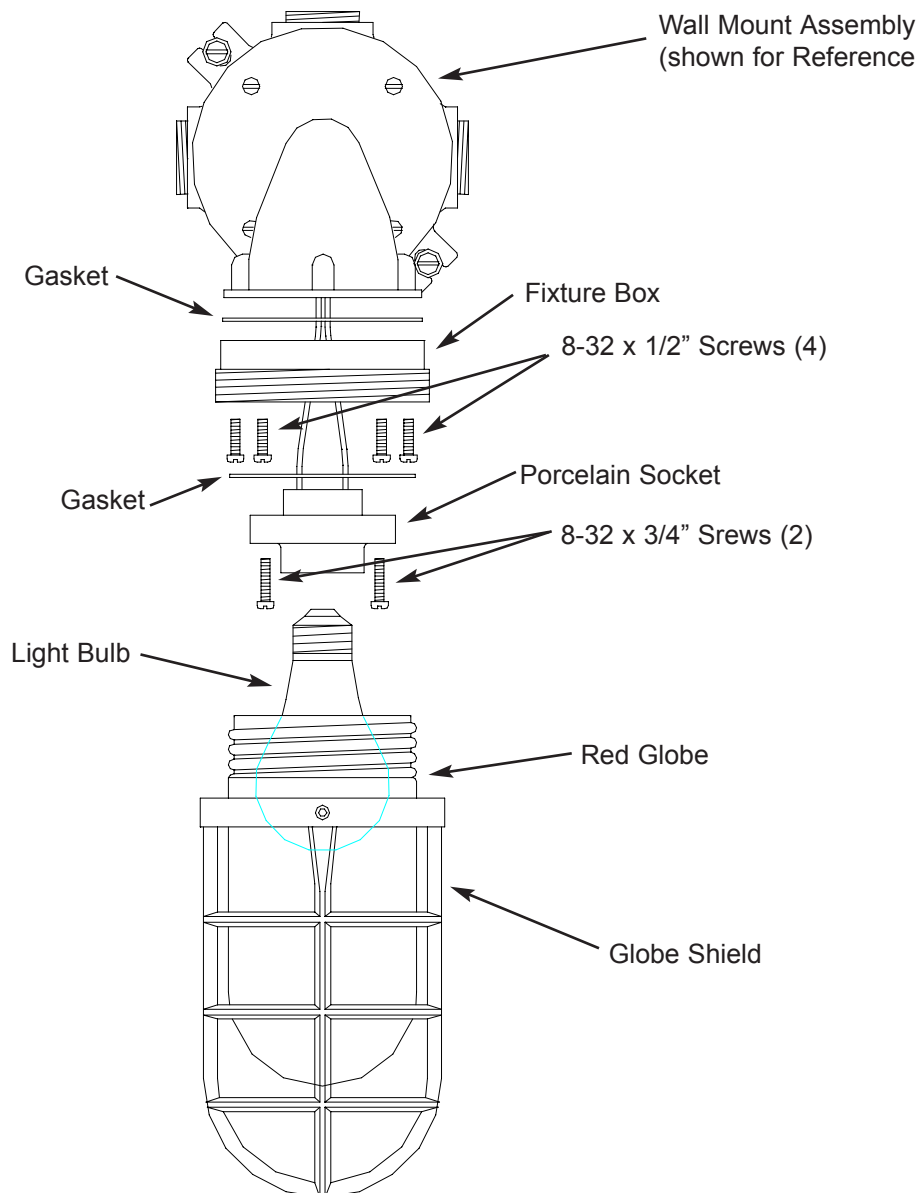
Support Bracket	90° Elbow
Fixture Box	Porcelain Socket
Red Globe	Globe Guard

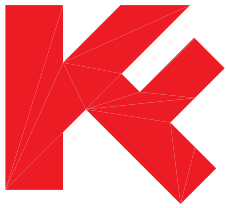
2. DRILL a 1 ½" to 2" hole in the Aluminum Pole where the Support Bracket is to be mounted. Remove any burrs or sharp edges.
3. STRAP Support Bracket to pole using ¾" Stainless Steel Banding and Clamps.



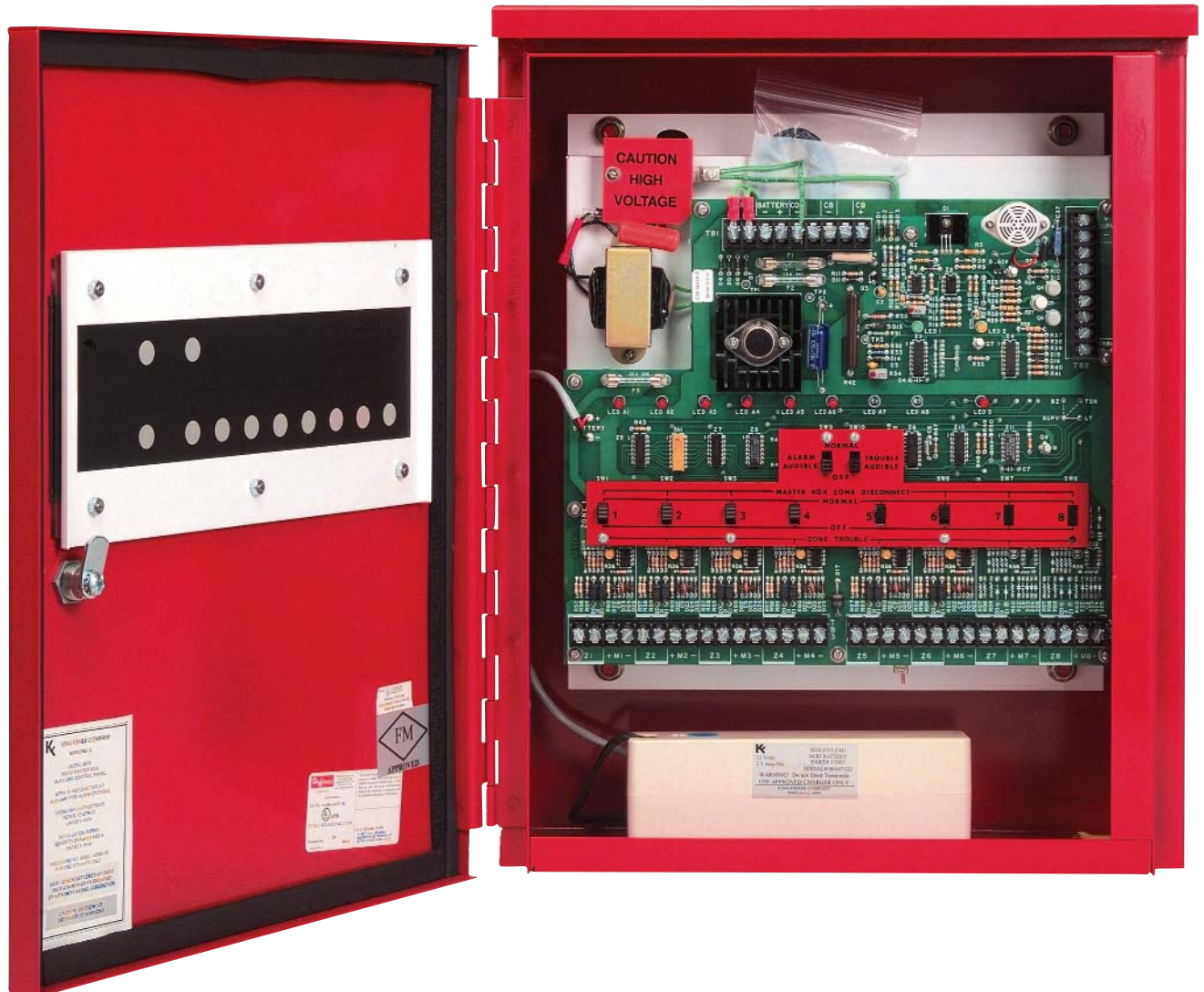
4. PULL 120 VAC wires through hole in bracket, gasket, and 90° Elbow.
5. ATTACH Gasket and Elbow using four anodized screws provided.
6. ROUTE wires through Gasket, Fixture Box, and 2nd Gasket. Connect AC wires to the porcelain socket.

7. ASSEMBLE all parts as shown below.





KFRI INTERFACE PANEL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com

GENERAL DESCRIPTION

The KFRI Interface Panel provides a reliable connection between interior alarm systems and radio alarm master box transmitters.

In addition to KFRI Interface Panel features described in this bulletin, identical features are provided in the COMBINATION TRANSMITTER/INTERFACE PANEL. The COMBINATION TRANSMITTER/INTERFACE PANEL houses both the interface and transmitter circuitry in a common Nema 3R rainproof enclosure.

For additional information, please refer to the King-Fisher data sheet titled COMBINATION TRANSMITTER/INTERFACE PANEL.

OPERATION

The KFRI Interface Panel is used with a radio call box transmitter to provide automatic transmission of emergency message signals. The KFRI Interface Panel can be connected to interior or exterior fire alarm systems.

As many as eight zones can be simultaneously monitored by the KFRI Interface Panel. Closing the contacts in any of these zones will cause an alarm message to be conveyed to the radio transmitter. The emergency condition will also cause an alarm on the KFRI Interface Panel to be sounded. When an emergency condition is detected, an alarm message is transmitted to the associated radio transmitter. A buzzer in the interface panel sounds, and a common alarm LED lights. In addition, the zone alarm LED lights. Both LED's are visible through a window in the front panel.

The zone monitoring is supervised; that is, any disruption in the wiring will cause an audible alert to be sounded and transmitted. The KFRI Interface Panel automatically sounds the audible alert and transmits a message if power is interrupted, if the wiring between the interface unit and the radio transmitter is broken, or if the standby battery is disconnected or drops below allowable limits.

The interface unit circuits may be programmed to indicate the kind of trouble encountered. If desired, a delay of 2 seconds to 45 minutes may be programmed before a trouble message is sent.

EMERGENCY BATTERY STAND-BY

The KFRI Interface Panel requires 120VAC, 60 HZ. The KFRI Interface electronics operate on 12 volts D.C. and a standby 12 volt, 2.5 ampere-hour battery provides up to 60 hours operation in the event of primary power failure. The battery is kept charged by a built-in two-stage constant current charger. Switchover to battery power is automatic if primary power fails. In addition, a constant current charge circuit for maintaining the charge on the radio transmitter battery is provided.

INSTALLATION

The KFRI Radio Interface Panel requires 120V AC, 60 HZ., 15 amp circuit, properly grounded, for normal operation. This power supply is stepped down to 12V DC for operation of the KFRI Radio Interface Circuitry.

A separate pair of 16 gauge wires are required for each circuit between the initiating device and the KFRI Radio Interface Panel. An end-of-line resistor on each initiating circuit is required for supervision. Additionally, a pair of 16 gauge wires is required for each circuit (zone) between the KFRI Radio Interface Panel and any KF radio transmitter.

The installation of the KFRI Radio Interface Panel is simple due to its construction and design. Removal of the interface electronic circuitry attached to the subplate assembly is easily accomplished as there are no wire connections to any door panel mounted equipment. The Nema 3R enclosure can then be installed in its permanent location. The interface circuitry and subplate are then installed before final field wiring connections are made.

FEATURES

- Standard NEMA 3R Rainproof Enclosure • Up to Eight (8) Supervised Zones
- Individual LED Alarm Zone Indicators • LED AC On Indicator
- Built-in Individual Audible Alarm and Trouble Signals
- Reliable, Long-Life Rechargeable Sealed Lead Acid Battery
- Radio Master Box Battery Charging Circuit • Individual (ON/OFF) Zone Control Switches • U.L. Listed
- Common LED Alarm and Trouble Indicators • Individual LED Zone Trouble Indicators
- 12V DC Limited Energy Operation
- 60-Hour Internal Stand-by Battery with Built-in Charger
- Wiring to Door Equipment Eliminated
- Programmable Time Delay of System Trouble Reporting to Radio Master Box (Transmitter)

APPROVALS

The KFRI-WP 8-Zone Interface Panel is U.L. and F.M. Listed, meeting all applicable N.F.P.A. requirements.

KFCI - KING-FISHER CORROSION INHIBITOR

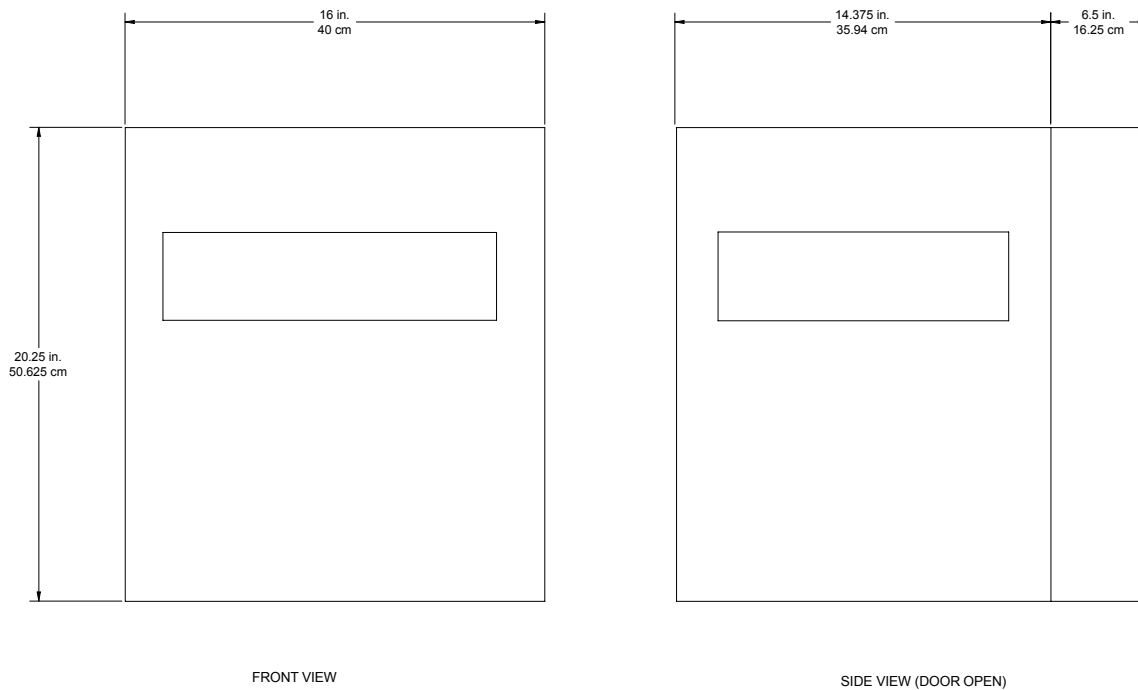
Every KFRI Interface Panel contains a corrosion inhibiting tape which contains a chemical combination that vaporizes and then condenses on all surfaces within the control panel enclosure.

The vapor is invisible, and cannot be felt by the human hand. The inhibitor tape is installed at the top of the control panel enclosure where the vapor film from the inhibitor tape is continuously renewed, neutralizing most corrosive elements.

Complete enclosure protection is accomplished within 48 hours, and the inhibiting tape's long-lasting chemical is effective for one to two years depending on the installation and severity of local conditions.

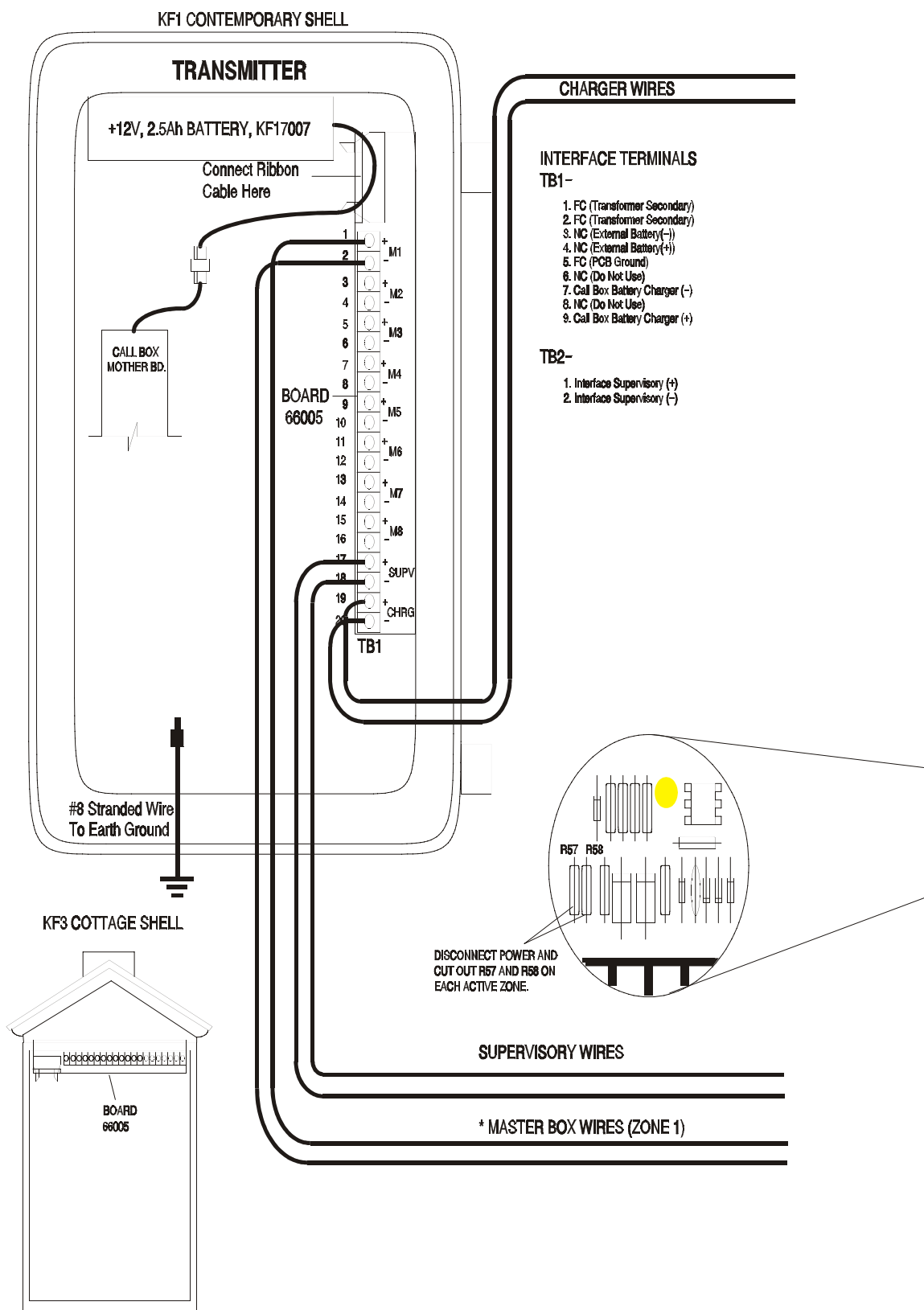
CONSTRUCTION

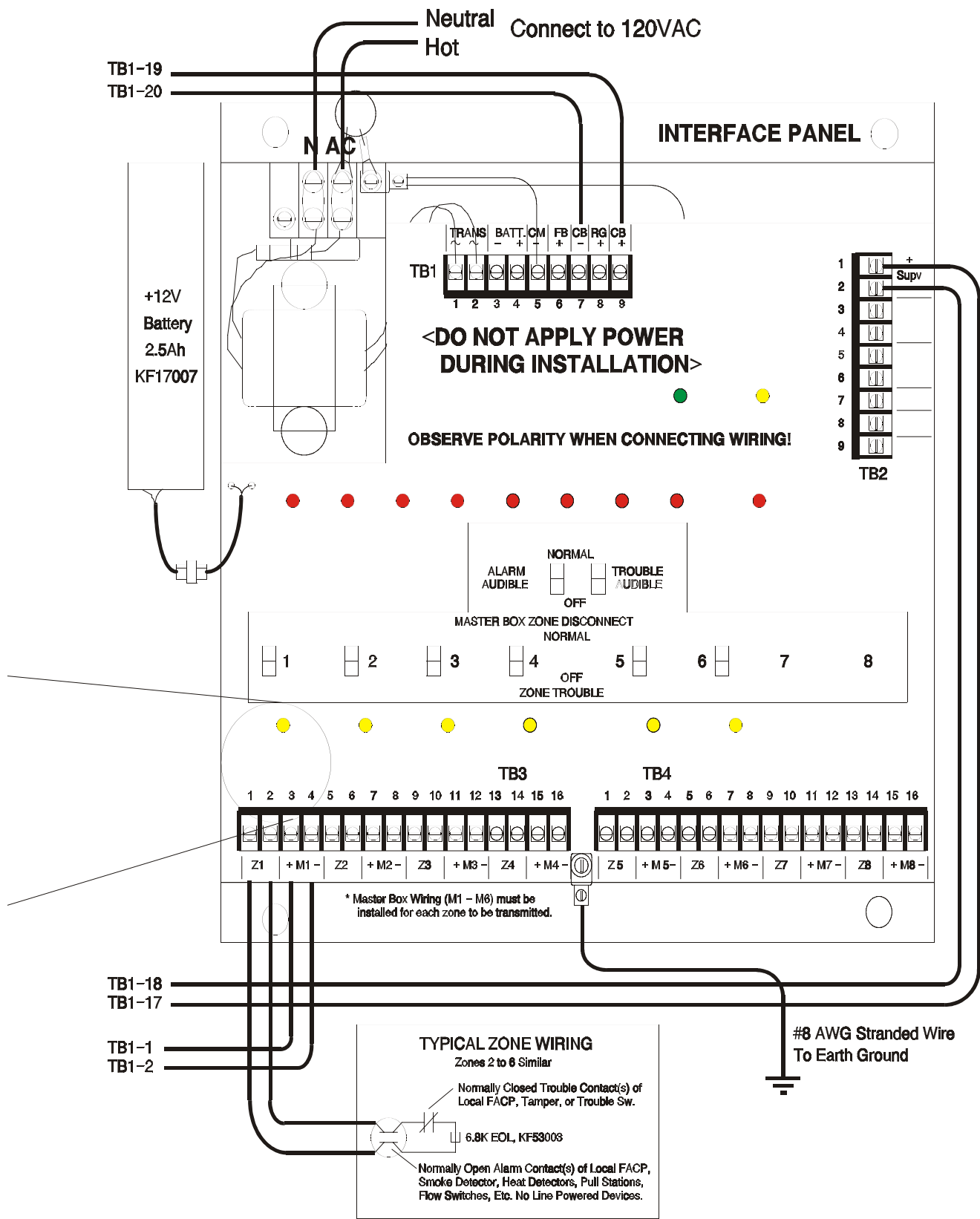
The KFRI Interface circuitry is constructed of solid state C-MOS logic and discrete switching components. The operating temperature range of all components is -40°F to +140°F (-40°C to 60°C). All electronics are mounted on a removable sub-plate which is housed in a Nema 3R rainproof enclosure. A Lexan viewing window is installed on the front door.



NUMBER OF ZONES	PART NO.	WEIGHT		CUBE	
4	KFRI-WP-4	40 lbs.	18 KG	1.2 ft ³	54.5 cm ²
6	KFRI-WP-6	40 lbs.	18 KG	1.2 ft ³	54.5 cm ²
8	KFRI-WP-8	40 lbs.	18 KG	1.2 ft ³	54.5 cm ²

NOTE: Installed in NEMA 3R Rainproof enclosures, each unit includes adjustable Time Delay Trouble Output, Zone Alarm and trouble LED Indicators, and an integral Battery Charger that services both the interface and associated Radio Box Transmitter Batteries. Batteries must be ordered separately. Standard color of the NEMA 3R enclosure is Red.

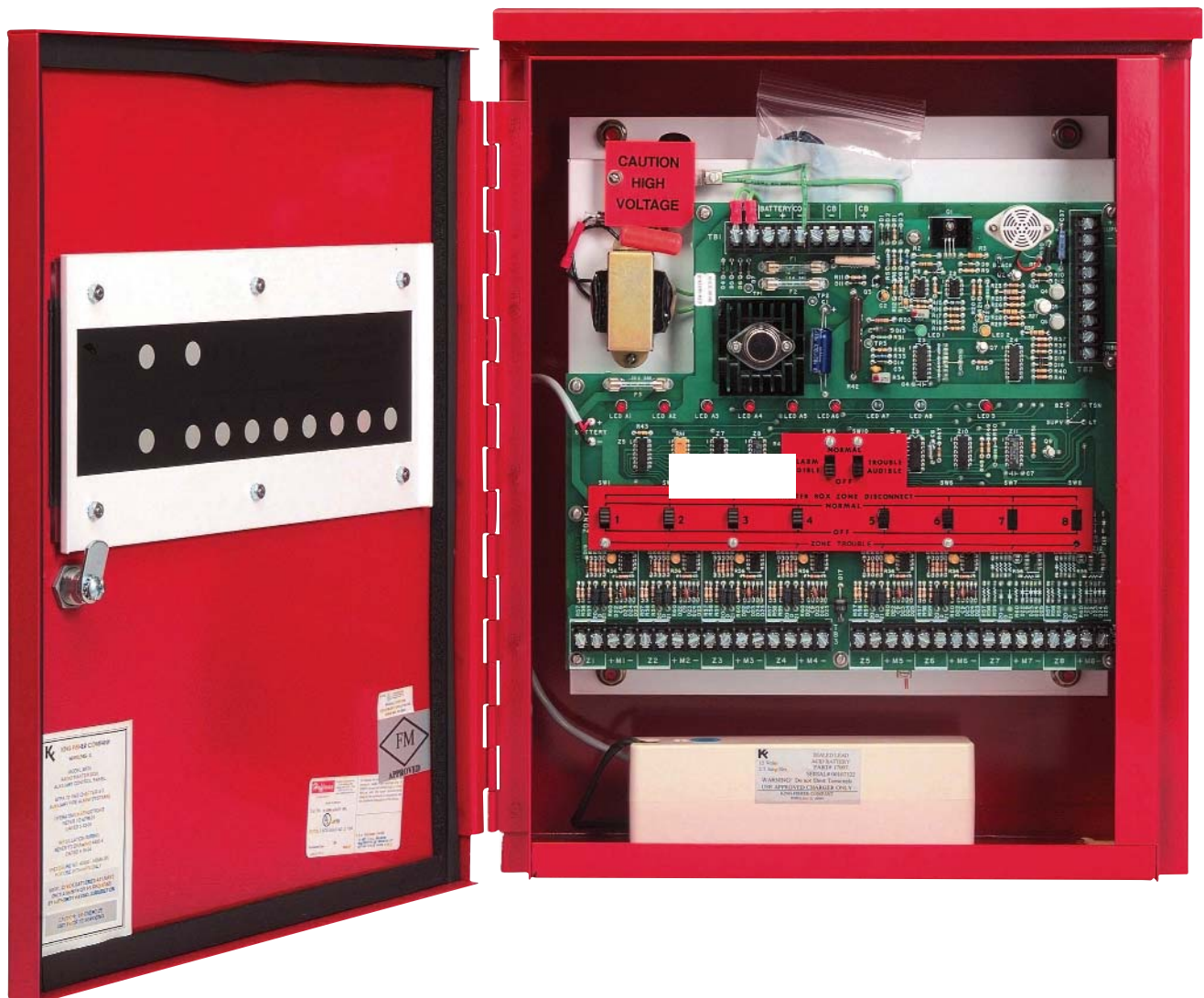






KFRI INTERFACE PANEL

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

RADIO MASTER BOX INTERFACE PANEL

KFRI

The King-Fisher KFRI panel provides a reliable and efficient means of connecting interior or exterior fire alarm systems, waterflow switches, heat detectors, manual pull stations, or any normally open contact device, to a radio fire alarm master box. Up to six (6) supervised zones can be monitored by the panel simultaneously. All wires connecting the panel to the initiating devices and master box are supervised, and any fault condition will activate visual and audible trouble signals.

Power to the panel is supplied by 120 VAC, 60Hz., 15 Amp service with a standby 12 volt, 2.5 Ahr. sealed lead acid battery. This battery will allow the panel to operate for sixty (60) hours in the event of AC power failure; and is kept fully charged by a charger internal to the panel.

This charger is a two stage constant current charger providing approximately 125mA. in the high rate mode and 13 mA., nominal, in the low rate. The charger circuit changes rate automatically in response to the battery's terminal voltage.

The master box battery may also be charged by this panel.

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATION IN DIRECT SUNLIGHT AND IN RAIN RUNOFF PATHS.
- DO NOT INSTALL CONDUIT INTO THE TOP SURFACE OF THE CABINET.

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR ZONE INPUTS, ANTENNA, AND AC POWER
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AND ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

King-Fisher Company

2350 Foster Ave., Wheeling, IL. 60090-6574

Manual 75111-1 10/98

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail service@kfco.com Internet: www.kfco.com

INSTALLATION OF ENCLOSURE

GENERAL

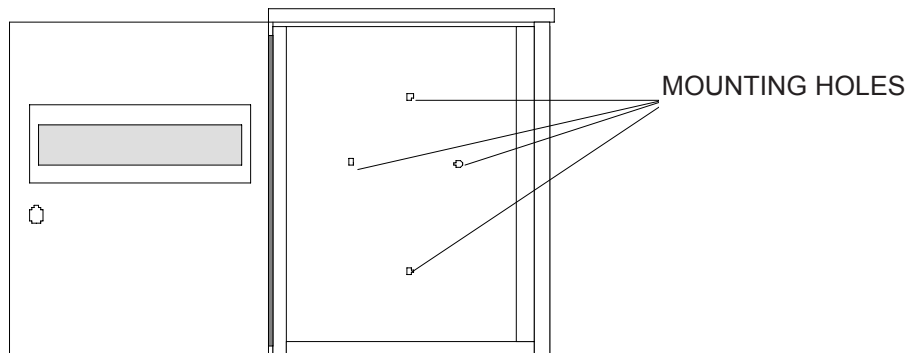
Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

- * Read all instructions first.
- * Do not connect batteries or apply power until wiring and installation is complete and checked.
- * King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, The National Electric Code, the Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.
- * Locate a suitable position and structure for mounting the enclosure.

WALL MOUNTING

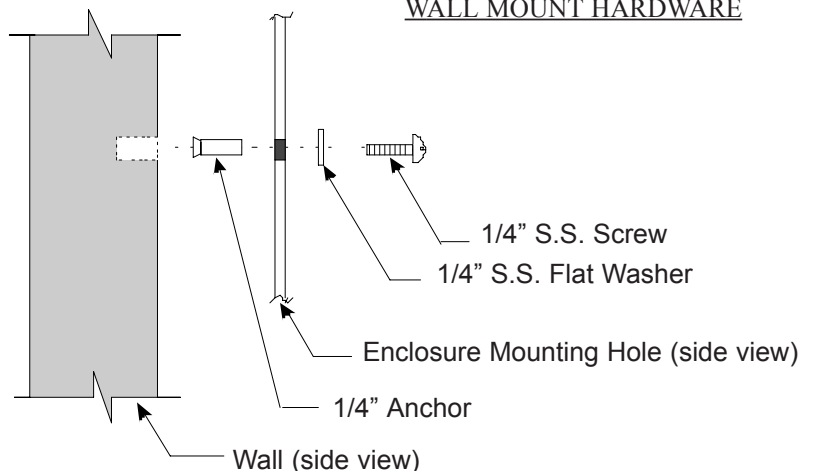
1. REMOVE the subplate assembly from the enclosure by removing the four nuts and washers located at each corner of the subplate. Place in a temporary protected location.
2. REMOVE the mounting hole knockouts located at the rear of the enclosure.
3. MOUNT the enclosure on a wall using appropriate hardware shown below. For pole mounting refer to the illustrations on the following pages. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.

KFRI ENCLOSURE (DOOR OPEN)



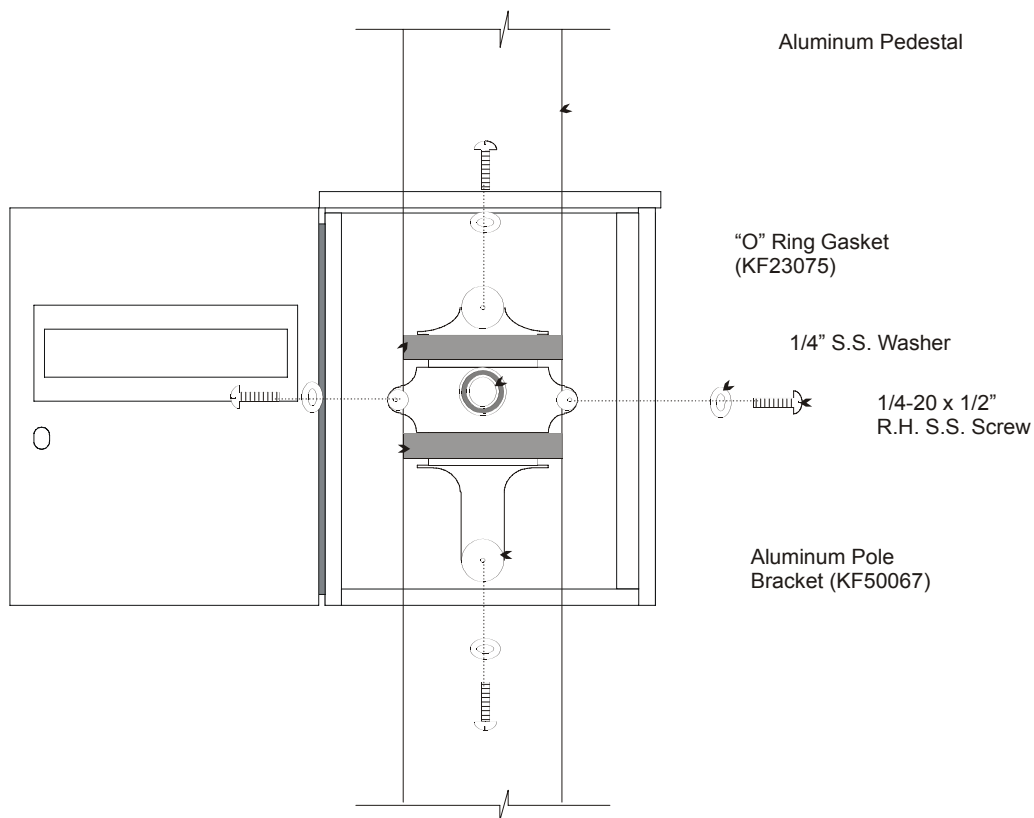
4. RUN all conduit necessary to the enclosure. Conduit should not be attached to the top surface of the enclosure, as moisture from condensation or water may drip or leak on the internal electrical components. Knockouts are provided on the bottom of the enclosure. DO NOT remove knockouts with sub-plate installed. Attach conduit to enclosure using waterproof fittings with star lock-nuts. DO NOT use reducing washers. Separate conduit runs are required for:
 - AC Power
 - Zone Inputs (Z1-Z6)
 - Master Box Outputs (M1-M6)

WALL MOUNT HARDWARE



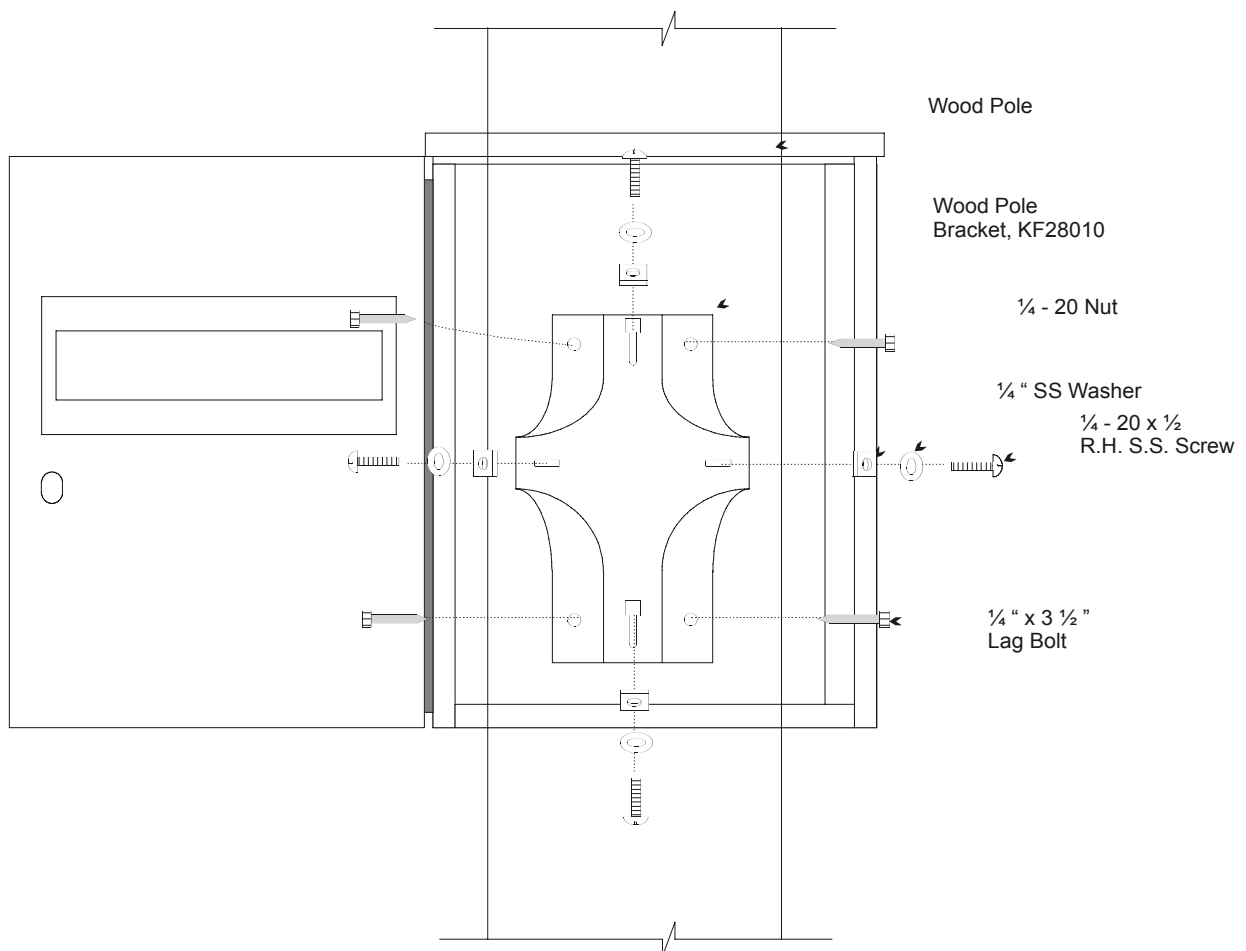
ALUMINUM POLE MOUNTING

- LOCATE a position on the pole where the bracket is to be mounted and mark the center hole position with a scratch awl or pencil.
- DRILL a 1-5/8" hole using a hole saw. File any burrs or sharp edges.
- STRAP the bracket to the pole using 3/4" stainless steel banding and clamps.
- ATTACH the enclosure to the bracket using the appropriate hardware and "O" Ring Gasket shown.
- TIGHTEN all screws securely



WOOD POLE MOUNTING

- LOCATE a position on the pole where the bracket is to be mounted and mark the four corner holes.
- DRILL the holes for the four (4) Lag Screws.
- SCREW bracket to the pole using Lag screws. Tighten securely.
- PLACE washers on each of the screws.
- INSERT Upper and Lower screws through cabinet mounting holes and loosely attach the nuts.
- LIFT enclosure and fit square nuts through keyed holes in the mounting bracket. Let the cabinet slide down into position.
- INSTALL the two remaining screws through enclosure and bracket. Tighten all Securely.



PANEL WIRING

GENERAL

All wiring must be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction.

Refer to the illustration on pages 5 and 6 for steps 1-5.

NOTE: Dress field wiring around the perimeter of the enclosure. 120 VAC main power should be dressed to the upper left hand corner of the enclosure. Carefully re-install the subplate assembly in the enclosure using the four nuts.

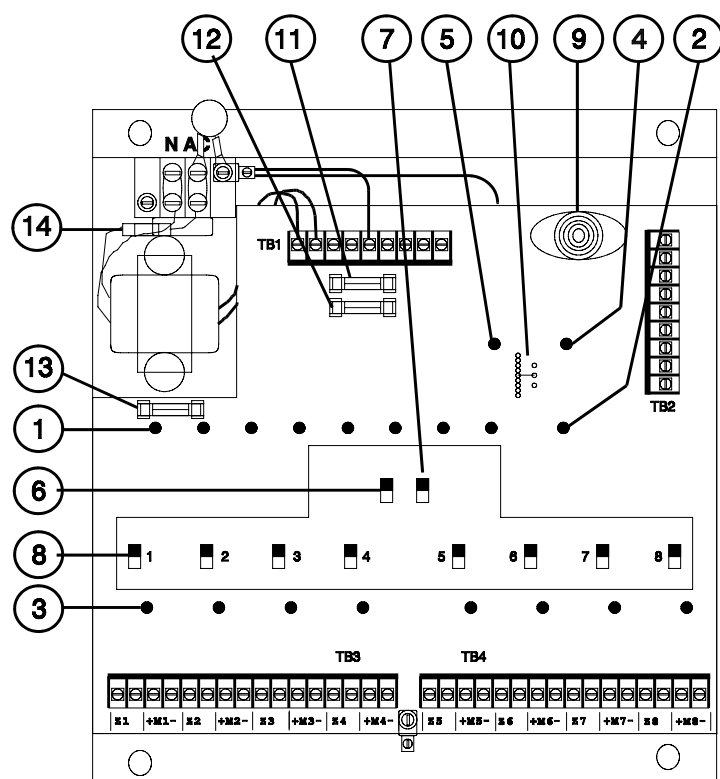
1. **AC wiring** - The KFRI Interface panel operates on 120 VAC 50/60 Hz, single phase power. Connect Hot (H) and Neutral (N) as shown to the terminal block in the upper left corner of the subplate. This panel requires a 15 Amp/120 VAC circuit breaker or fused circuit to be installed external to the panel. Connect Earth Ground to the ground lug provided at the bottom of the subplate. The circuitry on the KFRI contains electronic filters and surge protectors to aid in suppressing spikes, noise and lightning strikes; and, requires ground connection to function.
2. **Zone Wiring (Z1 to Z6)** - Zone Wiring must be connected as per specifications and in accordance with King-Fisher instructions and drawings. The End-of-Line Device must be a 6.8K, 1/2W EOL resistor (KF53003). DO NOT connect line powered detectors of any kind to zone inputs. Cut out resistors R57 and R58 from each active zone as shown. Properly supervised wiring is series-parallel connected with NO separate runs or "T" taps permitted.
3. **Master Box Wiring (M1 to M6)** - Master Box wiring must be connected as per specifications and in accordance with King-Fisher instructions and drawings. Be sure to observe proper polarity when connecting wire to terminals (M+ and M-).
4. **Transmitter charger wires** - Connect these wires to TB1-7 & 9 in the Interface and TB1-19 & 20 in the Transmitter as shown. OBSERVE POLARITY.
5. **Interface supervisory wires** - Connect these wires to TB2-1 & 2 in the Interface and TB1-17 & 18 in the Transmitter as shown. OBSERVE POLARITY.

<DO NOT APPLY POWER TO PANEL>

OPERATION

GENERAL

The KFRI Interface Panel includes a complete array of controls and indicators which simplify the operation of the panel. Each zone has a separate indicator for alarm and trouble as well as a Master Box Zone Disconnect Switch to isolate defective zone conditions. Switches also silence Alarm or Trouble audible signals. Indicators such as AC Power, Common Alarm, and Common Trouble are provided for quick observation of the panel's status. This manual provides a quick summary of each control and indicator as well as normal panel operation.



KFRI CONTROL AND INDICATOR LOCATION DETAIL

1. ZONE ALARM LEDs	8. MASTER BOX ZONE DISCONNECT SWITCHES
2. COMMON ALARM LED	9. INTERNAL BUZZER
3. ZONE TROUBLE LEDs	10. TROUBLE DELAY JUMPERS
4. COMMON TROUBLE LED	11. FUSE F1 (1.0 AMP)
5. AC POWER LED	12. FUSE F2 (1.5 AMP)
6. ALARM AUDIBLE SWITCH	13. FUSE F3 (1/4 AMP)
7. TROUBLE AUDIBLE SWITCH	14. INLINE FUSE (1 AMP)

KFRI CONTROLS AND INDICATORS

1. ZONE ALARM LEDs - Indicates zone (1 to 6) in alarm. Stays lit until device's contacts open.
2. COMMON ALARM LED - Indicates when any zone is in alarm.
3. ZONE TROUBLE LEDs - Indicates a zone (1 to 6) in trouble. Stays lit until ground fault or open circuit on the field wiring is repaired.
4. COMMON TROUBLE LED - Indicates a problem with zone wiring, AC power, battery power, or circuits.
5. AC POWER LED - Indicates AC power is applied to panel.
6. ALARM AUDIBLE SWITCH - Shuts off internal buzzer when in OFF position.
7. TROUBLE AUDIBLE SWITCH - Shuts off pulsing internal buzzer when a trouble is present.
8. MASTER BOX ZONE DISCONNECT SWITCHES - Isolates a zone in alarm. Prevents transmission of alarm signals yet annunciates the alarm when in the "OFF" position. Zone trouble will occur during disconnect.
9. INTERNAL BUZZER - Pulses when a trouble condition is present. Constant buzzer when an alarm condition is present.
10. TROUBLE DELAY JUMPERS - Programmable time delay which sets time between activation and transmission of a Supervisory message. The KFRI panel will send a supervisory message whenever a trouble condition exists with; the zone wiring, the panel's circuit board, the switches, and/or the AC & battery power. To avoid false signals and channel congestion, all supervisory signals are delayed. The delay time jumper settings are shown below. Factory setting is for 2-3 minutes.

TROUBLE TIME DELAY JUMPER SETTINGS

2-3 sec.	1	0	4-6 min.	6	0
16-24 sec.	2	0	8-12 min.	7	0
32-48 sec.	3	0	16-24 min.	8	0
1-1.5 min.	4	0	32-45 min.	9	0
2-3 min.	5	0-----0 C			

11. FUSE F1 (1.0 AMP) - Protects battery charger circuits.
12. FUSE F2(1.5 AMP) - Protects power supply circuits.
13. FUSE F3 (1/4 AMP) Protects the Z+ & M+ output lines going to zone wiring & transmitter for ground fault protection.
14. INLINE FUSE (1 AMP) Protects the primary 120 VAC side of the transformer.

ALARM CONDITION

GENERAL

Each of the six (6) initiating circuits utilizes normally open contacts, which in the alarm condition shunt a 6.8K ohm end of line resistor. When an alarm occurs, the panel will operate a normally open contact of a de-energized relay in the master box, which will cause an alarm signal corresponding to the appropriate zone to be transmitted. Exact zone wiring will depend on system specifications.

INITIAL ALARM CONDITIONS - When an alarm condition does exist on one of the zones, the panel will indicate the following.

1. The respective RED Zone Alarm LED will light as long as the initiating devices contacts are closed.
2. The RED Common Alarm LED will also light.
3. The internal buzzer will be turned on in the constant mode.
4. The Transmitter will send three rounds of Emergency message.

OPERATOR ACKNOWLEDGMENT - Upon dispatch recovery of a transmitted alarm message, the operator should perform the following tasks.

1. Observe all annunciated status indicators and record their current status.
2. If desired, silence the audibles by switching the Alarm Audible switch off.

ZONE DISCONNECT - If you wish to test a zone without transmitting an alarm message, the zone disconnect switch may be placed in the “off” position prior to testing. This will cause a zone trouble condition until the switch is restored to the normal up position. This feature can also be used to isolate a defective zone until the fault is corrected.

TROUBLE CONDITIONS

GENERAL

Each zone consists of an independent closed loop connecting the device’s open contacts, interface panel, and radio master box together. In normal operation, a small supervisory current is maintained throughout. Should a fault such as a broken wire occur anywhere in the loop, the panel goes into a trouble condition. The KFRI Panel will cause the master box to send a supervisory message whenever a trouble condition exists with; the zone wiring, the panel’s circuit board, the switches, and/or the AC & battery power. To avoid sending signals during regularly scheduled maintenance operations, all supervisory signals are delayed 90 seconds.

ZONE TROUBLE - A zone trouble condition occurs when the zone's field wiring or device has an open state or a ground fault, causing the zone to be inoperative. Whenever a trouble condition does exist on one of the zones, the following will happen.

1. The respective AMBER Zone Trouble LED will illuminate.
2. The AMBER Common Trouble LED will pulse.
3. The Internal Buzzer will pulse.
4. The Transmitter will send three rounds of SUPERVISORY message.

COMMON TROUBLE - Common trouble can occur when the panels circuit board malfunctions, loses AC or battery power, or blows a fuse. The following will happen when there is a board trouble.

1. The AMBER Common Trouble LED will pulse.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of SUPERVISORY message.

SWITCH TROUBLE - Switch trouble can occur when one or more of the panel's switches are out of position. All switches must be in the up position as in illustration on page 6. The following will happen when there is switch trouble.

1. The AMBER Common Trouble LED will pulse.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of SUPERVISORY message.

TESTING AND CHECKOUT

GENERAL

KFRI Interface panel checkout is performed following installation. The KF1 or KF3 radio transmitter is assumed to be powered and operating satisfactorily. Refer to KF1 & KF3 Transmitter Installation & Maintenance manual.

TEST EQUIPMENT:
-DC Volt Meter

PREPARATION FOR SYSTEM TESTS

CAUTION: THIS PANEL HAS 120V HIGH VOLTAGE CIRCUITS. USE EXTREME CAUTION!

Check the following items before powering and testing the interface panel.

- A. Be sure all field wiring is correct in accordance with the installation manual(s) and field wiring

diagrams.

- B. Be sure the KF1/KF3 transmitter is transmitting correctly. Press TEST button.
- C. Be sure JK7 is installed (see transmitter installation and maintenance manual).
- D. Remove R57 and R58 on zones with field connections to activate zone wiring. Refer to pages 6 and 7.

CHECKOUT PROCEDURE

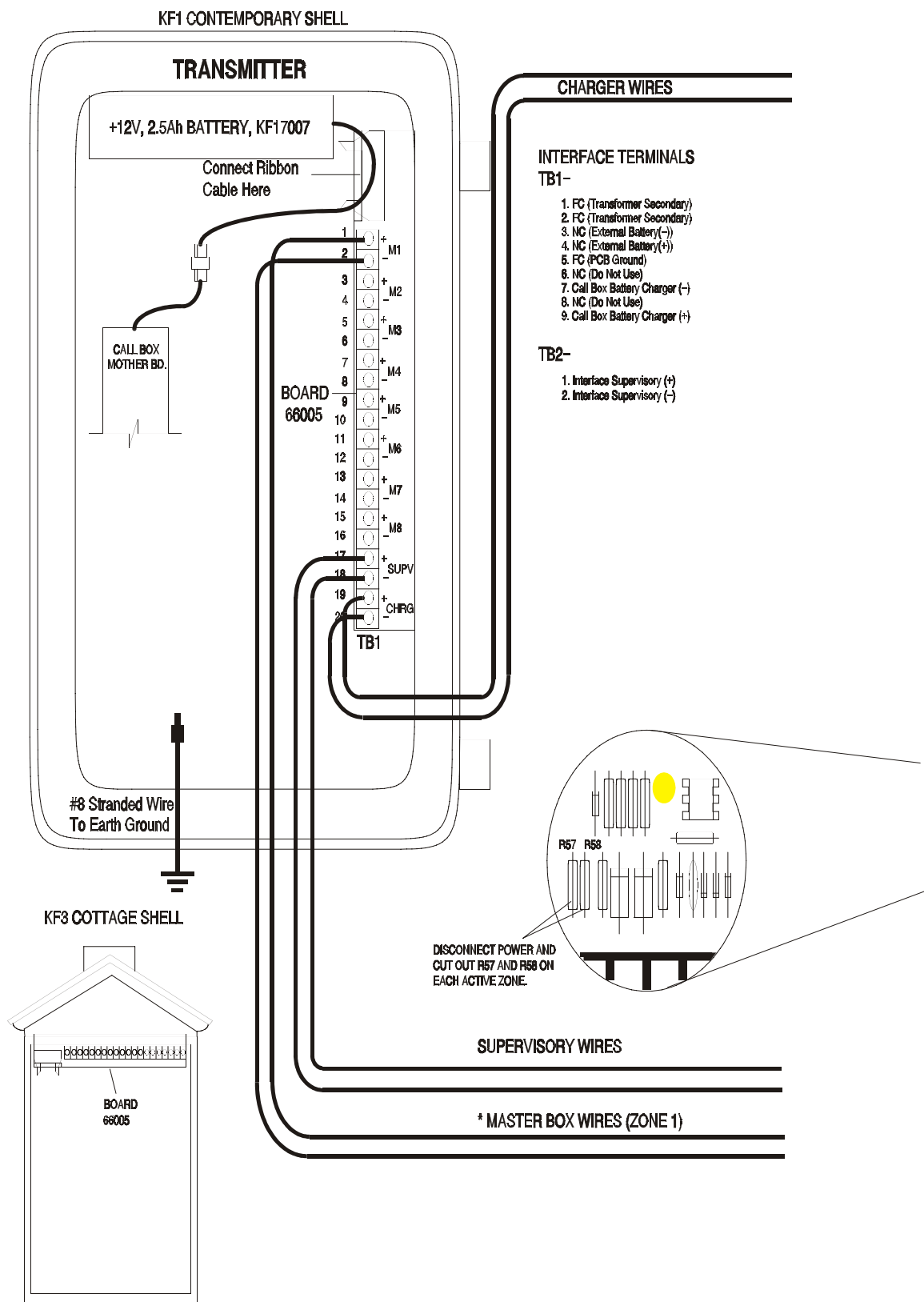
GENERAL

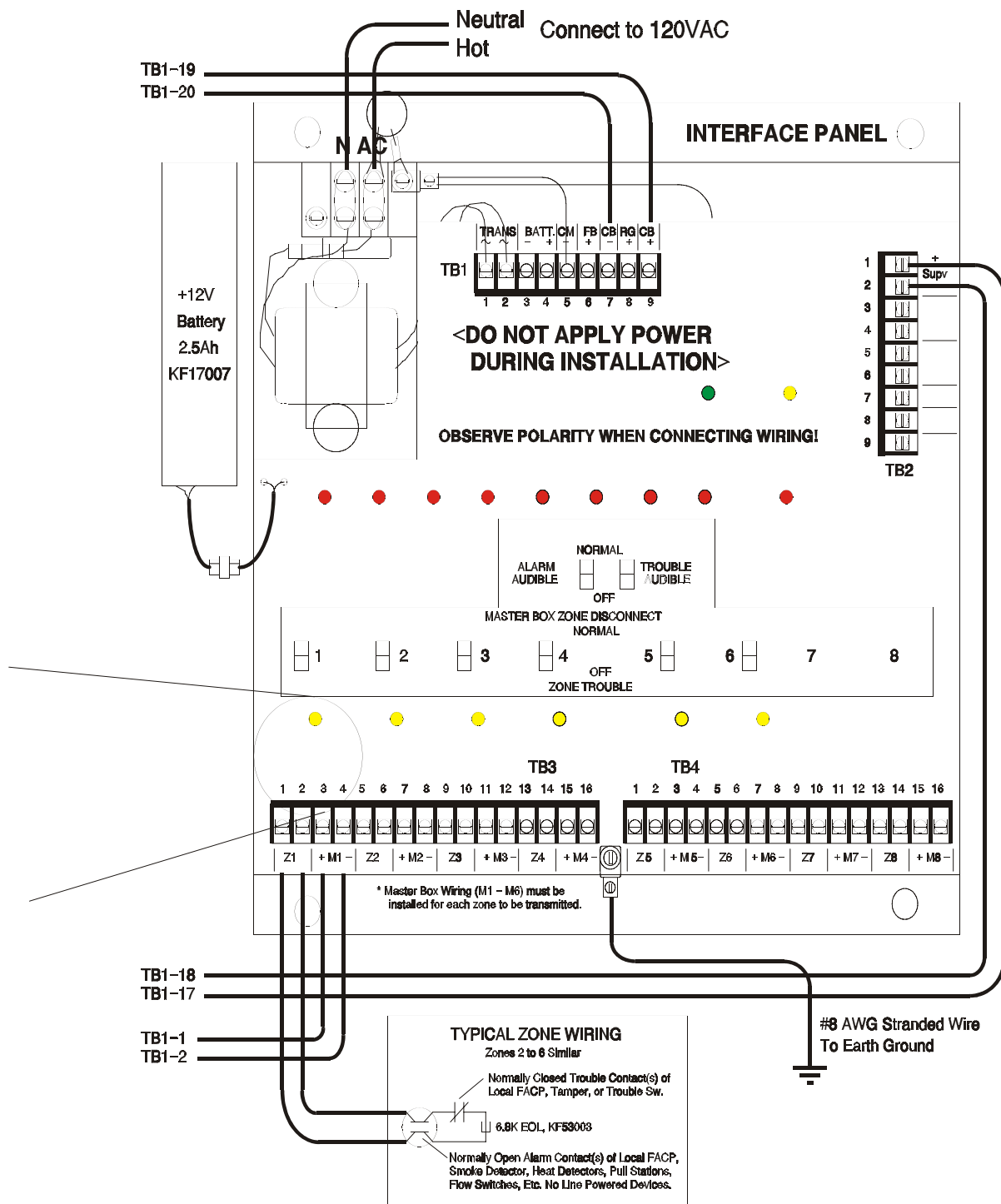
These test should be performed only by those who are knowledgeable in the installation, operations, and maintenance of King-Fisher equipment.

NOTE: Whenever the following procedure produces a transmission, wait at least one minute after the third round is transmitted before proceeding to the next step.

- A. **CHECK** the battery voltage - The voltage across the battery terminals should be between 12 and 15 volts.
- B. **CONNECT** AC Power to the interface panel - The green AC Power LED will illuminate. The amber comon trouble LED and internal buzzer will pulse, because the battery is not yet connected.
- C. **CONNECT** the 12v batttery to the polarized connector hanging from the interface - The common trouble LED and internal buzzer should turn off, leaving only the green AC power LED on, indicating everything is operating normal.
- D. **TRIP** each zone (Z1 to Z6) by placing each zone's alarm initiating devices into the alarm mode - Confirm their reception at the base receiving station. DO NOT short Zone Inputs (Z1 to Z6) to Master Box Outputs (M1 to M6) or damage to circuitry will result.
- E. **PLACE** the Alarm Audible switch in the "OFF" position - The common trouble LED and internal buzzer will pulse. After 2 to 5 minutes, the transmitter will send three rounds of supervisory messge.
- F. **PLACE** each zone disconnect switch in the "OFF" position - Check for trouble annunciation. Return all switches to their "NORMAL" positions.
- G. **REMOVE** AC power and check the operation of the panel on battery backup. The common trouble LED and internal buzzer will pulse. Re-install AC power after test.

NOTE: Trouble Audible switch out-of-position generates audible signal only. Before leaving the panel, check to make sure: all switches are in the normal up positions, all alarm and trouble indicators are off, and only the Green AC Power LED is glowing.





TROUBLE SHOOTING HINTS

NOTE = CAUTION: THIS UNIT HAS HIGH VOLTAGE, 120 VAC ON CIRCUITS IN THE UPPER LEFT-HAND CORNER. USE EXTREME CAUTION.

GENERAL

Use Extreme Caution when testing the Interface for Alarm at the Zone Terminals. Shorting the wrong two terminals will cause failure of Alarm LEDs which will then need replacement.

Never allow trouble contacts to be connected in front of alarm contacts. This leads to disaster!

All power, both AC and standby battery is supervised. Should the AC power fail, the internal buzzer and trouble LEDs will pulse. The same will happen if the standby battery is either disconnected, loses voltage, or fails to accept a proper charge current. One can easily determine which of the power sources is at fault by whether or not the AC LED is lit.

TROUBLE - SHOOTING - RADIO TRANSMITTER

SYMPTON	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. Blows Fuse	1. Normal Operation	the transmitter will blow its fuse if the battery voltage drops below 11.2 volts or the transmitter locks on.
	2. Power-Up	see Power-Up procedure
	3. Board 1R (KF66002-4)	replace Board
B. Will Not Transmit	1. Fuse F1, Board 1R	replace with 1/4A. Norm-Blo fuse only
	2. Board 1R (KF66002-4)	replace Board
	3. Battery	if Battery Voltage is less than 11.9 volts, replace battery
C. Weak Transmit (Misses Occasionally)	1. Antenna	try a different antenna location several feet laterally and /or higher
	2. Coax Connector	gently twist PL-259 connector. Look for rotation or other indications of improperly installed connectors
	3. Board 2R (KF66003-2)	replace board 2R (KF66003-2) and RF module as a set
D. Short Battery Life	1. Bad Battery	check battery voltage, a fresh battery should be 12.9 vdc. or more under load.
	2. Low Battery Set Point	replace board 1R (KF66002-4)
	3. High Temperature	high temperatures cause faster battery self-discharge
E. TRANSMITTER shows up on Memory Read as not working.		check internal fuse on Board 1 (66002-4)
		check Console tape for "LB" normal battery shut-down
		check battery voltage under load, it should be above 11.2 vdc
		if transmitter "buzzes" analyze signal by listening with speaker & watching Signal Meter on Console
		check test time on Console printer tape; avoid other transmitter auto test times
		check antenna connector and perform SWR and Power test
		check Address Code Plugs for proper address; compare with another transmitter
		try a different address code.
		substitute electronics from another "working" transmitter

TROUBLE - SHOOTING - INTERFACE BOARD

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. Fuse F1 blows	1. Defective Battery	check battery voltage, it should be between 12 and 15 volts.(replace with same type (1.0A, 3AG, norm-blo)
B. Fuse F2 blows	1. Power Surge	possibly lightning related, transformer surge, or AC shorted
C. Fuse F3 blows	1. Zone Wiring	check for shorts and ground faults on zone wiring
D. Battery will not charge	1. Defective Battery	replace defective battery
	2. Fuse F1	if blown, replace with same type (1A., 3Ag, norm-blo)
E. Zone Trouble	1. Disconnect Switch	place all disconnect switches in their "Normal" up position
	2. Zone wiring	check the wiring for open circuit, short & ground fault
	3. No EOL Resistor	all zones require a 6.8K EOL resistor across contacts or Z terminals
F. Common Trouble	1. Zone Trouble	see "E" above
	2. Switch out-of-position	place all switches in their "Normal" up position
	3. Battery	check the battery, cable, connectors and fuse F1
	4. No AC Power	check AC wiring and fuse F2
G. Constant Alarm	1. Zone devices	all zone devices should be normally open
	2. Zone wiring	check zone wiring for no shorts (Alarms)
H. If all else fails		REPLACE the Interface assembly: 79001, 4 zone; 79002, 6 zone; 79003, 8 zone
I. Zone Alarm LED lights, but Common Alarm Doesn't:		If it affects only one zone, suspect Z12 (on that zone). If all zones are affected, suspect Z7, Z4
J. Common Alarm is "ON" at all times:		Suspect Z10 and Z4. Also check (or add) C37 for better performance

Measure the Voltage across the Battery. If the voltage is less than +13.8 Volts check:

- * Battery Connections
- * Fuse F1
- * TP1 for +28 Volts or greater
- * Make sure no other devices are wired to Battery terminals.

PREVENTATIVE MAINTENANCE

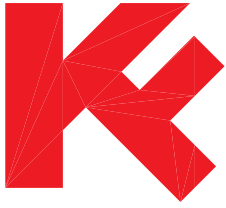
GENERAL

- * Physically inspect KFRI at least once a year
- * Operate switches
- * Maintain tight connections at all terminals.
- * Check battery voltage
 - Battery should read 12.5 vdc. under load. If the battery is 11.9 vdc. or less; then replace the battery with a freshly charged one.
- * Stock 10% complete units.
- * Extra fuses should be on hand also.

REPLACEMENT PARTS:

The following parts are listed for possible replacement during maintenance operations.

<u>KF NUMBER</u>	<u>DESCRIPTION</u>
69001	Transformer, 1 Amp, 20 Volt
53003	Resistor, End-of-line, 6.8K, 1/2W
69005	Surge Suppressor, 200V
30002	Fuse, 1 Amp, Norm-Blo, 3 Ag
30003	Fuse, 1.5 Amp, Norm-Blo, 3 AG
19011	LED, Red
19014	LED, Amber
19015	LED, Green
79001	Interface, 4-Zone, Assembled and Tested on subplate
79002	Interface, 6-Zone, Assembled and Tested on subplate
17007	12 Volt, 2.5 AH, Rechargeable Lead-Acid Battery



COMBINATION TRANSMITTER INTERFACE PANEL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 **f** 847 • 255 • 1507 **e-mail** sales@kfco.com **Internet** www.kfco.com

COMBINATION TRANSMITTER/ INTERFACE FEATURES

- ★ NEMA 3-R Rainproof Enclosure
- ★ Up to Eight Supervised Zones
- ★ LED “AC On” Indicator
- ★ Individual LED Alarm Zone Indicators
- ★ Remote Alarm and Trouble Outputs
- ★ Transmitter Battery Charging Circuit
- ★ Reliable, Long-Life Rechargeable Sealed Lead Acid Battery
- ★ Individual ON/OFF Zone Control Switches
- ★ Programmable Time Delay of System Trouble Reporting to Transmitter
- ★ AM Tone or FM-FSK
- ★ F.C.C. Type Accepted
- ★ Transmitter Frequency Range: 72-76 MHZ/138-174 MHZ (Government Use Only)
- ★ Operating Temperature Range -40°F to +140°F
- ★ U.L. Listed Interface and Trip Circuitry
- ★ Factory Mutual Approved
- ★ Built-in Individual Audible Alarm and Trouble Signal
- ★ 12V DC Limited Energy Operation
- ★ 60-Hour Internal Stand-by Battery with Built-in Charger
- ★ Up to 6-digit/1,000,000 Transmitter Numbers
- ★ Automatic Self Testing
- ★ Transmitter Test Button
- ★ Tamper/Knockdown Feature
- ★ Transmitter Electronics Inter-Chargeable with Call Box (Simplifies Inventory of Spares and Maintenance)



GENERAL DESCRIPTION

THE [KING-FISHER COMBINATION TRANSMITTER/INTERFACE PANEL](#) provides a unique savings by combining the King-Fisher Radio Alarm Master Box Transmitter and the KFRI Interface in a common Nema 3R rainproof enclosure. Ideally suited when no direct public accessible functions are required. The King-Fisher Combination Transmitter/Interface Panel provides an economical solution for a radio fire alarm transmission and supervised monitoring system. For applications requiring direct public accessible functions, refer to the King-Fisher data sheets titled Radio Call Box Transmitters and KFRI Interface panels.

OPERATION

THE [KING-FISHER COMBINATION TRANSMITTER/INTERFACE PANEL](#) offers the same reliable and efficient means of connecting local fire alarm systems, emergency signals, or special supervised signals to the King-Fisher radio alarm master box electronics within one common Nema 3R enclosure. As many as eight zones can be simultaneously monitored by the combination Transmitter/Interface Panel. All internal panel wiring connecting the interface circuitry to the King-Fisher radio alarm master box transmitter is factory installed within the Nema 3R rainproof enclosure, thus minimizing the labor for field installations.

Total reliability and flexibility are featured in the [KING-FISHER COMBINATION TRANSMITTER/INTERFACE PANEL](#) satisfying the protection and safety requirements of any government facility or community. King-Fisher's combination transmitter/interface panel offers all of the functions of both the radio alarm call box transmitter and the KFRI Interface Panel. A choice of AM tone or FM-FSK signal transmissions backed up with C-MOS solid state circuitry and proven circuit design is available.

The King-Fisher radio master box transmitter is capable of transmitting **FIRE, POLICE, MEDICAL AID, ROAD AID**, etc. As many as ten(10) different types of messages, including a test message, are possible. The specific emergency message can be transmitted automatically through the combination transmitter/interface circuitry, which is programmed to transmit any pre-programmed message. The test message is transmitted daily to verify that the King-Fisher radio call box transmitter is functioning properly.

The King-Fisher combination transmitter/interface panel may also be arranged to automatically transmit tamper/knockdown signals in the event of any abnormal tilting of the unit. The tamper signal circuitry is damped to eliminate false signals.

EMERGENCY BATTERY STAND-BY

The KFRI Combination Transmitter/Interface Panel has a power supply requiring 115 volts AC, 60 HZ, .25 ampere power for operation. The interface electronics operate on 12 volts D.C. A standby 12 volt, 2.5 ampere-hour battery provides up to 60 hours operation in the event of primary power failure. The battery is kept charged by a built-in two step constant current charger. Switchover to battery power is automatic if primary power fails.

CONSTRUCTION

The interface circuitry is constructed of solid state C-MOS logic and discrete switching components and programmable plug-in transmitter. The operating temperature range of all components is -40°F to +140°F (-40°C to 60°C). All electronics are mounted on removable sub-plates, which are housed in a Nema 3R rainproof enclosure. A Lexan viewing window is installed on the front door.

INSTALLATION

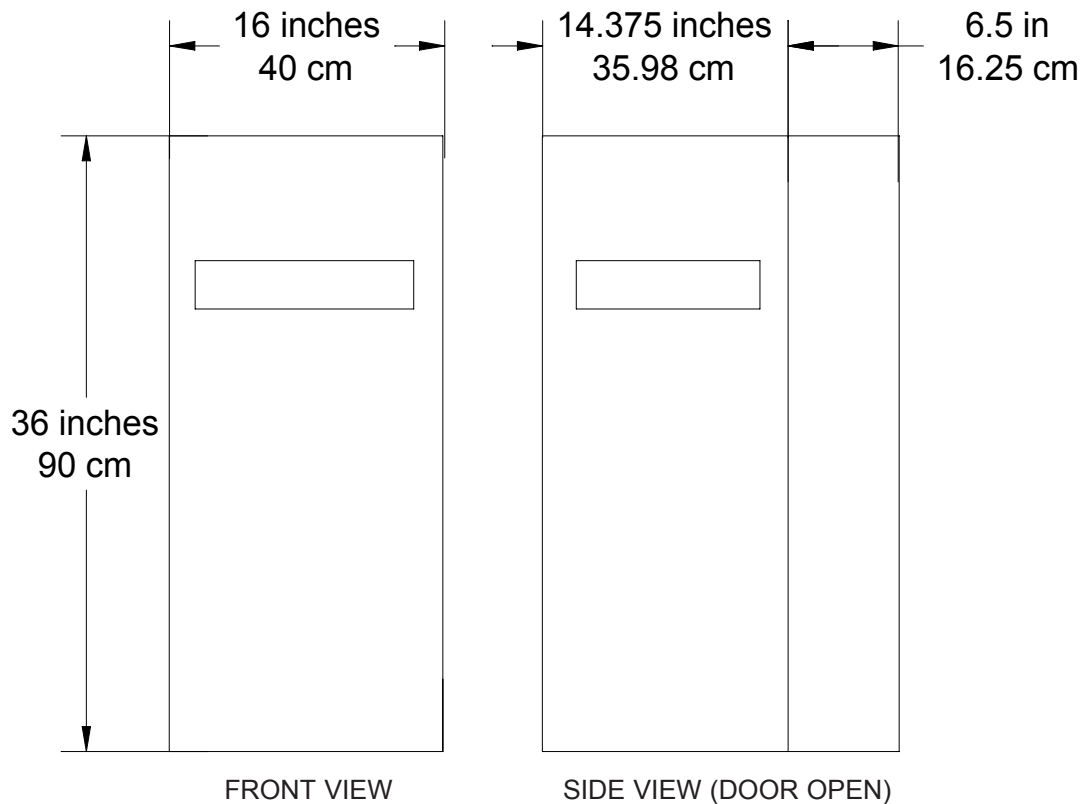
The installation of the COMBINATION RADIO CALL BOX TRANSMITTER/INTERFACE PANEL is simple due to its construction and design. Removal of the interface or radio alarm call box transmitter circuitry is easily accomplished, as there are no wire connections to any panel door mounted equipment.

KFCIT – KING-FISHER CORROSION INHIBITOR TAPE

Every combination transmitter interface panel contains a corrosion-inhibiting tape which contains a chemical that vaporizes and then condenses on all surfaces within the control panel enclosure. The vapor is invisible, odorless, and cannot be felt by the human hand. The inhibitor tape is installed at the top of the control panel enclosure where the vapor film from the inhibitor tape is continuously renewed, neutralizing most corrosive elements. Complete enclosure protection is accomplished within 48 hours, and the inhibiting tape's long-lasting chemical is effective for one to two years, depending on the installation and severity of local conditions.

APPROVALS

The interface and associated trip circuitry is U.L. listed, and factory mutual approved, meeting all applicable N.F.P.A. codes including N.F.P.A. 1221.

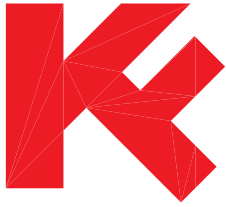


KFRTI-WP
PANEL

ORDERING INFORMATION

NUMBER OF ZONES	PART NO.	WEIGHT		CUBE	
4	KFRTI-WP-4	65 LBS.	30 KG.	2.2 FT. ³	105 CM ³
6	KFRTI-WP-6	65 LBS.	30 KG.	2.2 FT. ³	105 CM ³
8	KFRTI-WP-8	65 LBS.	30 KG.	2.2 FT. ³	105 CM ³

NOTE: These units are designed for auxilialized service only. No publicly accessible actuating devices are provided. All units are installed in Nema 3R Rainproof Cabinets. Batteries and antennas must be ordered separately. Standard color of the Nema 3R enclosure is Red.



KFRTI-WP -4/6/8 COMBINATION PANEL

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

KFRTI-WP -4/6/8 COMBINATION PANEL

COMBO

The King-Fisher KFRTI-wp-4/6/8 Combination Panel has two (2) basic assemblies. The **INTERFACE UNIT** (on top) indicates up to eight (8) zones of alarm and trouble locally. The **TRANSMITTER UNIT** (on the bottom) instantly transmits ALARM, SUPERVISORY and TEST messages to the base receiving station.

The King-Fisher KFRTI-WP -4/6/8 Combination panel provides a reliable and efficient means of connecting interior or exterior fire alarm systems, waterflow switches, heat detectors, manual pull stations, or any normally open contact device, to a radio fire alarm system. Up to eight (8) supervised zones can be monitored by the panel simultaneously. All wires connecting the panel to the initiating devices or existing fire alarm control panel are supervised, and any fault condition will activate visual and audible trouble signals.

Power to the panel is supplied by 120 VAC, 60Hz., 1 Amp service with a standby 12 volt, 2.5 Ahr. sealed lead acid battery. This battery will allow the panel to operate for sixty (60) hours in the event of AC power failure; and is kept fully charged by a trickle charger internal to the panel.

This charger is a two step constant current charger providing approximately 125 mA. in the high rate mode and 1.3 mA., nominal, in the low rate. The charger circuit changes rate automatically in response to the battery's terminal voltage. The transmitter battery is trickled charged by this panel.

-CAUTION-

- **RISK OF ELECTRICAL SHOCK.**
- **READ THIS INSTALLATION MANUAL** completely before installing or servicing panels.
- **CHASSIS MUST BE CONNECTED TO EARTH GROUND.**
- **OBSERVE** hot and neutral polarity when connecting AC Power.
- **DO NOT** apply AC or Battery Power during installation.
- **AVOID** installation in direct sunlight and in rain runoff paths.
- **DO NOT INSTALL** conduit into the top surface of the cabinet.

-SITE SELECTION-

- **LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.**
- **MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR ZONE INPUTS, ANTENNA, AND AC POWER**
- **THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AN ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.**

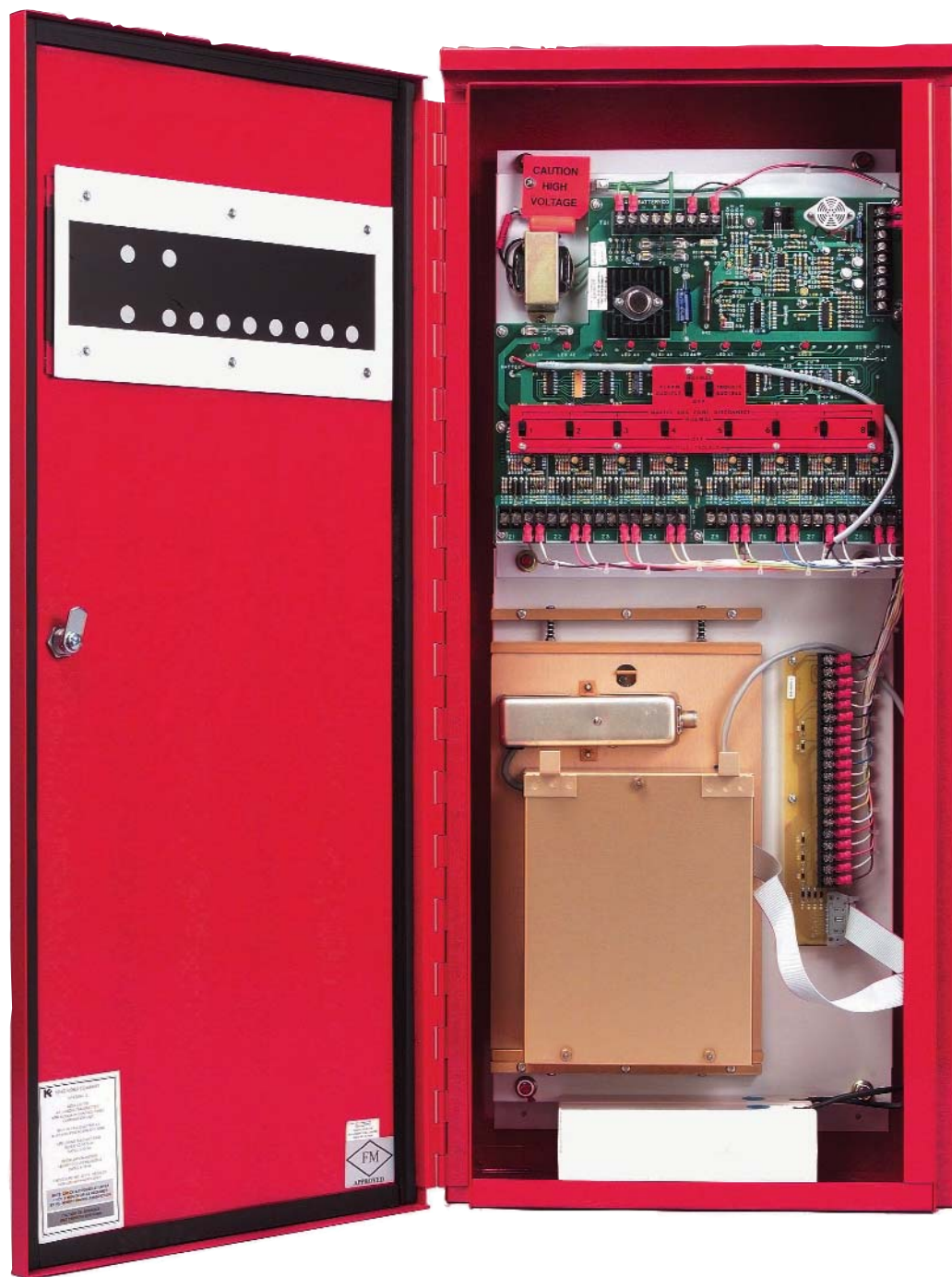
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t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail service@kfco.com Internet: www.kfco.com

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Spare Parts	-12
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INSTALLATION OF ENCLOSURE

General

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

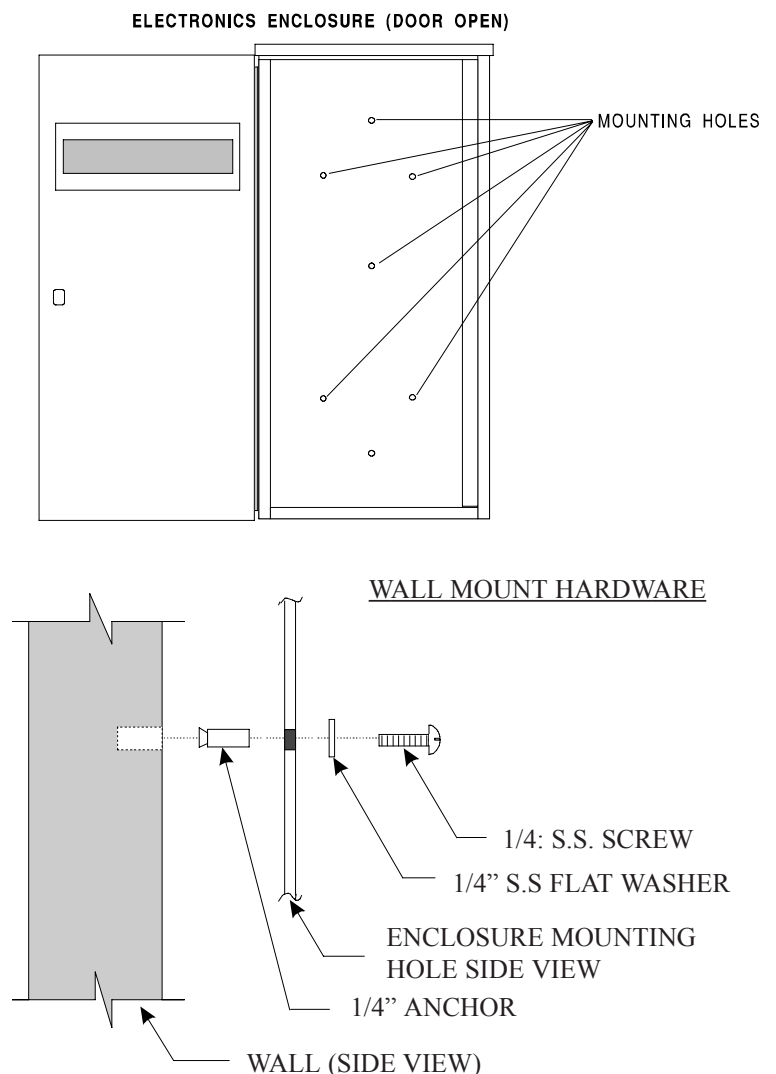
Read all instructions first.

Do not connect batteries or apply power until wiring and installation is complete and checked.

King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, The National Electric Code, the Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.

Locate a suitable position and structure for mounting the enclosure.

1. REMOVE the two (2) subplate assemblies from the enclosure by removing the six(6) nuts and washers located at each corner and the center. They are wired together so they must be removed as a unit. Place them in a temporary protected location.
2. REMOVE the mouting hole knock-outs located at the rear of the enclosure.
3. MOUNT the enclosure on a wall using appropriate hardware shown below. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.
4. RUN all conduit necessary to the enclosure. Conduit must NOT enter through the top of the enclosure. Knockouts are provided on the bottom of the enclosure. DO NOT remove knockouts with subplates installed. Attach conduit to enclosure using waterproof fittings with star locknuts. DO NOT use reducing washers. Separate conduit runs are required for:
 - *-AC Power
 - *-Zone Inputs (Z1-Z8)
 - *-Antenna



5. REINSTALL subplates and secure with six (6) nuts and washers provided.

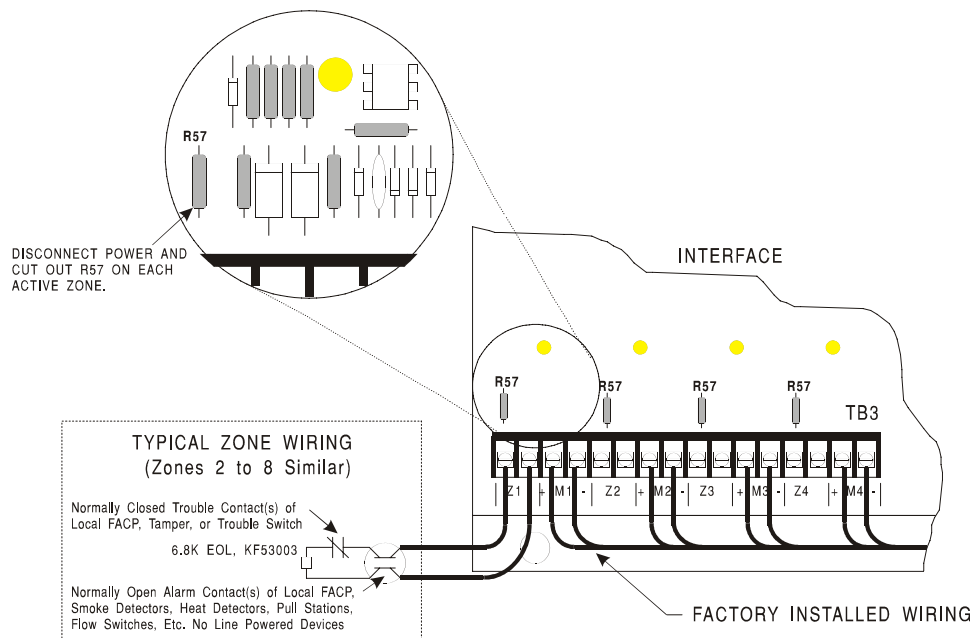
PANEL WIRING

1. All wiring must be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction.

Refer to the illustration on page 8 for steps 2-7.

NOTE: Dress field wiring around the perimeter of the enclosure. 120 VAC main power should be dressed to the upper left hand corner of the enclosure.

2. PULL AC wiring into the enclosure. The KFRTI-WP-4/6/8 panel operates on 120 VAC 50/60 Hz, single phase power. Connect Hot (H) and Neutral (N) as shown to the terminal block in the upper left corner of the subplate. This panel requires a 15 Amp/120 VAC Circuit Breaker or fused circuit to be installed external to the panel. Connect Earth Ground at the bottom of the upper subplate to the ground lug provided.
3. PULL all Zone Wiring (Z1 to Z8) into the enclosure. Zone Wiring must be connected as per specifications and in accordance with King-Fisher instructions and drawings. The End-of-Line Device must be a 6.8K, 1/2W EOL resistor (53003). DO NOT connect line powered detectors of any kind to zone inputs. Cut out resistor R57 from each active zone as shown. Properly supervised wiring is series-parallel connected with NO separate runs or "T" taps permitted.
4. INSTALL the antenna according to the directions given with the antenna assembly.



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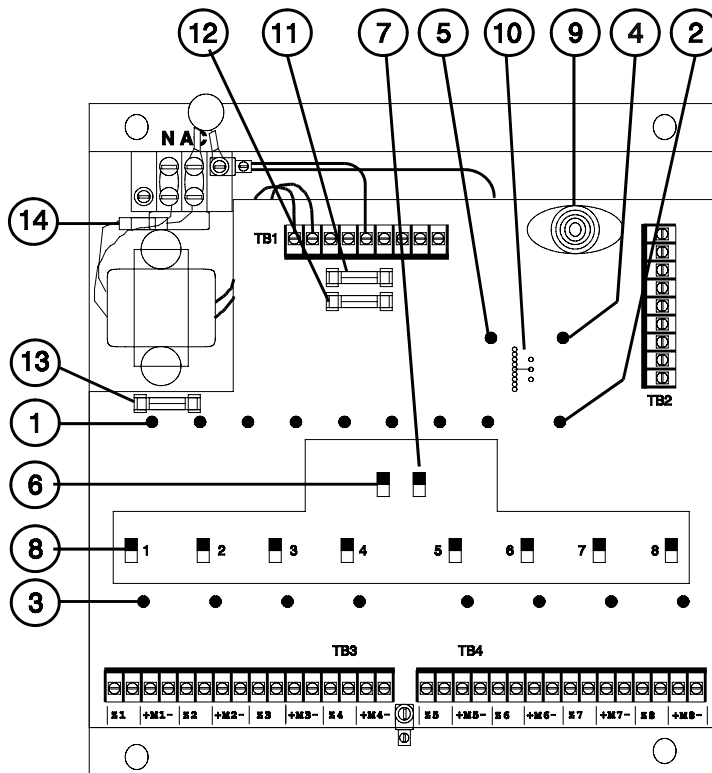
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<DO NOT APPLY POWER TO PANEL>

OPERATION

KFRI CONTROL AND INDICATOR

Location Detail



1. ZONE ALARM LEDs	8. MASTER BOX ZONE DISCONNECT SWITCHES
2. COMMON ALARM LED	9. INTERNAL BUZZER
3. ZONE TROUBLE LEDs	10. TROUBLE DELAY JUMPERS
4. COMMON TROUBLE LED	11. FUSE F1 (1.0 AMP)
5. AC POWER LED	12. FUSE F2(1.5 AMP)
6. ALARM AUDIBLE SWITCH	13. FUSE F3 (1/4 AMP)
7. TROUBLE AUDIBLE SWITCH	14. INLINE FUSE (1 AMP)

GENERAL

The KFRI Interface Panel includes a complete array of controls and indicators which simplify the operation of the panel. Each zone has a separate indicator for alarm and trouble as well as a Master Box Zone Disconnect Switch to isolate defective zone conditions. Switches also silence Alarm or Trouble Audible signals. Indicators such as AC Power, Common Alarm, and Common Trouble are provided for quick observation of the panel's status. This manual provides a quick summary of each control and indicator as well as normal panel operation.

KFRI CONTROLS AND INDICATORS

1. **ZONE ALARM LEDs** - Indicates zone (1 to 8) in alarm. Stays lit until device's contacts open.
2. **COMMON ALARM LED** - Indicates when any zone is in alarm.
3. **ZONE TROUBLE LEDs** - Indicates a zone (1 to 8) in trouble. Stays lit until ground fault or open circuit on the field wiring is repaired.
4. **COMMON TROUBLE LED** - Indicates a problem with zone wiring, AC power, battery power, or circuits.
5. **AC POWER LED** - Indicates AC power is applied to panel.
6. **ALARM AUDIBLE SWITCH** - Shuts off internal buzzer when in OFF position.
7. **TROUBLE AUDIBLE SWITCH** - Shuts off pulsing internal buzzer when a trouble is present.
8. **MASTER BOX ZONE DISCONNECT SWITCHES** - Isolates a zone in alarm. Prevents transmission of alarm signals yet annunciates the alarm when in the "OFF" position. Zone trouble will occur during disconnect.

2-3 sec.	1	0	4-6 min.	6	0
16-24 sec.	2	0	8-12 min.	7	0
32-48 sec.	3	0	16-24 min.	8	0
1-1.5 min.	4	0	32-45 min.	9	0
2-3 min.	5	0-----0 C			

9. **INTERNAL BUZZER** - Pulses when a trouble condition is present. Constant buzzer when an alarm condition is present.
10. **TROUBLE DELAY JUMPERS** - Programmable time delay which sets time between activation and transmission of a Supervisory message. The KFRI panel will send a supervisory message whenever a trouble condition exists with; the zone wiring, the panel's circuit board, the switches, and/or the AC & battery power. To avoid false signals and channel congestion, all supervisory signals are delayed. The delay time jumper settings are shown below. Factory setting is for 2-3 minutes.

11. FUSE F1 (1.0 AMP) - Protects battery charger circuits.
12. FUSE F2 (1.5 AMP) - Protects power supply circuits.
13. FUSE F3 (1/4 AMP) - Protects the Z+ & M+ output lines going to zone wiring & transmitter for ground fault protection.
14. INLINE FUSE (1 AMP) - Protects the primary 120 VAC side of the transformer.

ALARM CONDITION

GENERAL

Each of the eight (8) initiating circuits utilizes normally open contacts, which in the alarm condition shunt a 6.8K ohm end of line resistor. When an alarm occurs, the panel will operate a normally open contact of a de-energized relay in the transmitter, which will cause an alarm signal corresponding to the appropriate zone to be transmitted. Exact zone wiring will depend on system specifications.

INITIAL ALARM CONDITIONS - When an alarm condition does exist on one of the zones, the panel will indicate the following.

1. The respective RED Zone Alarm LED will light as long as the initiating devices contacts are closed.
2. The RED Common Alarm LED will light.
3. The internal buzzer will be turned on in the constant mode.
4. The Transmitter will send three rounds of Emergency message.

OPERATOR ACKNOWLEDGMENT - Upon dispatch recovery of a transmitted alarm message, the operator should perform the following tasks.

1. Observe all annunciated status indicators and record their current status.
2. If desired, silence the audibles by switching the Alarm Audible switch off.

ZONE DISCONNECT - If you wish to test a zone without transmitting an alarm message, the zone disconnect switch may be placed in the “off” position prior to testing. This will cause a zone trouble condition until the switch is restored to the normal up position. This feature can also be used to isolate a defective zone until the fault is corrected.

TROUBLE CONDITIONS

GENERAL

Each zone consists of an independent closed loop connecting the device’s open contacts, interface panel, and radio master box together. In normal operation, a small supervisory current is maintained throughout. Should a fault such as a broken wire occur anywhere in the loop, the panel goes into a trouble condition. The KFRI Panel will cause the transmitter to send a supervisory message whenever a trouble condition exists; zone wiring, panel’s circuit board, switches and/or AC & battery power. To avoid sending signals during regularly scheduled maintenance operations, all supervisory signals are

delayed 90 seconds.

ZONE TROUBLE - A zone trouble condition occurs when the zone's field wiring or device has an open state or a ground fault, causing the zone to be inoperative. Whenever a trouble condition does exist on one of the zones, the following will happen.

1. The respective AMBER Zone Trouble LED will illuminate.
2. The AMBER Common Trouble LED will pulse.
3. The Internal Buzzer will pulse.
4. The Transmitter will send three rounds of SUPERVISORY message.

COMMON TROUBLE - Common trouble can occur when the panel's circuit board malfunctions, lose of AC or battery power, or blows a fuse. The following will happen when there is a trouble.

1. The AMBER Common Trouble LED will pulse.
2. The Panel's Internal Buzzer will pulse.
3. The Transmitter will send three rounds of SUPERVISORY message.

SWITCH TROUBLE - Switch trouble can occur when one or more of the panel's switches are out of position. All switches must be in the up position as in illustration on page 3. The following will happen when there is switch trouble.

1. The AMBER Common Trouble LED will pulse.
2. The Panel's Internal Buzzer will pulse.

CODING CALL BOX BOARD 2R (#66003-2)

First, determine the Address Code needed and verify that this number is programmed into the Base Receiving Console.

- A. Access address board 2R by removing the gold electronic assembly from it's bracket. Board 2R's address plugs are shown in illustrations on page 7.
- B. "Numbers" are address digits.-- "M" & "0" plugs are the message code. As with example 2 below:
0-0-3-2-1 is the address code, and M-0 is the message code.
- C. Program the transmitter's address code. For the transmitter in example 2, five address plugs are required in the first five digit positions.

NOTE: Not all of the digit positions will necessarily be filled as in example 1.

EXAMPLE 1

Single Message Function,

3 Address Digits, Box #321

ADDRESS	3	=	Digit 1
CODE	2	=	Digit 2
	1	=	Digit 3
MESSAGE	M	=	Digit 4
CODE		=	Digit 5
		=	Digit 6
		=	Digit 7

EXAMPLE 2

Dual Message Function,

5 Address Digits, Box #321

ADDRESS	0	=	Digit 2
ADDRESS	0	=	Digit 2
CODE	3	=	Digit 3
	2	=	Digit 4
	1	=	Digit 5
MESSAGE	M	=	Digit 6
CODE	0	=	Digit 7

ILLUSTRATION 1
SINGLE MESSAGE FUNCTION
3 ADDRESS DIGITS, BOX #321

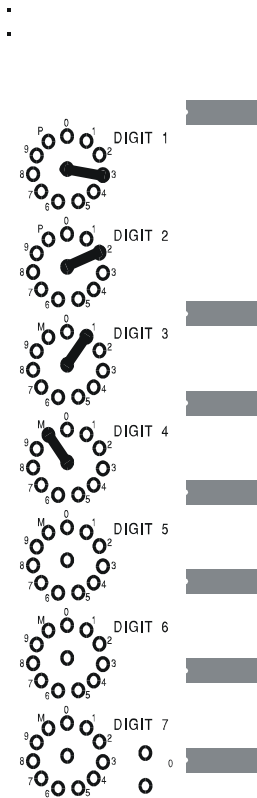
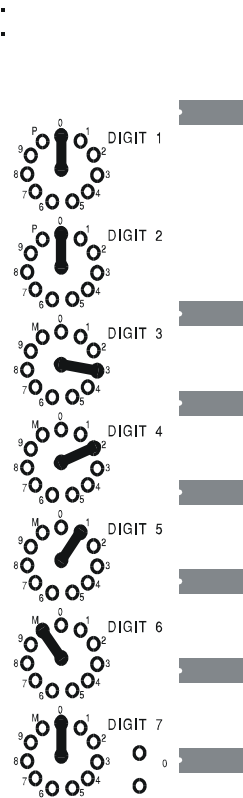
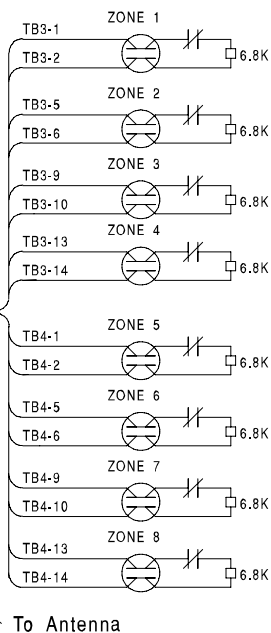
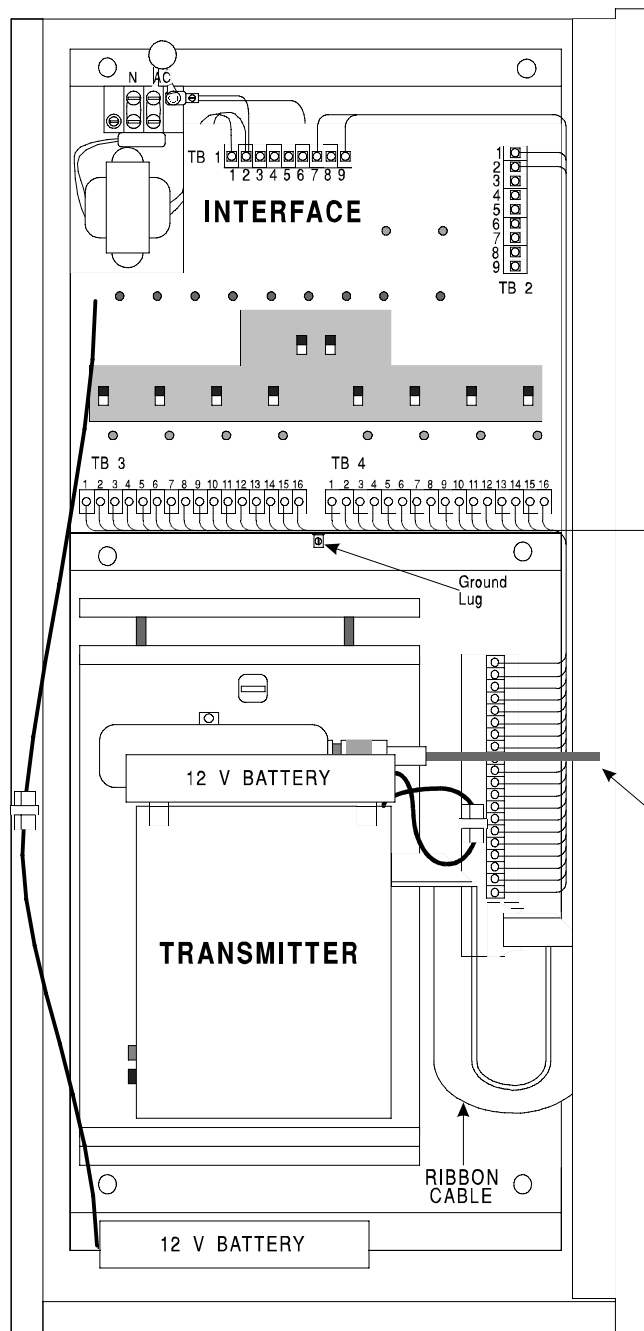


ILLUSTRATION 2
DUAL MESSAGE FUNCTION
5 ADDRESS DIGITS, BOX #321





INTERFACE TERMINALS

TB 1-

1. FC (Transformer Secondary)
2. FC (Transformer Secondary)
3. NC (External Battery (-))
4. NC (External Battery (+))
5. FC (PCB ground)
6. NC (Do Not Use)
7. FC (Call Box Battery Charger (-))
8. NC (Do Not Use)
9. FC (Call Box Battery Charger (+))

TB 2-

1. FC (Interface Supervisory (Output))
2. FC (Interface Supervisory (Output))
3. NC
4. NC
5. NC
6. NC
7. NC
8. NC
9. NC (Trouble input @ 12v., 100K impedance)

NC = No Connection (Unless otherwise specified)

FC = Factory Connection (Do Not connect Additional Wiring)

- D. Now, program the transmitter's message code. Insert one plug in the "M" position for Single Message Function and two plugs in the "M" and "0" positions for Dual Message Functions.
- E. After powering up: Check the new number by pressing TEST and see if it is properly received and processed by the Receiving Console. If the message and address digits programmed do not match the Base Receiving Console's memory, the entire message will be rejected.

PREPARATION FOR SYSTEM TESTS

Transmitter/Interface Combination panel checkout is performed following installation.

TEST EQUIPMENT: -DC Volt Meter

CAUTION: THIS PANEL HAS 120V HIGH VOLTAGE CIRCUITS. USE EXTREME CAUTION!

Check the following items before powering and testing the combination panel.

- A. Be sure all field wiring is correct in accordance with the installation manual(s) and field wiring diagrams.
- B. Configure the transmitter Address Code number.
- C. Remove R57 on zones with field connections to activate zone wiring. Refer to page 2.

Power-Up Sequence:

- * Antenna coax
- * Battery connector
- * Cable, ribbon

Power-Down Sequence:

- * Cable, ribbon
- * Battery connector
- * Antenna coax

- D. Check Interface and Transmitter battery voltage, both should be between 12 and 14.5 Vdc.

TRANSMITTER UNIT POWER UP/DOWN PROCEDURE

The following procedures must be performed in the correct order or damage to transmitter unit may result. Remember: ABC to power-up and CBA to power down.

CHECKOUT PROCEDURE

These tests should be performed only by those who are knowledgeable in the installation, operations, and maintenance of King-Fisher equipment.

NOTE: Whenever the following procedure produces a transmission, wait at least one minute after the third round is transmitted before proceeding to the next step.

- A. CHECK the battery voltage before the batteries are connected. The voltage across the battery terminals should be between 12 and 15 volts.

- B. CONNECT AC Power to the Interface panel. The green AC Power LED will illuminate. The amber common trouble LED and internal buzzer will pulse, because the battery is not yet connected.
- C. CONNECT the 12v battery to the polarized connector hanging from the Interface. Connect the transmitter using the above procedure (ABC). The common trouble LED and internal buzzer should turn off, leaving only the green AC power LED on, indicating everything is operating normal.
- D. Press the black test button on the side of the transmitter. Verify that three rounds of test were received at the base receiving station.
- E. TRIP each zone (Z1 to Z8) by placing each zone's alarm initiating devices into the alarm mode. Confirm their reception at the base receiving station. DO NOT short Zone Inputs (Z1 to Z8) to transmitter Outputs (M1 to M8) or damage to circuitry will result.
- F. PLACE the Alarm Audible switch in the "OFF" position. The common trouble LED and internal buzzer will pulse. After 2 to 5 minutes, the transmitter will send three rounds of supervisory message.
- G. PLACE each zone disconnect switch in the "OFF" position and check for trouble annunciation. Return all switches to their "NORMAL" positions.
- H. REMOVE AC power and check the operation of the panel on battery backup. The common trouble LED and internal buzzer will pulse. Re-install AC power after test.
- I. PRESS the red CLOCK button to reset the automatic test clock. The transmitter will send TEST after 12 hours, and then TEST every 24 hours thereafter. To prevent overlapping TEST signals, space transmitters at least 2 1/2 to 3 minutes apart. Transmitters should also be spaced so that a TEST signal is transmitted at least every 60 minutes.

TROUBLE SHOOTING KFRTI-WP -4/6/8

GENERAL

Alignment procedures: let the Factory do it!

Watch for water in the bottom of the cabinet.

Since Board 2 (#66003-2) is matched and tuned to the RF module, always replace Board 2 and the RF module as a pair. For temporary testing and diagnosis only, a different Board 2 can be tried. For long-term use, Board 2 must be aligned.

TROUBLE - SHOOTING - RADIO TRANSMITTER

SYMPTON	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. Blows Fuse	1. Normal Operation	the transmitter will blow its fuse if the battery voltage drops below 11.2 volts or the transmitter locks on.
	2. Power-Up	see Power-Up procedure
	3. Board 1R (KF66002-4)	replace Board
B. Will Not Transmit	1. Fuse F1, Board 1R	replace with 1/4A. Norm-Blo fuse only
	2. Board 1R (KF66002-4)	replace Board
	3. Battery	if Battery Voltage is less than 11.9 volts, replace battery
C. Weak Transmit (Misses Occasionally)	1. Antenna	try a different antenna location several feet laterally and /or higher
	2. Coax Connector	gently twist PL-259 connector. Look for rotation or other indications of improperly installed connectors
	3. Board 2R (KF66003-2)	replace board 2R (KF66003-2) and RF module as a set
D. Short Battery Life	1. Bad Battery	check battery voltage, a fresh battery should be 12.9 vdc. or more under load.
	2. Low Battery Set Point	replace board 1R (KF66002-4)
	3. High Temperature	high temperatures cause faster battery self-discharge
E. TRANSMITTER shows up on Memory Read as not working.		check internal fuse on Board 1 (66002-4)
		check Console tape for "LB" normal battery shut-down
		check battery voltage under load, it should be above 11.2 vdc
		if transmitter "buzzes" analyze signal by listening with speaker & watching Signal Meter on Console
		check test time on Console printer tape; avoid other transmitter auto test times
		check antenna connector and perform SWR and Power test
		check Address Code Plugs for proper address; compare with another transmitter
		try a different address code.
		substitute electronics from another "working" transmitter

TROUBLE - SHOOTING - INTERFACE BOARD

SYMPTOM	POSSIBLE CAUSE	POSSIBLE SOLUTION
A. Fuse F1 blows	1. Defective Battery	check battery voltage, it should be between 12 and 15 volts.(replace with same type (1.0A, 3AG, norm-blo)
B. Fuse F2 blows	1. Power Surge	possibly lightning related, transformer surge, or AC shorted
C. Fuse F3 blows	1. Zone Wiring	check for shorts and ground faults on zone wiring
D. Battery will not charge	1. Defective Battery	replace defective battery
	2. Fuse F1	if blown, replace with same type (1A., 3Ag, norm-blo)
E. Zone Trouble	1. Disconnect Switch	place all disconnect switches in their "Normal" up position
	2. Zone wiring	check the wiring for open circuit, short & ground fault
	3. No EOL Resistor	all zones require a 6.8K EOL resistor across contacts or Z terminals
F. Common Trouble	1. Zone Trouble	see "E" above
	2. Switch out-of-position	place all switches in their "Normal" up position
	3. Battery	check the battery, cable, connectors and fuse F1
	4. No AC Power	check AC wiring and fuse F2
G. Constant Alarm	1. Zone devices	all zone devices should be normally open
	2. Zone wiring	check zone wiring for no shorts (Alarms)
H. If all else fails		REPLACE the Interface assembly: 79001, 4 zone; 79002, 6 zone; 79003, 8 zone

PREVENTATIVE MAINTENANCE

GENERAL

When rotating the batteries every six (6) months do a complete investigation of the Combo Unit. Look for corrosion, water or dirt inside and run the unit through all it's functions.

Physically inspect the KFRTI-WP -4/6/8 at least once a year

Operate switches

Maintain tight connections at all terminals.

Check battery voltage: Battery should read 12.5 vdc. under load. If the battery is 11.9 vdc. or less; replace the batttery with a freshly charged one

Stock 10% complete units.

Extra fuses should be on hand also.

Spare parts

10% complete units plus additional fuses

REPLACEMENT PARTS:

The following parts are listed for possible replacement during maintenance operations.

NUMBER	DESCRIPTION
69001-0	Transformer, 1 Amp, 20 Volt
53003	Resistor, End-of-line, 6.8K, 1/2W (was KF33088)
69005-1	Surge Suppressor, 200V
30002	Fuse, 1 Amp, Norm-Blo, 3 Ag
30003	Fuse, 1.5 Amp, Norm-Blo, 3 AG
19011	LED, Red
19014	LED, Amber
19015	LED, Green
79001	Interface, 4-Zone, Assembled and Tested
79002	Interface, 6-Zone, Assembled and Tested
79003	Interface, 8-Zone, Assembled and Tested
17007	12 Volt, 2.5 AH, Rechargeable Lead-Acid Battery
30001	Fuse, 1/4 Amp, Norm-Blo
66002-4	Board 1R (Assembled and Tested)
66003-2	Board 2R (Assembled and Tested)
69060-0	AM LO-BAND RF Module (Assembled and Tuned)
69070-0	AM HI-BAND RF Module (Assembled and Tuned)
66004-0	Board 3R Mother Board
66005-1	Terminal Board (w/Hardware)
57060	Ribbon Cable Assembly
22178 & 22177	PL-259 Connector (Solder-On Replacement)
22179	PL-259 Connector (Crimp-On Replacement)



ADDRESSABLE TRANSMITTER PANEL (KFAPT)



IMAGINE!

Emergency Response personnel having detailed prior knowledge before arriving at the scene of an emergency. Advance information of a specific smoke detector, sprinkler waterflow or manual pull station in alarm or trouble. Knowledge of the condition of any combination of initiating alarm devices can save minutes or even seconds by pre-planning the response prior to arriving at the scene.

The King-Fisher KFAPT panel #99250 or #99260 provides the most reliable and efficient means of transmitting radio coded alarm and trouble signals to an Emergency Service Dispatch Center having a KFRA-C radio fire alarm receiver(s) up to 25 miles away (line of site).

When connected to various addressable panels the KFAPT panel can transmit instantaneously up to 1008 addressable devices. Individual coded alarm and trouble signals include smoke detectors, heat detectors, manual pull stations, sprinkler flow, tamper, and much more. In fact all alarm and trouble signals received by the addressable fire alarm panel are duplicated by the KFAPT panel.

Besides the ALARM and TROUBLE signal reporting capabilities, the KFAPT panel provides MAIN POWER FAILURE, SUPERVISORY, TAMPER SIGNALS, PANEL DEAD, RETURN TO NORMAL and AUTOMATIC TEST SIGNALS TO THE KFRA-C RADIO RECEIVER.

The KFRA-C Radio Receiver will display what ADDRESSABLE LOOP is in an Alarm or Trouble along with **DEVICE NUMBER, TRANSMITTER ADDRESS, TIME and DATE.**

PANEL OPERATION

Panel operation or maintenance use is simplified with only **FOUR PUSHBUTTON CONTROL SWITCHES.**

AUTOMATIC TEST BUTTON

The **TEST BUTTON** when pressed, creates a test message and transmits it.

TROUBLE SILENCE BUTTON

The **TROUBLE SILENCE BUTTON** allows the operator to silence the trouble audible sounder within the panel.

CLOCK RESET BUTTON

The **CLOCK RESET BUTTON** allows the operator to set a specific time of the day or night for the automatic daily test to be transmitted from the KFAPT panel. By simply pressing the **CLOCK RESET BUTTON** once, the **AUTOMATIC TEST SIGNAL** is delayed one hour from the time it was pressed and every 24 hours after. For each additional press of the **CLOCK RESET BUTTON** an additional hour is delayed.

MEMORY RESET BUTTON

The **MEMORY RESET BUTTON** when pressed, causes all messages being held in the CPU of the KFAPT panel for processing to be erased, except the message under process at the time. If many devices from the addressable panel are being tested, this feature will keep from tying up the KFRA-C Radio Receiver.



POWER REQUIREMENTS

Panel Power Input	120 vac 50/60 Hz.
Panel operation	12 vdc
Battery Backup	24 to 90 Hrs.
Panel Security	Tamper Switch on Door
Enclosure size	6.125" X 16.125" X 20.125" (155.6 mm X 409.6 mm X 511.2 mm)
Total Panel weight	28 lbs. (12.7 kg.)

The following parts are listed for possible replacement during maintenance operations.

KF NUMBER

DESCRIPTION

30033	Fuse, 2 Amp, 5 x 20 mm
66252	Power Supply and Cable Assembly
66253	CPU Assembly (New program EPROM not included)
97250-1 or 97260-1	EPROM with program and Transmitter # for spare (the number will be required before the part can be shipped)
57250 or 57260	Cable assembly, CPU to KFAPT Controller Cable assembly, KFAPT to Addressable Panel (length and type may vary).
66251 and 69070-0 or 69060-0	KFAPT Controller Board and RF Module tuned together.
17014 or 17033	5 Amp Hour (60 hr. backup) or 8 Amp Hour (90 hr. backup) battery (as required)

APPROVALS

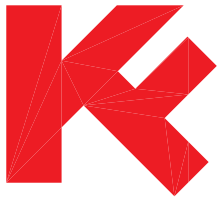
KFAPT Panel	Factory Mutual Approved and Listed

KFAPT Enclosure	Factory Mutual/U.L. Listed

For approved addressable control panel compatibility please contact the Factory.

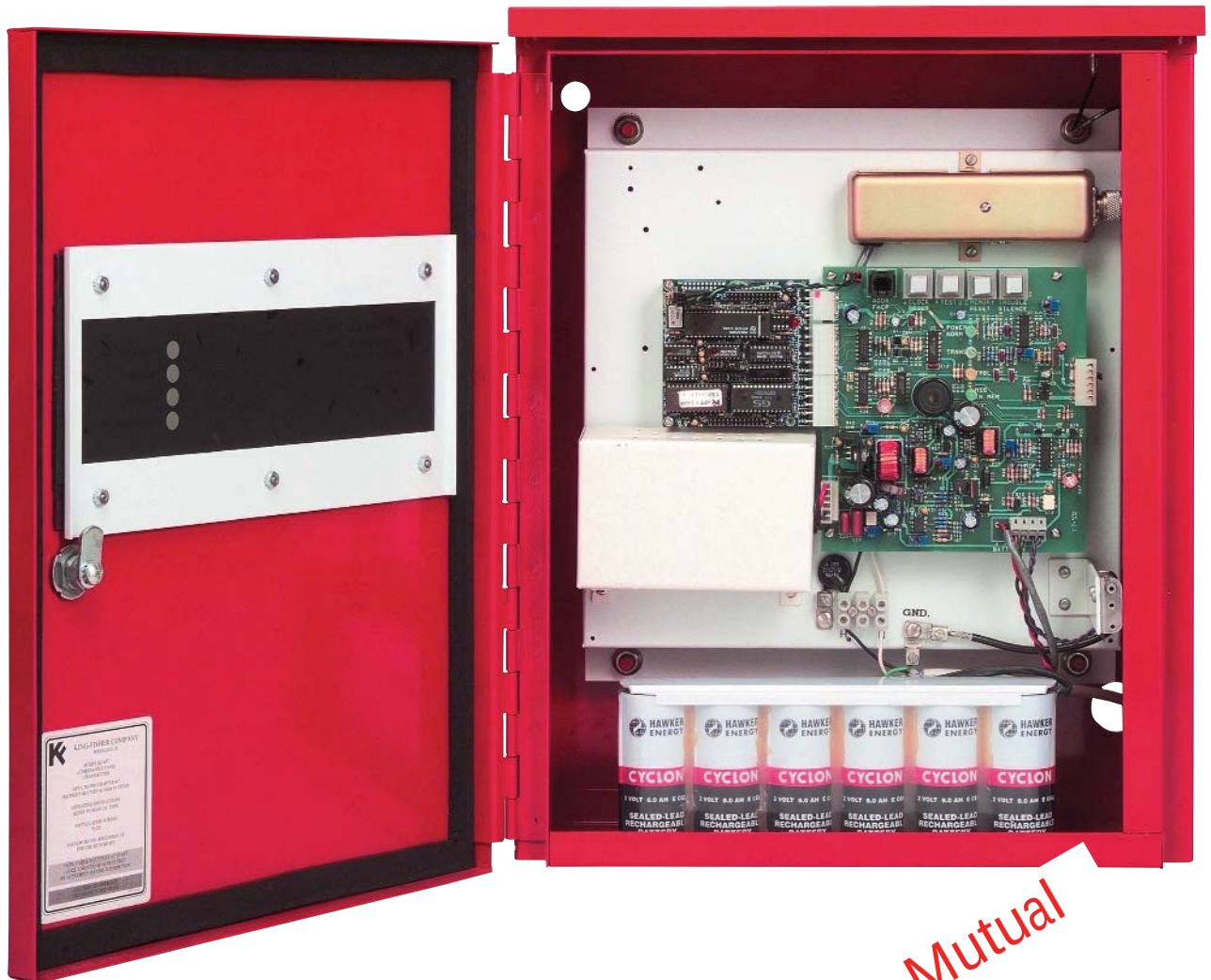
LIMITED WARRANTY

We warranty our products solely to direct purchasers from us and subject to the limitations hereinafter set forth in this paragraph for one year from date of shipment when such products are applied to the use for which they are designed and manufactured. We limit our warranty to extending credit for defective products at invoice price. In no case will we allow charges for labor, consequential expense or damages incurred as a result of defective products. THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS TO USE FOR OUR PRODUCTS OTHER THAN AS STATED ABOVE.



KFAPT TRANSMITTER PANEL

TECHNICAL MANUAL



Factory Mutual
Approved

KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

ADDRESSABLE PANEL TRANSMITTER

KFAPT

The King-Fisher KFAPT panel provides a reliable and efficient means of connecting various Addressable Panels to a radio fire alarm system. This will allow transmissions of up to 1008 addressable devices such as, manual pull stations, heat and smoke detectors, flame detectors, water flow switches as well as any other type of detector the Addressable Panel supports. The KFAPT receives its incoming data via a two or four wire serial cable from the addressable panel, checks for validity, then decodes and transmits the signal via radio frequency to the King-Fisher KFRA-C Receiving Base Stations located at the Emergency Service Dispatch Center.

Internal housekeeping circuits include: **POWER NORMAL LED**, **TROUBLE LED**, **TRANSMIT LED**, and **MESSAGE IN MEMORY LED** along with the **TROUBLE AUDIBLE INDICATOR**. The KFAPT comes supplied with a CPU interface board, embedded microprocessor, power supply, battery backup and a battery charging circuit.

Operator and maintenance controls include: A **Clock Reset Pushbutton** for adjusting the 24 hour test clock's transmit time, a **Manual Test Pushbutton** to send an immediate Test call, **Memory Reset** to clear any messages from the CPU that are not in the process of being transmitted at the time and a **Trouble Silence Pushbutton** to stop the audible from sounding during a trouble condition. The Trouble circuit has a ring-back built in feature which will cause a constant ringing if the Trouble has gone away and the Trouble Silence has not been reset.

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATIONS THAT ARE IN DIRECT SUNLIGHT AND IN RAIN RUNOFF PATHS.

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR CONTROL CIRCUITS, ANTENNA, AND AC POWER.
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AND MINIMUM ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

INSTALLATION OF ENCLOSURE

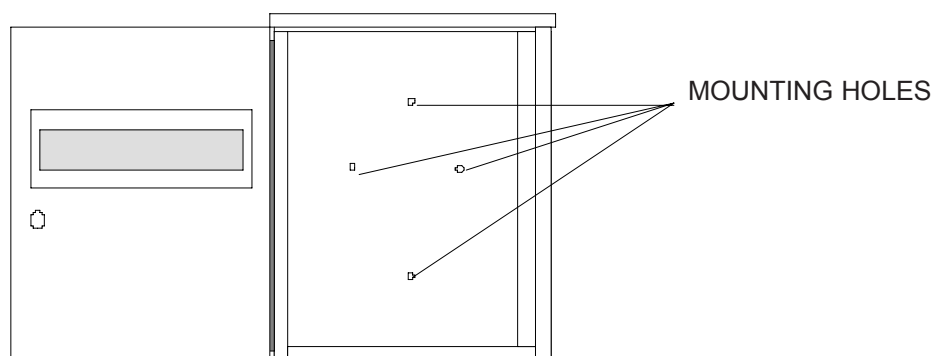
GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

- * Read all instructions first.
- * Do not connect batteries or apply power until wiring and installation is complete and checked.
- * King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, The National Electric Code, the Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.
- * Locate a suitable position and structure for mounting the enclosure.

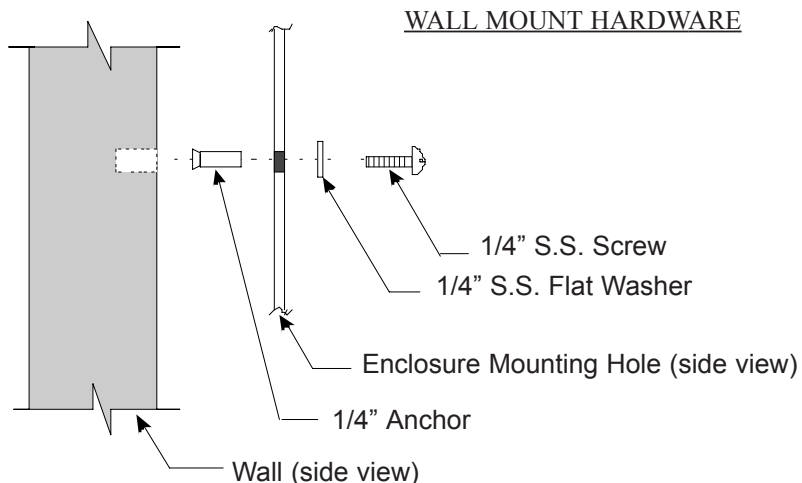
WALL

KFAPT ENCLOSURE (DOOR OPEN)



MOUNTING

1. REMOVE the subplate assembly from the enclosure by removing the four nuts and washers located at each corner of the subplate. Place in a temporary protected location.
2. REMOVE the mounting hole knockouts located at the rear of the enclosure.
3. MOUNT the enclosure on a wall using appropriate hardware shown below. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.
4. RUN all conduit necessary to the enclosure. Conduit should



not be attached to the top surface of the enclosure, as moisture from condensation or water may drip or leak on the internal electrical components. Knockouts are provided on the bottom of the enclosure. DO NOT remove knockouts with sub-plate installed. Attach conduit to enclosure using waterproof fittings with star locknuts. DO NOT use reducing washers. Separate conduit runs are required for:

- * AC Power
- * Antenna
- * KFAPT Addressable panel communications and power monitoring pair

POWER AND BACKUP REQUIREMENTS

The KFAPT Panel operates in standby mode using less than 80 ma of battery current. This allows for 60 hours of backup time from one 5 Amp Hour battery (KF# 17014) and for 90 hours from one 8 Amp Hour battery (KF# 17033). The battery is located inside the KFAPT cabinet and requires no external wiring or cabinet.

The AC power requirements are for 5 Amps at 120 VAC nominal through a 15 Amp circuit breaker or fused panel with a disconnect switch.

PANEL WIRING

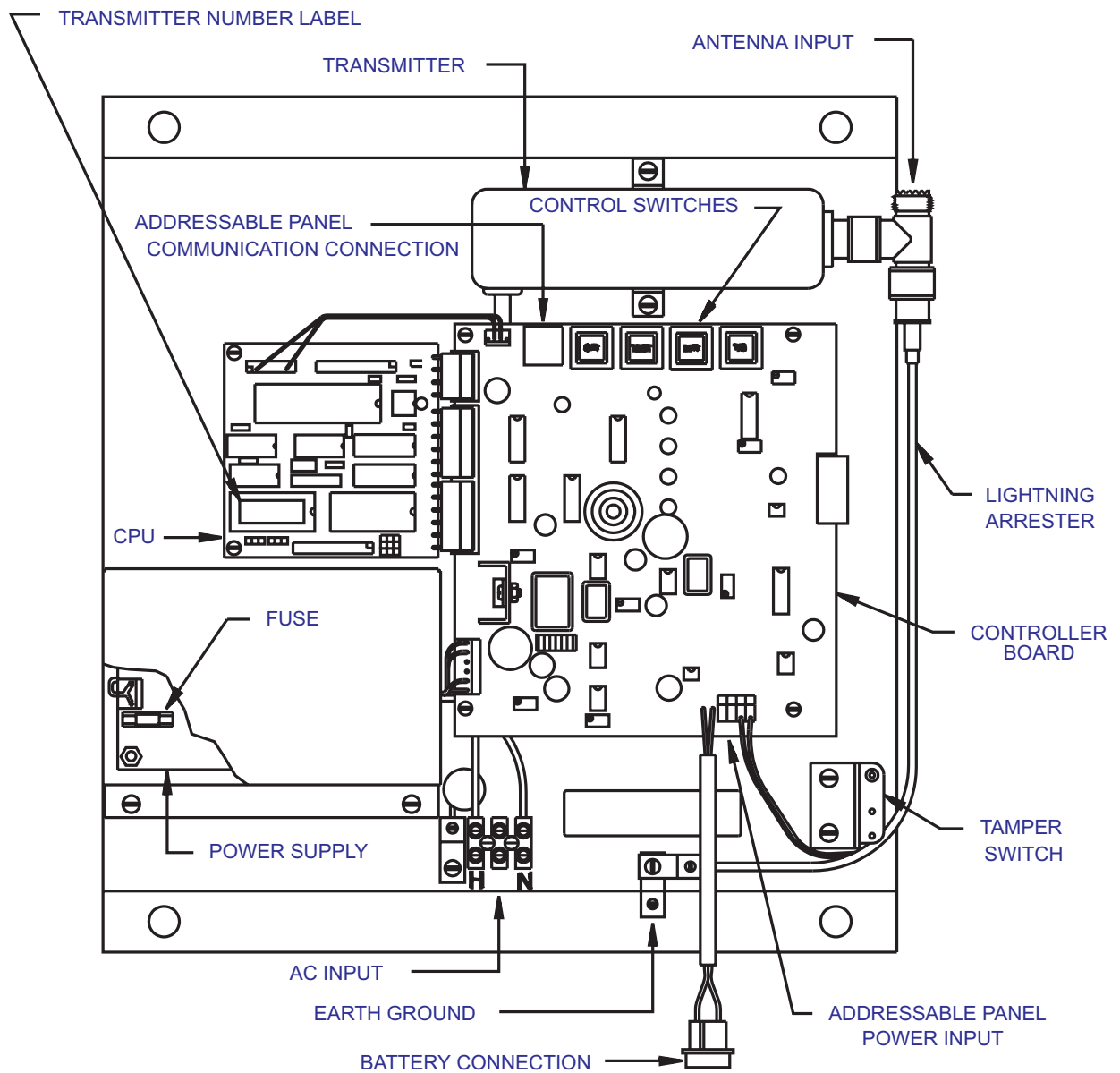
GENERAL

All wiring must be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction.

Refer to the illustration on page 3 steps 2-5

NOTE: Dress field wiring around the perimeter of the enclosure. Carefully re-install the sub-plate assembly in the enclosure using the four nuts.

1. **AC wiring** – The KFAPT panel operates on 120 VAC 50/60 Hz, single-phase power. Connect Hot (H) and Neutral (N) as shown to the terminal block in the lower center of the sub-plate. This panel requires a 15 Amp/120 VAC circuit breaker or fused circuit to be installed external to the panel. Connect Earth Ground to the ground lug provided at the bottom of the sub-plate.
2. **Addressable Panel Communication Wiring** – A telephone jack is supplied in the KFAPT and in the addressable panel. A pre-made cable of sufficient length can usually be purchased if the length is unknown at the time of shipping; otherwise, the proper cable will be supplied with the KFAPT



unit. Dress the cable around the left side of the cabinet then back to the jack on the Controller Board. (see drawing #76120 or #76130)

3. **Addressable Panel Power Monitor Wiring** – Two wires from the addressable panel's power circuit are required for the KFAPT to monitor the condition of the addressable panel. J4 on the bottom right-hand side of the Controller Board requires 24 volts dc and Ground from the addressable panel. Attach these to the + AP MON and – AP MON as shown and marked on the Controller Board. (see drawing #76120 or #76130)
4. **Antenna** –A coaxial cable from the antenna (see antenna installation) requires a PL-259 type RF connector. Attach the connector to the RF module's lightning arrestor assembly located in the upper right-hand corner (see illustration page 3).
5. **Tamper Switch**- Reconnect the Tamper switch wires to J4.

<DO NOT APPLY POWER TO THE PANEL>

OPERATION

GENERAL

The KFAPT Panel includes a complete array of controls and indicators that simplify the operation of the panel. The KFAPT Controller is a PC Board with the circuits required for interconnecting the primary units of the King-Fisher KFAPT Addressable Panel Transmitter. The subassembly circuits on this board are:

1. **Radio Transmitter Modulator**
2. **CPU Board**
3. **Trouble Circuits**
4. **Battery Charger**
5. **LED Display**
6. **Control Switches**

RADIO TRANSMITTER MODULATOR

The Radio Transmitter Modulator circuit assembly converts the digital format data concerning the fire alarm data or normal status reporting data from the digital format of the CPU to the tone sequence to be transmitted via radio to an alarm center. After this conversion, the tones are amplified to a regulated level to drive the power stage of the transmitter module. A separate switch line from the CPU controls the start and finish of this process. The length of each radio message is the time length of one fire alarm round containing the status of an alarm-signaling device and it's location.

CPU INTERFACE

There are a number of circuits on the CPU interface. Two connectors are on the board for receiving data from the APT Alarm System; one is for alarm data and the other is for status signals. Power is also provided for the operation of the CPU. The outputs from the CPU to the trouble circuits operate the trouble audible signal and the LED light. There is also a Watch Dog circuit and a Watch Dog switch feeding back to the CPU Reset. Three manual switches, Memory Reset, Clock Reset and Test, also provide inputs to the CPU.

KFAPT panel internal troubles are sent to the CPU for encoding to report by radio to the alarm center and turn on the trouble audible to alert local personnel of the presence of a system trouble. The audible device can be silenced by persons with access to the KFAPT panel by a trouble silence button. The trouble alarm has a ring back circuit, which locally restarts the audible when the system trouble is cleared. Two distinct audible sounds are made, depending whether the trouble is causing a pulsing alarm or the ring back is causing a constant alarm, for the operators to easily distinguish the difference.

CONTROLLER BOARD

There are seven (7) adjustments on the KFAPT Controller Board. Each is factory set for nominal operation at the time they leave the factory. If there are adjustments required in the field, consult the factory for constraints of compliance. Here, we will give a quick reference list:

R1 adjusts the Amplitude of the modulation of the RF signal and should not require field adjustment. Do not adjust without specific test equipment.

R26 adjusts the power output of the RF module and should not require field adjustment. Adjustment without proper test equipment will result in signal distortion and perhaps loss of signals and damage to the RF module itself.

R44 adjusts the High-rate current and is set at the factory to the battery that was initially provided. If a different capacity or type of battery is put in place, factory consultation is required to optimize this adjustment.

R47 adjusts the voltage where the battery detect circuit will flag a Low Battery to the CPU. It is set to 12.00 volts at the factory and should not require field adjustment. If you suspect this setting has moved you may use a variable power supply to operate the KFAPT Panel and check the level, readjusting as necessary to 12.00 volts DC.

R58 adjust the Low-rate or sustaining charge current and is set at the factory to the battery that was initially provided. If a different capacity or type of battery is put in place, factory consultation is required to optimize this adjustment.

R81 adjusts the level of the Brown Out Detector and is set at the factory for about 102 VAC, 15% below 120 VAC. If your system is on a line where the voltage is consistently less than 120 VAC you may want to adjust this setting to prevent premature Power Trouble signals from being sent. First, you must make sure the 12.70 volts is at the proper level. Second, check the DC voltage on the cathode of D15 and adjust

R81 for about 5.9 to 6.0 volts DC.

R82 adjusts the voltage where the High-rate charger circuit switches off and is set at the factory to the battery that was initially provided. If a different capacity or type of battery is put in place, factory consultation is required to optimize this adjustment.

POWER CIRCUITS

Two DC power sources are used for this panel. One is a 12.7 volt switcher power supply operating off the AC mains; the second is by a rechargeable battery.

The switcher power supply operates as the primary source of power to the unit. Its output is monitored by a circuit that detects if the 12.7 volt input fails. Primary power is also monitored by a Brown Out Detector circuit that detects a lowering of the 120 VAC power source to a level of about 102 VRMS. If either or both of these circuits are tripped, the battery switch is activated. Both monitoring circuits automatically reset when adequate power returns.

Power monitoring circuits also monitor for a battery disconnect or a low battery condition, in either case a trouble signal is sent to the CPU and therefore via radio to the fire alarm monitoring center. The Low Battery trouble signal is triggered at a battery voltage level of 12.0 volts to indicate to operating personnel that the battery capacity is nearly exhausted. If no correction is made at a battery voltage level of about 11.2 volts a Battery Cutoff trouble signal is transmitted and then the KFAPT panel shuts off for lack of usable power. This feature also preserves the battery from damage.

Another power circuit is the battery charger and charge sustaining circuit. The charger circuit operates whenever the battery voltage falls below 13.6 volts. When this happens the battery charger applies up to 1 Amp constant charge current to the battery. When the battery then rises to a voltage of 14.5 volts the 1 Amp high rate charge current turns off and low level charge sustaining current continues, without regard to the battery voltage. If the battery is not fully charged, its terminal voltage falls below 13.6 volts and the high rate charger turns on and the cycle will run again.

LED DISPLAY

Four LED display lights are visible through the KFAPT cabinet and are labeled POWER NORMAL, TRANSMIT, TROUBLE and MESSAGE IN MEMORY.

The Power Normal LED is ON when all power to the panel is within normal levels. If any one of the power circuits are out of proper range, i.e. AC volts below 102 VRMS, 12.7 volt supply below 11.8 volts, battery unable to take a minimal charge, or battery disconnected, the Power Normal LED will extinguish, the Trouble LED and Audible will begin pulsing and a Transmitter Power Fail message will be transmitted to the KFRA-C receiving station. Once the Power trouble is cleared, the Trouble circuit will return to normal, the Power Normal LED will turn on and a Transmitter Power OK signal will be transmitted to the KFRA-C receiving station. If the Trouble was silenced while the condition was not normal, the ring back circuit will cause a constant ringing of the trouble audible to indicate another press of the button is required.

The Transmit LED is illuminated only when power is being applied to the RF portion of the transmitter.

The LED is normally on for less than .7 seconds at a time.

The Trouble LED is normally off. It will come on whenever the CPU senses a trouble in any circuit. During its ON cycle (senses trouble) the Trouble LED is on for about .5 seconds and off for about 7 seconds. This time cycle helps keep the standby current drain at a minimum if the trouble is loss of AC power. There is only one cadence for all trouble conditions. If the trouble condition is going to be long lasting, one momentary press of the Trouble Silence pushbutton will cause the Trouble Audible device to remain silent while allowing the Trouble LED to continue pulsing, giving the operator notice that there is still a trouble condition in the panel. A call to the base radio receiving station will let you find which trouble signal was sent. If the condition clears, after the panel was silenced, and the Trouble Silence switch was not pressed again within about 20 seconds, the Trouble Audible device will be turned on constant until the circuit is reset manually.

The Message in Memory LED will light whenever a signal has been received and decoded by the CPU but has not been transmitted completely. Since the KFAPT transmits 3 rounds of alarm signals and 2 rounds of all Test, Trouble and Return to Normal signals, and multiple detector devices may trip quickly or even simultaneously, the CPU will have to store messages and transmit them within the guidelines of the NFPA signaling protocols. The Message in Memory LED will remain lit, constantly, until the last round of the last message is sent.

CONTROL SWITCHES

There are four pushbutton control switches located along the top edge of the Controller Board for operator or maintenance use. The switches are: CLOCK RESET, TEST, MEMORY RESET and TROUBLE SILENCE.

The **CLOCK RESET SWITCH** allows for the setting of the time when the daily Test call is to be sent from the KFAPT panel. If pressed one time, the Clock Reset circuit is set for a one-hour delay before transmission of Test and subsequent 24 hour Test calls from that time. A further feature of the KFAPT panel is that by pressing the Clock Reset button multiple times, you can set the daily Test call for multiples of one hour for each press of the Clock Reset button. For example, if it is 11:15 AM now and you want the daily Test to come in overnight, you can press the Clock Reset button 14 times to advance 14 hours and call in at 1:15 AM and every day at 1:15 AM from then on, as long as power is maintained to the CPU.

The **TEST SWITCH** causes a Test function to be transmitted when pressed. Two rounds of Test will be transmitted each time the button is pressed. Once the Message in Memory LED is off, another Test function may be input for another transmission.

The **MEMORY RESET SWITCH** will clear all messages that are being held in the CPU except the message under processing at the time. If you are running a test of many devices on the addressable panel but do not want to tie up the receiving station; you can press Memory Reset and clear all but one message from the transmitter.

The **TROUBLE SILENCE SWITCH** will prevent the trouble audible device from sounding while the KFAPT panel is in an abnormal condition. One momentary press of the button will cause the trouble

silence circuit to turn on and another momentary press of the button will cause the trouble silence to return to normal. If the Trouble Silence switch is inadvertently pressed, the Trouble Audible device will be on constantly until the ring back circuit is reset with another press of the Trouble Silence switch. If the Trouble Silence switch is used to silence a trouble in the system and the trouble is later repaired, the Trouble Silence switch must be pressed again or the ring back circuit will cause a constant Trouble Audible activation.

SETUP AND NORMAL OPERATION

The straightforward installation and operation makes the KFAPT Panel simple to use, maintain and troubleshoot. Only three conduit entry points are required. Connection to AC power, antenna and the connection to the addressable panel are needed in separate conduits per code. The battery backup system is located inside the KFAPT cabinet and can be configured to supply up to 90 hours of backup and recharge in less than twelve hours, if required.

The AC must be supplied through a separate 15 Amp fuse or circuit breaker with a cutoff switch. The panel AC fuse is located underneath the power supply cover.

CAUTION: ELECTRICAL SHOCK

The potential of 120 VAC will be exposed if the Power Supply cover is removed. Make certain the incoming power is off at the outside circuit breaker or fuse panel before attempting to service the KFAPT panel. No other user serviceable parts are beneath this cover. Refer further service to the factory. An Earth ground must be connected to the KFAPT sub-plate at the lug, bottom center.(see page 3)

The antenna (see antenna installation drawing # 76504-1 or 76506) must be routed through a separate conduit. The conduit should be grounded outside the building. The coaxial connection to the RF Module is a PL-259 type RF connector located in the upper right-hand corner of the KFAPT Panel. The KFAPT Panel is supplied with a shunt lightning arrestor kit cut to the specific frequency required at each particular installation (see page 3). Typically, RG-58/U coaxial cable is used but larger diameter, lower loss; cable may be installed as required. Any coaxial cable used must be 50 OHM impedance.

The connections to the addressable panel are communications and 24 volt power. The communication cable requires it fit RJ-11 jacks on both ends. As an option King-Fisher Company will supply these cables if the proper length is known before shipment. If the length is not known until installation has begun or is complete, the interconnecting cable can be purchased in most stores that serve either the telephone or computer industries.

The connecting jacks are either 4 to 6 positions or 6 to 6 positions to maintain a common style available on the market. The communications line is constantly monitored for signals. If the data stream is interrupted for about 25 seconds, the KFAPT Panel will transmit COMM FAIL to the KFRA-C receiving station.

The 24 volt power connection from the addressable panel is for monitoring purposes only. If the communications line is polling and returning properly, the 24 volt line is not checked. The 24 volt line is checked only after the communications line has stopped its data stream. If the 24 volts has disappeared and the communications line is dead, the KFAPT Panel will transmit PANEL DEAD to the receiving station. The KFAPT Panel will not send a restoration signal when the 24 volts is regained unless the communications line is properly connected again.

TAMPER OPERATION

The KFAPT Panel has a Tamper circuit that will monitor the cabinet door and send a Transmitter Tamper signal to the Radio KFRA-C Receiving station(s) whenever the door is opened. To prevent any intentional damage of the KFAPT Panel, the Tamper signal will be sent upon circuit trip. A Return from Tamper signal is transmitted when the cabinet door is again closed properly.

TESTING AND CHECKOUT

GENERAL

KFAPT Panel checkout is performed following the installation. The Addressable Panel is assumed to be powered and operating satisfactorily. Refer to the Addressable Panel manufacturer's Installation and Operation Manuals for instructions for testing.

TEST EQUIPMENT:

- AC – DC voltmeter
- SWR meter with proper cables
- Communication link with Receiving Station

PREPARATION FOR SYSTEM TESTS

CAUTION: THIS PANEL HAS 120V HIGH VOLTAGE CIRCUITS. USE EXTREME CAUTION!

Check the following items before powering and testing the KFAPT Panel.

Be sure all field wiring is correct in accordance with the installation manual(s) and field wiring diagrams.

- AC power
- Antenna
- Addressable Panel to KFAPT

Be sure the Addressable Panel is operating properly.

CHECKOUT PROCEDURE

GENERAL

These tests should be performed only by personnel who are knowledgeable in the installation, operations, and maintenance of King-Fisher equipment and the Addressable Panel.

NOTE: While doing the initial checkout, the enclosure door will be open, tripping the Tamper Circuit “ON” and will transmit a signal to the Radio KFRA-C Receiving station(s), notify the dispatcher on duty that you are performing tests before initial power is applied.

There is a constant 24 volts on J4 AP MON + and – terminals as long as the KFAPT Addressable Panel is powered.

CHECK THE BATTERY VOLTAGE—The voltage across the battery terminals should be between 12 and 14 volts when the battery is disconnected.

CONNECT AC POWER TO THE KFAPT PANEL — Within 30 seconds of power ON, there should be a transmission sequence and the Trouble Audible and LED should begin pulsing. Press the Trouble Silence button and wait for the next LED pulse. The audible will be silent. Check the AC line voltage for 108 VAC or greater.

CONNECT THE 12 VOLT BATTERY — The POWER NORM LED should come ON, wait for the Trouble circuits to return to normal and the Trouble Audible will constantly sound. Press the Trouble Silence button to restore the ring back circuit and silence the audible. Attach the meter to the battery connector and watch the battery voltage climb while the initial charging current is applied. The transmitter should again be keyed to transmit a Transmitter Power Normal signal to the receiver. Check to be sure that this signal is received at the receiving station.

CONNECT THE SWR METER BETWEEN THE ANTENNA CABLE AND PANEL — Press the TEST button and adjust for a full scale reading (about 1 watt). This may take several rounds depending on the equipment used. Now set the meter to monitor the Standing Wave Ratio, and press the TEST button again. The nearer the ratio is to 1:1 the better. Measurements of 1.5 or greater indicate there is a problem with the antenna. Steps should be taken to correct the problem before any more transmissions are made or damage to the transmitter module is possible.

TRIP SEVERAL DETECTOR DEVICES — Contact the receiving station to confirm that each signal was received and decoded properly. Notice that the bright green Transmit LED illuminates during each transmission but NO audible indication is given. Audible indications for alarm are left to the Addressable Panel. Also notice the green Message in Memory LED is illuminated for the time between receipt of signal from the Addressable Panel and the final transmission of the decoded signal.

CONTACT THE RECEIVING STATION — Make sure each signal sent from the Addressable Panel also has an Alarm/Trouble Acknowledge and a Return to Normal message received for each. Check with the Addressable Panel's Operation Manual for the particular sequence of signals each may use.

REMOVE AC POWER — Make sure the KFAPT Panel goes into Trouble and sends a TRAN PWR FAIL message to the KFRA-C receiving station. Restore AC power and the KFAPT Panel will automatically clear the Trouble and send a TRAN PWR NORM to the KFRA-C receiving station.

CLOSE THE DOOR AND LOCK THE CABINET — Make sure the KFAPT Panel transmits a transmitter door shut signal.

DISCONNECT THE COMMUNICATION CABLE — Make sure the KFAPT Panel transmits a COMM FAIL signal to the KFRA-C receiving station within 30 to 45 seconds. Connect the communication cable and make sure the KFAPT Panel transmits a COMM NORMAL signal to the KFRA-C receiving station.

DISCONNECT THE COMMUNICATION CABLE AGAIN — Make sure the KFAPT Panel transmits the COMM FAIL signal again, then DISCONNECT one wire from the 24 volt pair to the AP MON terminal in the KFAPT Panel, either wire will work. Make sure the KFAPT Panel transmits FACP DEAD to the KFRA-C receiving station.

RESTORE THE COMMUNICATION CABLE AND THE AP MON WIRE(S)—Make sure the KFAPT Panel transmits a FACP NORMAL signal to the KFRA-C receiving station.

ALL ADDRESSABLE PANEL DEVICES SHOULD BE TESTED—Make sure all detector points are transmitted by the KFAPT Panel to the receiving station and that all Acknowledge and Reset signals follow according to the Addressable Panel protocol. A final FACP NORMAL signal will be sent when all devices are reset and all troubles are cleared.

TROUBLESHOOTING HINTS

CAUTION: THIS UNIT HAS HIGH VOLTAGE, 120 VAC ON THE INCOMING TERMINAL BLOCK AND BENEATH THE POWER SUPPLY COVER. USE EXTREME CAUTION.

SYMPTOM	CAUSE/TEST	REPAIR
The NORMAL LED is off and the TROUBLE LED is pulsing. The panel is emitting a pulsing sound. The KFRA-C receiver is receiving a <u>power fail</u> message	No AC power or Low AC power. Measure the voltage at the terminal block.	If the AC voltage is zero, check the circuit breaker at the AC power panel or fused disconnect switch. If the AC voltage is below 102 volts, check the voltage at the AC power panel or fused disconnect switch. If it is low then contact the local power company.
	No DC power Measure the voltage at the Power Supply connector J3, red and black leads.	If the voltage is zero, check the fuse. Disconnect AC power to the panel. Remove the cover from the power supply. Check the fuse. If it is open then replace it with a 2 amp, 250 volt fuse. Reconnect the AC power and check the unit. If the fuse blows again, the power supply is defective and must be replaced
	Loss of battery voltage Make sure the battery is connected to the panel. Measure the voltage at the battery connector	The voltage should be between 11.2 to 16.5 VDC. If it is not then replace the battery.

SYMPTOM	CAUSE/TEST	REPAIR
No LEDs on, and KFAPT appears to be dead.	Loss of 5 volts Measure the 5 volts at connector J1 on the Controller board, pins 3 and 4. Do not short the meter leads when taking the reading. The voltage should be 5 volts plus or minus 0.1 volt DC	If the voltage reads okay, disconnect the AC power and unplug the battery. Wait for 20 seconds and reapply the power. The CPU will reboot. The POWER NORMAL LED should come on, press the test button and confirm that a test message was sent. If the POWER NORMAL LED does not go on, the CPU board is defective. If the voltage is not 5 volts, disconnect all power and unplug the CPU board. reconnect all power and measure the 5 volts again. If the 5 volts is good, then the CPU board is defective and must be replaced. If the 5 volts is still bad, the controller board is defective and must be replaced.
The KFRA-C receiving console receives a COMM FAIL message	Communication between the KFAPT and the addressable panel has been interrupted.	Check the connection between the KFAPT and the addressable panel. Check the connection between the CPU and the Controller board. Troubleshoot the addressable panel.
If the KFAPT panel seems to be transmitting properly, but, the signals are not received at the KFRA-C receiveing console or it misses rounds frequently.	Transmitter or Antenna problems Check the Transmitters SWR Check the power output and compare readings from a known good unit	If the SWR is higher than 1.5 the antenna, coax cable and connectors should be checked and tested. Clean coax connectors if any indication of corrosion and check for proper installation. If the output is low the Controller board and RF module must be returned to the Factory for repair

The surest method of correcting a questionable unit is to remove the entire sub-plate and return it to the factory for complete inspection and repair as required.

Having a spare unit will prove invaluable to servicing the KING-FISHER ADDRESSABLE PANEL TRANSMITTER.

PREVENTATIVE MAINTNEANCE

GENERAL

The KFAPT Panel comes with a two-stage battery charger that should be checked, periodically. To test the High-rate switching circuits, remove AC power for several minutes or a few hours to run the battery down a little. Insert the DC meter probes into the battery connectors or jumper the meter onto R75 left side (+ Battery) and R85 right side (Ground) using micro hooks. Power down the panel before connecting.

Be very careful that you don't cause a short circuit in nearby circuits when connecting. Once the meter is properly connected, power up with AC then add the battery. Watch the battery voltage rise quickly with the High-rate charger turned on. When the battery reaches about 14.3 to 14.5 volts the High-rate charger will turn off and the battery will lose voltage until it reaches 13.6 volts when it again turns on the High-rate charger and the voltage rises. This cycle time will vary depending on how long the discharge time was. If the High-rate circuit does not shut down, the battery voltage will keep rising; the battery will start to heat and eventually cause a Power Trouble and probable permanent damage to the battery.

When the AC power fails, there are three different warning signals transmitted: Loss of AC power, battery low and battery shut down. When the battery low signal is received, it is important to replace the battery with a fully charged battery to prevent damage to the battery. Even though the panel has shut down on a Low Battery, there is still a small amount of current needed to keep the shutdown circuit active (about 3 ma.) and the battery will eventually become too deeply discharged to recover.

Check battery voltage- Battery should read 12.5 vdc under load. If the battery is 11.9 vdc or less; then replace the battery with a freshly charged one.

Physically inspect KFAPT Panel at least once a year

Operate switches

Maintain tight connections at all terminals and antenna cables

Stock at least 10% complete units

Extra fuses should be on hand

REPLACEMENT PARTS

<u>KF NUMBER</u>	<u>DESCRIPTION</u>
30033	Fuse, 2 Amp, 5 x 20 mm
66252	Power Supply and Cable Assembly
66253	CPU Assembly (New program EPROM not included)
97250-1 or 97260-1	EPROM with program and Transmitter # for spare (the number will be required before the part can be shipped)
57250 or 57260	Cable assembly, CPU to KFAPT Controller Cable assembly, KFAPT to Addressable Panel (length and type may vary).
66251 and 69070-0 or 69060-0	KFAPT Controller Board and RF Module tuned together.
17014 or 17033	5 Amp Hour (60 hr. backup) or 8 Amp Hour (90 hr. backup) battery (as required)



RADIO RECEIVER CONTROLLER

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

☎ 847 • 398 • 7100 ☎ 847 • 255 • 1507 ✉ sales@kfco.com

RADIO RECEIVER CONTROLLER

The Radio Receiver Controller is a microprocessor-based device which can be remotely activated by Radio Alarm Transmitters to automatically control a fire pump controller, remote sirens, lights, or other electrically-controlled devices. The Radio Receiver Controller basically consists of the following modules:

The antenna receives transmissions from the transmitters located in the remote area.

The radio receiver inputs RF from the antenna to its RF module. It is amplified and demodulated. The audio signal is extracted and prepared for the tone filter.

The tone filter inputs the audio signal and filters out the individual tones and encodes them for analysis by the microprocessor.

The microprocessor monitors, validates and deciphers the encoded tone information. It compares this newly acquired information with the critical transmitter and zone information which has been programmed and loaded in the memory. If a match is found, it is ready to propagate the control action to the output relays.

The relay module consists of four form C relays which provide maximum contact current, rated at 7 Amps, 240VAC or 30VDC. Relays 1, 2, and 3 can be programmed individually to react to a certain set of critical transmitters and zones. The On-time delay(0-250seconds) and the Off-time delay(1-999seconds) can be programmed into the software. Relay 4 gives a system supervisory output.

The power supply provides the necessary power requirements for all the circuitry of the Radio Receiver Controller, and provides a charging current to the back-up battery.

In case of an AC power failure, the back-up battery supplies the necessary power and is recharged by the power supply module.

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATIONS THAT ARE IN DIRECT SUNLIGHT AND IN RAIN RUNOFF PATHS.

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR CONTROL CIRCUITS, ANTENNA, AND AC POWER
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AND MINIMUM ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

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INSTALLATION OF ENCLOSURE

GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

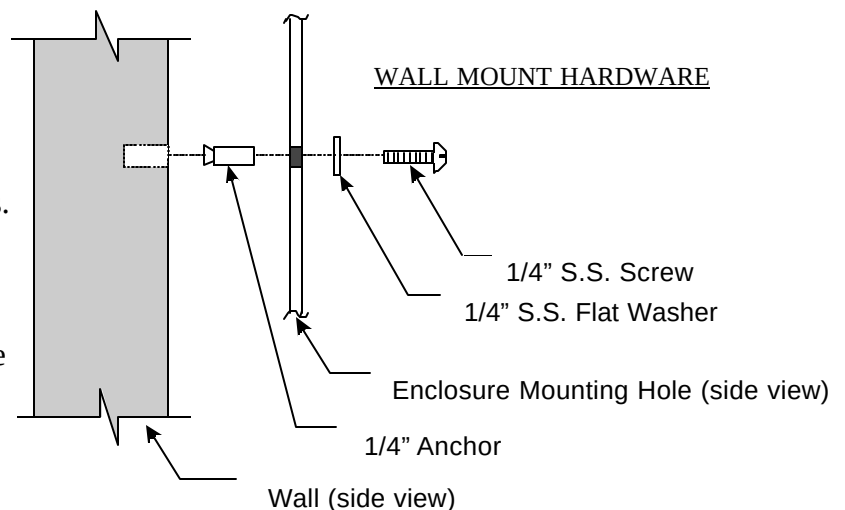
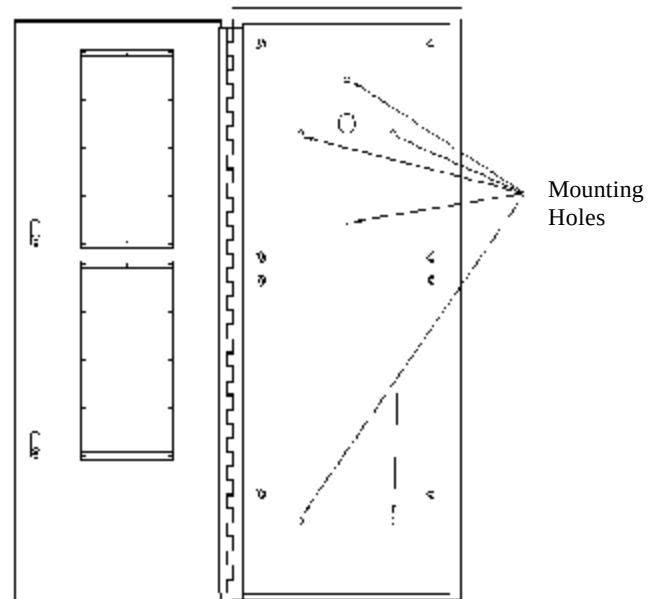
- * Read all instructions first.
- * Do not connect batteries or apply power until wiring and installation is complete and checked.
- * King-Fisher Co. equipment shall be installed in accordance with applicable NFPA codes, the National Fire Alarm Codes, the National Electric Code, the Local Authority Having Jurisdiction, and King-Fisher Co. manuals and drawings.
- * Locate a suitable position and structure for mounting the enclosure.

WALL MOUNTING

1. REMOVE the 2 subplate assemblies from the enclosure by removing the eight nuts and washers located at each corner of the subplates. Place in a temporary protected location.
2. REMOVE the mounting hole knockouts located at the rear of the enclosure.

4. RUN all conduit necessary to the enclosure. Conduit should not be attached to the top surface of the enclosure, as moisture from condensation or water may drip or leak on the internal electronic components. Knockouts are provided on the bottom of the enclosure. DO NOT remove knockouts with subplates installed. Attach conduit to enclosure using waterproof fittings with star locknuts. DO NOT use reducing washers. Separate conduit runs are required for:

- AC Power
- Antenna
- Control wiring



PANEL WIRING

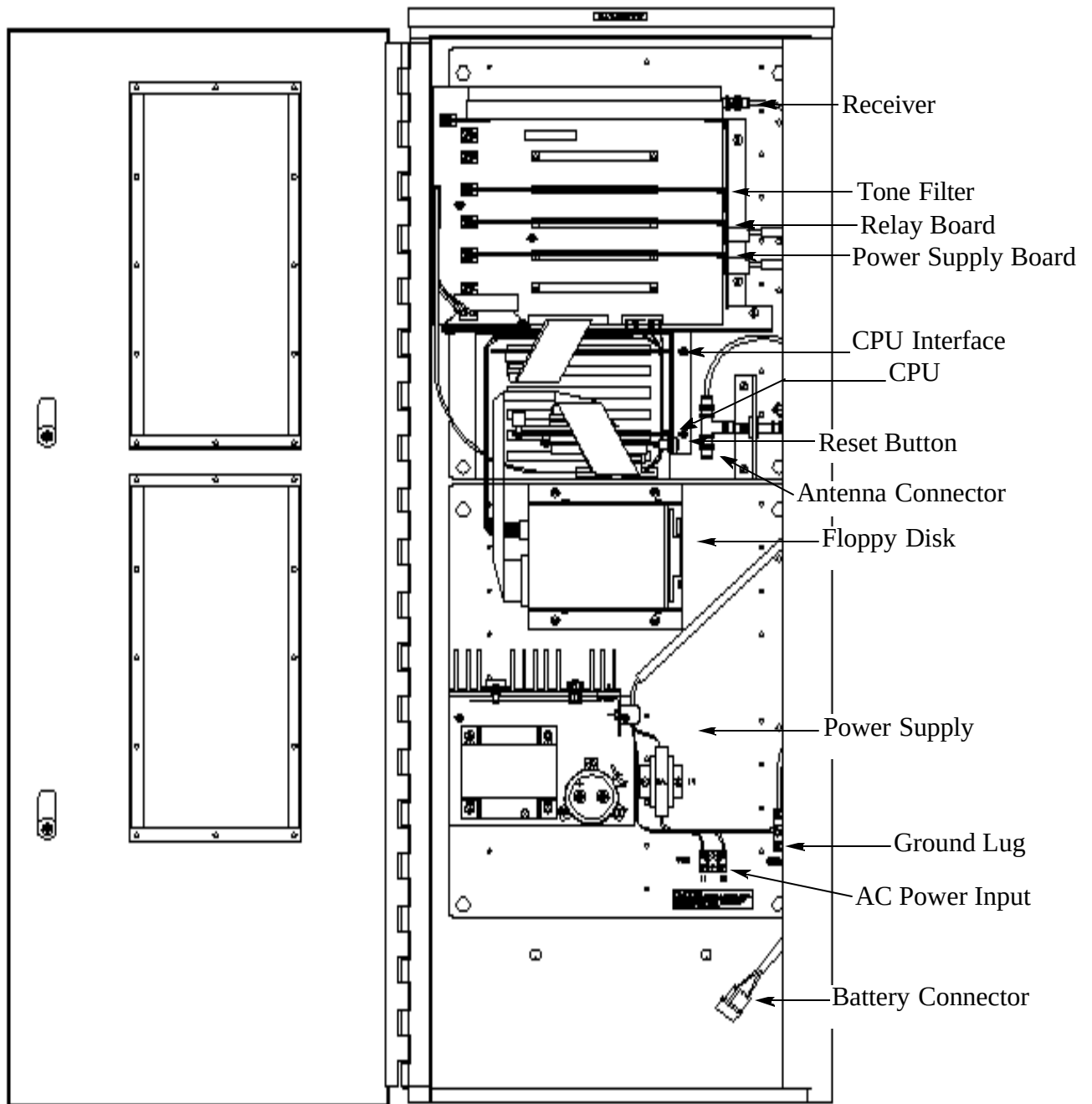
GENERAL

All wiring shall be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction.

NOTE: *Dress field wiring around the perimeter of the enclosure. 120 VAC main power should be dressed to the lower right hand corner of the enclosure. Carefully re-install the subplate assemblies in the enclosure using the eight nuts.*

1. **AC wiring** - The Radio Receiver Controller panel operates on 120 VAC 50/60 Hz, single phase power. Connect Hot (H) and Neutral (N) as shown to the terminal block in the lower right hand corner of the subplate. This panel requires a 15 Amp/120 VAC circuit breaker or fused circuit to be installed external to the panel. Connect Earth Ground to the ground lug provided at the bottom of the subplate. The circuitry within the Radio Receiver Controller contains electronic filters and surge protectors to aid in suppressing spikes, noise and lightning strikes; and, requires ground connection to function.

<DO NOT APPLY POWER TO PANEL>



GENERAL

The Radio Receiver Controller is a microprocessor-based device which can be remotely activated by Radio Alarm Transmitters to automatically control a fire pump controller, remote sirens, lights, or other electrically-controlled devices.

SPECIFICATIONS

- **ALARM FORMAT:** King-Fisher standard Tone format
- **ALARM SITES:** UP TO 999,999 different Remote Alarm Site codes with 9,999 codes per Site.
- **ERROR CHECKING:** All received signals are checked for proper format, alarm site match and errors. Highly resistant to false alarm incidence due to noise, static, storm activity, or multiple/simultaneous transmissions
- **CONSTRUCTION:** All solid-state construction using modular plug-in cards designed for fast service and maintenance.
- **TEMPERATURE:** 0 to +49 deg. C. Operational. -20 to +50 deg. C. Storage.
- **DIMENSIONS:** Standard 16 inches x 42 inches x 6.125 inches inches. Other configurations are available. Weight 26 lbs.

ANTENNA SYSTEM

The antenna system should be arranged to provide good reception from all remote sites (RF line-of-site wherever possible). The Radio Receiver Controller is designed for a 50 ohm antenna and 50 ohm coaxial cable. The Radio Receiver Controller antenna, and coax must be checked for SWR prior to operation and annually thereafter as part of a standard maintenance procedure.

RECEIVER BOARD

The Radio Receiver Controller is a frequency-synthesized design which utilizes digital circuits to generate and control local oscillators for the received channel. The prime function of the receiver is to convert RF signals on the channel into an audio signal which is further processed into alarm information. The incoming RF information is first amplified, then converted to a lower IF frequency where it is filtered to remove other frequencies which are not on the same channel. After additional amplification, it is sent to an AM detector or audio discriminator and converted to an audio signal.

NOTE: All active cards in the Radio Receiver Controller have been designed for extremely fast replacement or exchange. The best way to service the unit is to replace suspected defective assemblies with spare cards.

STONE FILTER/DETECTOR BOARD

The Tone Filter/Detector gets the recovered audio from the receiver and sends it into a series of precision audio filters. The audio filters selectively amplify specific tones which comprise the alarm information. This allows the unit to reject noises and pulses which are not related to the system alarms. The filtered tones are then detected as digital signals and the information is sent to the CPU Card.

POWER SUPPLY BOARD

The Power Supply Card is located in the center of the unit near the Tone Filter/Detector Card. It contains the main voltage supply regulators for +12 Volts, +5 Volts and -12 Volts. It has sophisticated battery charge circuits and power trouble detection circuits. It also has audible alarm circuits, audio monitor circuits and audio amplifier circuits.

CPU BOARD

The CPU card contains a microprocessor, memory, serial ports, on-board battery and a clock/calendar. It is specially designed for harsh industrial environments and demanding applications. Since it is an integral part of almost all functions, it would be difficult to list all problems which could be caused by a CPU malfunction. In real world testing, it has been proven to be extremely reliable and due to the self-testing nature of CPU subsystems, it is usually considered the last card to be changed in normal troubleshooting.

SYSTEM TROUBLE SUPERVISION

Relay 4 provides the supervisory contact output, which is a form C contact held in the energized condition under normal operation. The system trouble supervisory relay monitors System Power Trouble, Board out Trouble, Integrity of the cable connection between the CPU and the relay board, and Power supply to the relay board itself. System Power Trouble, Board out Trouble, has a **60 second delay** before opening. An external indicator can be connected to this contact for notification of trouble, also can be monitored by a zone from a Combo or KFRTI-20/52 unit.

TRANSMITTER BOX NUMBERS / DESCRIPTION OF OPERATION

This manual provides a detailed explanation of how transmitter "box" numbers are stored in the controller and how they can, be added or deleted within the system.

The process of adding or deleting box numbers is accomplished through the floppy disk drive.

Every time the controller is “powered-up” or “reset” , it checks to see if a floppy disk has been inserted into the drive. If the floppy disk is present, it checks for the file containing the list of box numbers. If the list is present, it loads the new numbers into the system (non-volatile) memory. If no list is present, it retains the previous set of numbers without any changes.

By simply inserting the appropriate floppy disk into the drive and then “resetting” the controller, an entirely different set of numbers can be quickly loaded in a matter of seconds. This is particularly convenient when a backup unit must be moved, changed or placed into service quickly.

A pre-programmed disk is provided with the system.

Press the eject button (on the drive) once to remove any floppies which might have been left inside. Insert the new floppy disk into the slot of the disk drive.

Gently slide the floppy disk into the drive (covered door) until the disk drops down and locks into position (disk clicks into place and the eject button pops out).

Push the Reset button in for 2 seconds and release. Watch the LED light on the front of the disk drive. The LED should turn on for a few seconds while the disk drive operates.

After a few more seconds, the controller should resume normal operation with the new list of transmitter numbers. This is indicated by the light on the disk drive no longer illuminated.

Remove the floppy disk by pressing the eject button on the front of the disk drive.

Label and date the floppy disk, place in a plastic container and store in a safe place

Test the Radio Receiver Controller thoroughly to verify that the added transmitter numbers and zones are correct.

ADD - DELETE TRANSMITTER NUMBERS

REQUIREMENTS:

Adding or deleting transmitter numbers requires the use of a desktop or laptop computer running MS-DOS 6.0, 6.2, or 6.22 with a floppy disk drive capable of reading/writing 1.44 MB, 3.5 inch floppy disks.

COPY ORIGINAL BEFORE STARTING:

Before attempting to edit the list of transmitter numbers, a copy of the previous disk should be made. This can be done using the DISKCOPY command, your favorite utility program or copying everything to an empty directory on your hard disk. Before copying, it is always a good idea to flip the write protect switch on the original floppy disk to the “open”, see-through position. This prevents damaging the original disk. Date and store the original in a safe location as previously described.

ADD-DELETE PROCEDURE:

Insert the new copy into the PC and change drives to the floppy drive as follows (example shown for A: floppy drive):

Directory of A:\				
	<DIR>		04-12-9	11:48a
	<DIR>		04-12-9	11:48a
EDIT	COM	69,886	07-11-9	9:50a
KFRACNUM	DAT	1,000	03-11-9	4:51p
TINDEXC	EXE	28,921	02-03-9	11:15a
TINDEX	DAT	1,000	03-13-9	9:02a
USR	TXT	61,000	03-20-9	9:19a
CHANGE	DAT	1,000	03-19-9	8:44a
RELAY	BAT	1,000	02-23-9	12:33p
7 file(s) 163,807 bytes				
???? bytes free				
Directory Example				

screen shows C:\> type A: (Enter)
screen shows A:\> type DIR (Enter)

Your screen display should now look similar to the example shown at the left (Directory Example).

FILE DESCRIPTIONS:

TINDEX.DAT Compiled Transmitter Numbers
KFRACNUM.DAT ASCII List of Customer Numbers
TINDEXC.EXE Special Compiler Program

ADD - DELETE PROCEDURE:

The list of transmitter numbers you will be required to edit is the file described as KFRACNUM.DAT

This is a standard "ASCII" file which contains a list of all transmitter numbers followed by a single character which describes each transmitter as a certain type (52 Zone Interior Box).

Deleting a transmitter from the list consists of opening this file in an edit mode, deleting the entire line on which the transmitter appears, reducing the quantity of transmitter entries and saving the file. Open the file as follows by carefully typing exactly as shown:

1116F
1124F
1149F
1152F
1153F
1154F
1155F

screen shows A:\>
type CHANGE (Enter)

The screen should fill with a list of transmitter numbers with a different number located on each line. See print-out at left. Your display should look similar to the one shown.

NOTE: In the partial list at left, the transmitter numbers are 1116 and 1155. The 5th Character just to the right of the transmitter number is the transmitter type. In this case the following letter is used:

F = a -KFRTI-20/52

DELETE A TRANSMITTER:

To delete transmitter 1155, simply cursor down or up until the cursor is flashing on the line containing 1155. Now use the Del key to erase each character to the right of the cursor. When 1155 is completely gone, the next line should move up to take it's place.

SAVE THE FILE:

When editing the list is completed, it must be SAVED by pressing Alt + F (file). Then press the S (save) key. The screen should briefly indicate that the file was saved.

EXIT THE EDITOR:

Press Alt + F again. This time press the X key to exit the editor wait a moment for the compiler to run automatically. The screen should fill with transmitter numbers and you should be able to quickly check the list against your changes. Press "ESC" to exit, then do a DIR (directory) and verify that the TINDEX.DAT shows the current date and time.

```
screen shows A:\>
type DIR      (Enter)
```

ADD TRANSMITTERS:

Adding transmitters is similar to the previous process of deleting transmitters except that the editor must be placed in the "Insert" mode (toggle the INSERT or INS key). Keep the list of transmitters in numeric order so it is easy to edit. Cursor to the beginning of the line at the proper position for the new transmitter entry. The line above should be a lower transmitter number and the current line should be a larger transmitter number. Press the [enter key] once. If the insert mode is correct, a new blank line should be created with the larger transmitter number moving down. Carefully type the new transmitter number on this line, followed by the "F" "type" designation. Save the file as previously described and exit the editor. Do a final check on the transmitter list, do a directory and check the file dates and times.

PROGRAMMING RELAY.DAT FILE

In addition to these files, a data file "RELAY.DAT" should be programmed. The file consists of 6 columns. The maximum number of lines in the file is 250 different combinations. Each line indicates one control, and consists of six (6) elements.

Column 1: The transmitter number followed by a comma. If you don't want to list specific transmitter(s) and have all transmitters activate relay(s), put -1 followed by a comma.

Column 2: The zone number followed by a comma. If you don't want to list specific zone numbers and have all zones activate relay(s), put -1 followed by a comma.

Column 3: The message type followed by a comma.

- 0 — Fire
- 1 — Medical/Emergency
- 2 — Police
- 3 — Tamper
- 4 — Supervisory
- 5 — Trouble
- 6 — Service
- 10 — Don't care

Column 4: Relay number(1-4) followed by a comma. **Do not use relay 4. See page 5, SYSTEM TROUBLE SUPERVISION**

Column 5: The on delay time (0-250 seconds) followed by a comma.

Column 6: The off delay time (1-999 seconds).

An example of a “relay.dat” file is as follows:

	<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>	<u>Column 4</u>	<u>Column 5</u>	<u>Column 6</u>
Row 1	1234,	2,	0,	1	1,	4
Row 2	2345,	34,	10,	1	12,	3
Row 3	3456,	-1,	0,	3	4,	15
Row 4	1995	-1	0	2	8	111

Row 1 means that if zone 2 of transmitter 1234 is in fire alarm, relay 1 will be turned on after a 1 second delay and turned off 4 seconds later.

Row 2 means that any type of messages (1-6) from zone 34 of transmitter 2345 will turn on relay 1 after a 12 second time delay and turn it off 3 seconds later.

Row 3 means that if any zones from transmitter 3456 is in fire alarm, relay 3 will be turned on after a 4 second delay and turned off 15 seconds later.

Row 4 means that any Fire message will turn on relay 2 after an 8 second time delay and the relay will stay on for 111 seconds.

NOTE: Jumper settings on the CPU board should be:
W1[1-2] “S”; W1[3-4] “X”; W1[5-6] “N”; W1[7-8] “T”
W1[9-10] “IB”; W2[4-6], and W2[3-5].

Before editing the file “Relay.Dat” a backup copy of the original disk should be made. Then use DOS “EDITOR” program to open the file.

To remove an element or change the element, move the cursor to the line that is indicating the element then remove the entire line or change as needed.

When an element needs to be added, in the INSERT mode of the DOS EDITOR, add a line with all six (6) elements as described above.

After any deletes, adds, or changes, save the file as previously described.

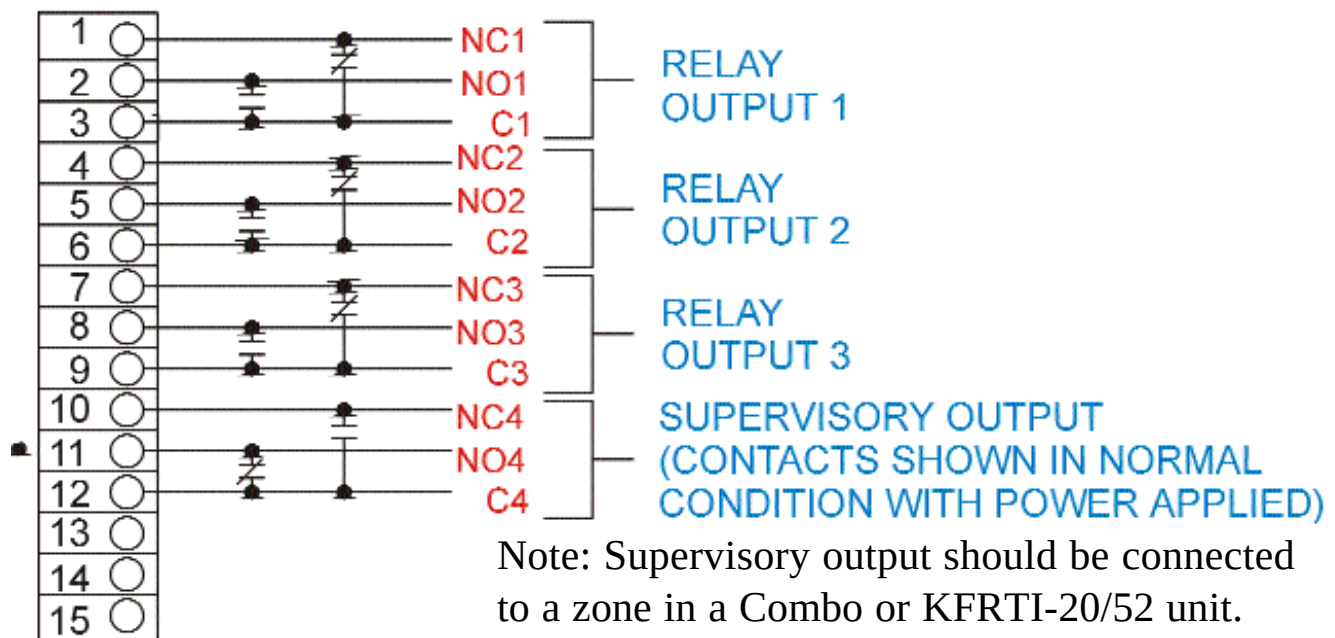
FLOPPY DISK:

Remove the floppy from the PC and follow the procedure for loading the floppy into the Controller as previously described.

Work sheet for programming the auxiliary relay board when used:

There are four relays available.

1. List the transmitter numbers that should activate the relays or all transmitters.
2. What zone number for each transmitter should activate the relay or all zones?
3. What message type for each zone?
Fire, Medical, Police, Tamper, Supervisory, Trouble, Service or don't care
4. How much of a delay should there be before activating the relay (0-250 seconds)?
5. How long should the relay be activated (1-999 seconds)?



TROUBLESHOOTING

Antenna problems are usually the result of:

- * Defective connections.
- * Interfering objects, such as trees, gutters, etc.
- * Loose hardware.
- * Damage from wind, construction, or vandals.

There are no user-servicable adjustments or alignments on the Receiver Card. If service is required, please return the card to the factory.

TROUBLESHOOTING: In order to simplify troubleshooting, the Tone Filter/Detector Card is equipped with “diagnostic LEDs” located along the entire top side of the card. As each tone in the transmission is detected, the appropriate LED will flash. For example: if the transmitter sends 1234, the LEDs will flash in sequence 1, 2, 3, and 4. Each of 11 LED and filter sections is labeled (0 to 9 inclusive plus X). If no LEDs flash, the problem may be the Receiver Card, or the Transmitter.

The easiest way to troubleshoot this card is to carefully view the LEDs and match the sequence with a known transmitter signal. A battery-powered call box is normally the best way to generate the desired transmitted signal. Send the same sequence over and over until you verify the proper sequence of LED flashes. Start with a simple sequence (2 or 3 digits) and continue changing the transmitter address code plugs until all tones have been checked and verified. Make certain only those LEDs which represent the tones transmitted illuminate.

TROUBLESHOOTING: Three LEDs are mounted on the CPU side of the chassis on the Aux. Mother Board located along the base of the chassis. Check the three red LEDs labeled +12, +5 and -12. If any LED is off, then the Power Supply Card may be defective.

TROUBLESHOOTING: The CPU Card should be checked/changed if any of the following symptoms are detected:

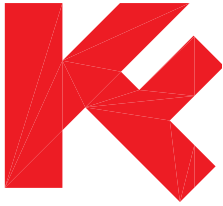
- * Unit dead, especially if Power Supply Card checks good.
- * All other boards seem to be working, but unit will not process any remote signal.
- * Can’t load new transmitter numbers into memory.
- * Floppy Drive will not read.

CAUTION: It is normally recommended that all transmitters being added to the system be tested by adding 6 - 10 dB of external attenuation at the Receiver. Transmitters that function properly thru the Receiver can then be considered safe to perform during poor signaling conditions and during aging. Be sure to remove the attenuator upon completion of test!!!

REPLACEMENT PARTS:

The following parts are listed for possible replacement during maintenance operations.

<u>KF NUMBER</u>	<u>DESCRIPTION</u>
66601-4	Power Supply Board
66606-3	Tone Filter/Detector Board
66603-2	CPU Interface
66618	CPU
66265	Relay Board
69037	Power Supply, 12vdc
30008	Fuse 5A, 250v



KFVC DUAL REPEATER

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com

I. GENERAL DESCRIPTION

The King Fisher AM repeater is designed to receive AM transmitter signals in areas where direct radio alarm transmission to the central receiving console antenna is inhibited by geographical or man made obstructions. The repeater antenna must be installed at an elevated location which has “line of sight” communication to the central receiving console and good reception from all transmitters.

II. GENERAL OPERATIONS

The repeater consists of a receiver section, a tone storage section, a transmitter, logic controls, power supply and cabinet. Two repeater units are used in tandem to conform to code requirements for redundancy. The logic sections of the two repeaters supervise each other to provide automatic switch over in case one unit should fail. Both repeaters are used during normal operation with each unit sending two transmissions of test, supervisory, or alarm signals.

AM RECEIVER

The receiver section monitors the RF channel for tone activity while the repeater is in the standby mode. A special preamble pilot tone is used to bring the repeater into the active mode. Radio transmitters which are designated for repeater application are modified to transmit 60 milliseconds of the pilot tone first, followed by the normal tones of each round. The central receiving console does not respond to the pilot tone and will process the modified transmitters directly if the signal strength is high enough. Transmitters which do not have the pilot tone modification will not be processed by the repeater.

TONE STORAGE PLAYBACK

Once the pilot tone has been detected, the repeater switches to the active mode and begins recording the tone signals into a solid state memory device. The recording process boosts the level of the tone signals and compresses the audio to improve the signal to noise ratio. After a short time delay, the repeater switches to a “playback” mode and re-transmits the signal on the same channel.

AM TRANSMITTER

The AM transmitter is tuned to the same frequency as the base receiving station. It illuminates a green LED during the entire transmission sequence. If the transmitter locks on, an RF detector circuit will shut the unit off automatically.

LOGIC CONTROLS

Logic circuits are included which monitor the repeater activity and can detect fault conditions such as power failure, transmit failure, transmission without modulation and failure of the redundant repeater. An optional feature provides for the transmission of a repeater “TROUBLE” signal which will be received and annunciated at the central receiving station. Trouble outputs can also be connected directly to zones of local alarm panels and auxiliary transmitters such as a KFRTI-WP-8 combination transmitter/interface panel.

POWER SUPPLY

The repeater has an internal 12 volt power supply and battery charging circuit which are fully supervised. Main power is supplied to the unit at 120 volts AC, 3 amps. The sealed lead acid battery is charged by a sophisticated dual stage constant current charger.

CABINET/ENCLOSURE

The repeater is housed in the KFRTI-52 enclosure utilizing the existing subplate and mechanical hardware. A special tinted LEXAN face plate was designed to enable the customer to view all LED'S yet protect and hide the internal electronics.

CONTROLS AND INDICATORS:

CONTROLS

a. TEST: There is a manual test switch when pressed generates an internal test message for checking out the repeater functions. This message however, will not be received by the console because there is no address coded into the repeater.

INDICATORS, CONTROL CARD

- a. POWER: A green LED is provided on the panel to indicate that primary AC is being applied to the unit. This LED will be off when the unit is running on secondary battery backup power.
- b. TRANSMIT: An ultra-bright green LED is provided on the front panel to indicate that the repeater is in the playback mode and is sending the audio tones to the transmitter.
- c. TROUBLE: An amber LED is provided on the front panel to indicate when the supervisory circuits have detected a trouble condition in the repeater.

INDICATORS, TRANSMITTERS

a. RF TRANSMISSION: A green LED is provided on the front of the transmitter card to indicate when the actual RF power is being generated by the repeater.

III. SYSTEM MAINTENANCE

A. On a daily basis, all transmitter ID'S which are required to be processed through the repeater should be checked at the base receiving console during the memory read function. If any transmitter appears as an "MB" (missing box), then all such transmitters and the repeater should be checked. The paper tape "hard copy" should also be checked to determine that all transmitters which utilize the repeater have transmitted more than 2 complete test messages (rounds) during each test period. If not, this could be an indication that one of the two redundant repeaters has failed.

B. In accordance with the "AUTHORITY HAVING JURISDICTION", actual alarm and trouble testing should be done on a periodic basis on all transmitters which utilize the repeater.

C. At least every six months, the repeater should be visually inspected. The enclosure should be checked for any signs of moisture or corrosion on the inside surfaces. The battery voltage should be checked and must be a minimum of 13.5 volts DC. The AC power should be temporally disconnected and alarm tests should be conducted to test full repeater operation on battery back up power. The antenna, the antenna coax, and relay switching system should be checked for forward and full reflected power.

IV. TRANSMITTER, "CALL BOX" MODIFICATIONS

The transmitters which are to be repeated require special coding so that only the repeater will recognize its signal. To accomplish this, a "preamble" tone of 507HZ. will be transmitted as the first digit of the signal. Following the preamble tone, the remaining digits will be a normal system sequence. In order to accomplish the 507HZ. preamble tone, only the tone generator board KF# 66003-2 in the call box needs to be modified. The modifications for this change depends on the revision level of the tone generator board, and what type system the repeater is required to operate in.

V. Transmitter Programming

The programming of the transmitter ID# will be slightly different on these units. Digit 1 will always start with a plug in rotary position "P". The remaining digits will then be programmed in sequence per normal operation.

Example: coding for transmitter ID# 123

digit 1 - P

digit 2 - 1

digit 3 - 2

digit 4 - 3

digit 5 - M

on a 2 digit system: digit 6 - 0

VI. Spare Parts List

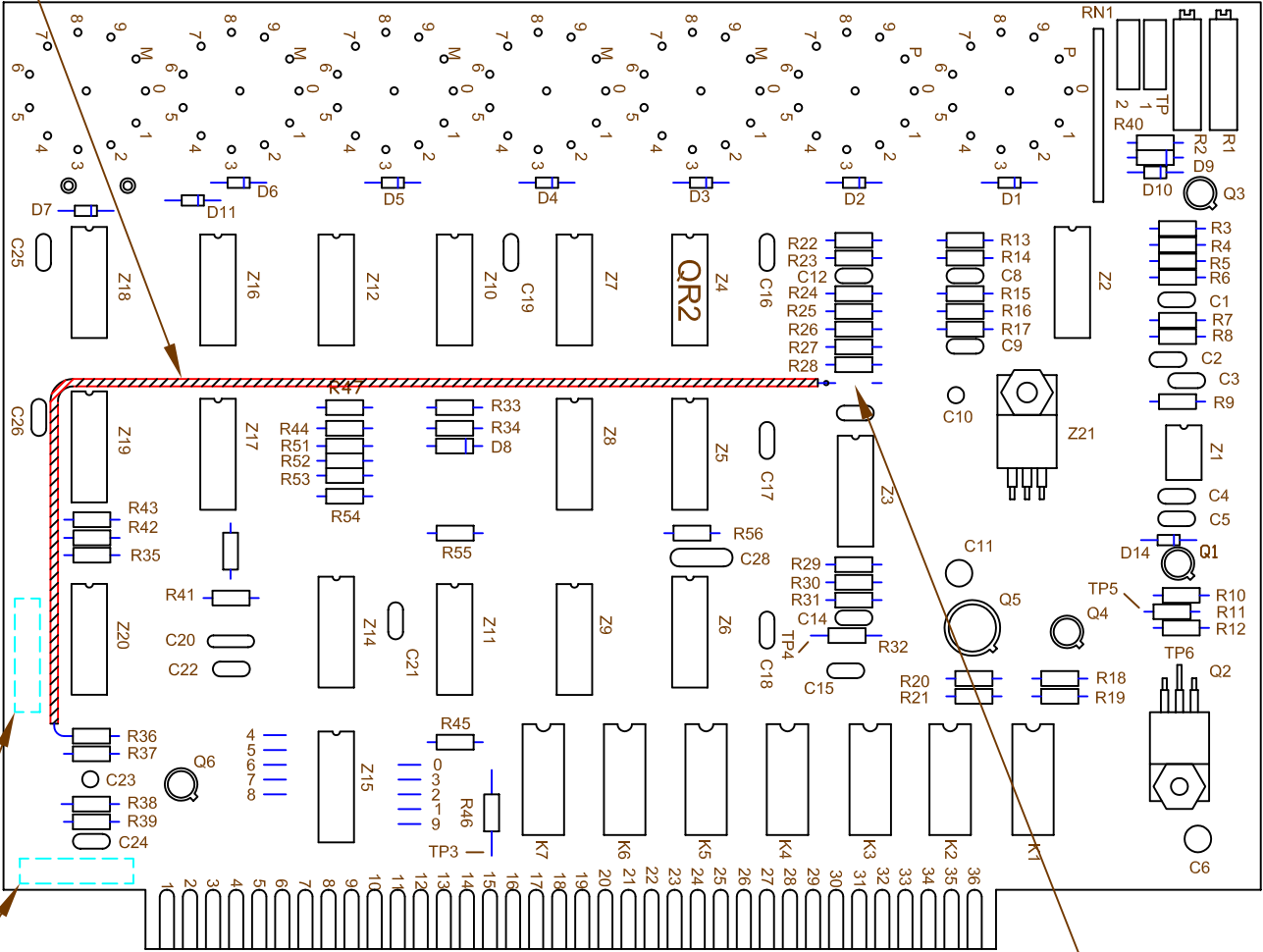
QTY	DESCRIPTION	KF PART NO.
1	battery pack, 12v rechargeable (12.5 ah)	17012
1	battery pack, 12v rechargeable (5 ah)	17014
1	fuse, 3 amp slo-blo	30013
1	fuse, 4 amp normal blo	30004
1	fuse, 2 amp normal blo	30012
1	pca, repeater control	66175-1
1	pca, power supply, 28V	66115-12
1	pca, power supply, 14V	66116
1	pca, am transmitter, hi band	66120-5
1	pca, main mother bd., repeater	66101
1	pca, cpu board	66150-2
1	pca, alarm control	66156-4
1	pca, (4) zone input	66163-3

For all Call boxes to be used with the dual repeater where a "P" tone is required a wire jumper must be installed from W11 to R36, Refer to drawing 75871. If the system is a 5 digit dual function or 6 digit single function other components must also be added or if the revision of 66003 is not the current revision other jumpers may need to be added. If Z4 is not labeled QR2 is must also be changed to provide the "P" tone frequency. Refer to drawings 75872 through 75878 for a description and location of other jumpers or components needed to modify any revision board 66003 for dual repeater use.

REVISIONS					
REV.	ECO	DESCRIPTION	DATE	DFT	APP
	119	NEW RELEASE	3/6/97	DA	DA

ADD JUMPER FROM W11 OR J1 TO R36 AS SHOWN ON COMPONENT SIDE USING KF# 27181, 24AWG, SOLID GREEN WIRE.
(SEE NOTE #2)

KF# 66003-2 PC BOARD (2R) TONE GENERATOR & MODULATOR SHOWN.



- NOTE: 1) THESE MODIFICATIONS MUST BE MADE TO ALL TONE GENERATOR & MODULATOR BOARDS IN THE TRANSMITTER "CALL BOX", FROM BOARD REVISION 16002-3 TO 16002-7.
- 2) A JUMPER WIRE MUST BE ADDED BETWEEN PIN 4 OF Z20 (JUNCTION OF R36) AND THE TERMINAL OF W11 WHICH CONNECTS TO PIN 14 OF Z4. THIS WIRE JUMPER WILL ALLOW THE ALTERNATE TONE SET TO BE SELECTED AND THE 507HZ. TONE TO BE GENERATED (INSTEAD OF "X" TONE) WHENEVER DIGIT "1" IS PROGRAMMED FOR "P" PREAMBLE TONE.
- 3) IF JUMPER WIRE W11 (BOARD REVISION 16002-4 TO 16002-7) OR, J1 (BOARD REVISION 3), IS INSTALLED, IT MUST BE CUT AND REMOVED.

BOARD REVISION NUMBER AREA
(SEE NOTE #1)

IF INSTALLED CUT W11 OR J1 ON REVISION 3 BOARDS
(SEE NOTE #3)

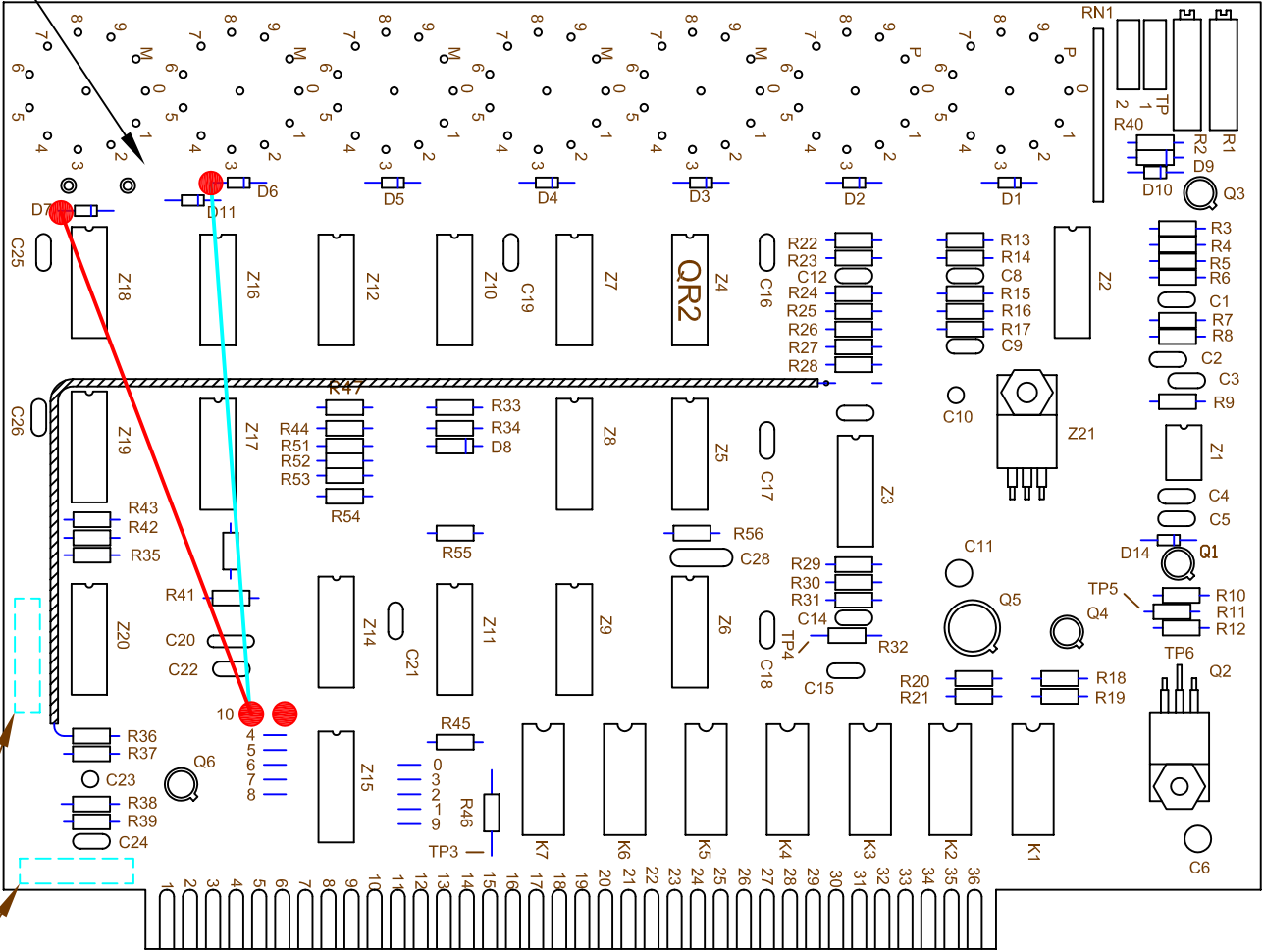
CAD FILE: 75871

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	TOLERANCES ON: FRACT. DECIM. ANGL. ±1/64 ±.01 ±1° ±.005		DFT.	D.A.	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
			CHK	D.A.	
			APPD	D.A.	TITLE
			DATE	1/30/97	TONE GEN. MOD. #16002 REV. 3 TO 7
			SCALE	NONE	DWG. NO.
MATERIAL		SHT	1 OF 1	75871	

REVISIONS					
REV.	ECO	DESCRIPTION	DATE	DFT	APP
	119	NEW RELEASE	3/6/97	DA	DA

FOR USE WITH 4 DIGIT DUAL FUNCTION WITHOUT "P" TONE
MOVVE WIRE FROM ANODE OF D6 TO ANODE OF D7

KF# 66003-2 PC BOARD (2R) TONE GENERATOR & MODULATOR SHOWN.



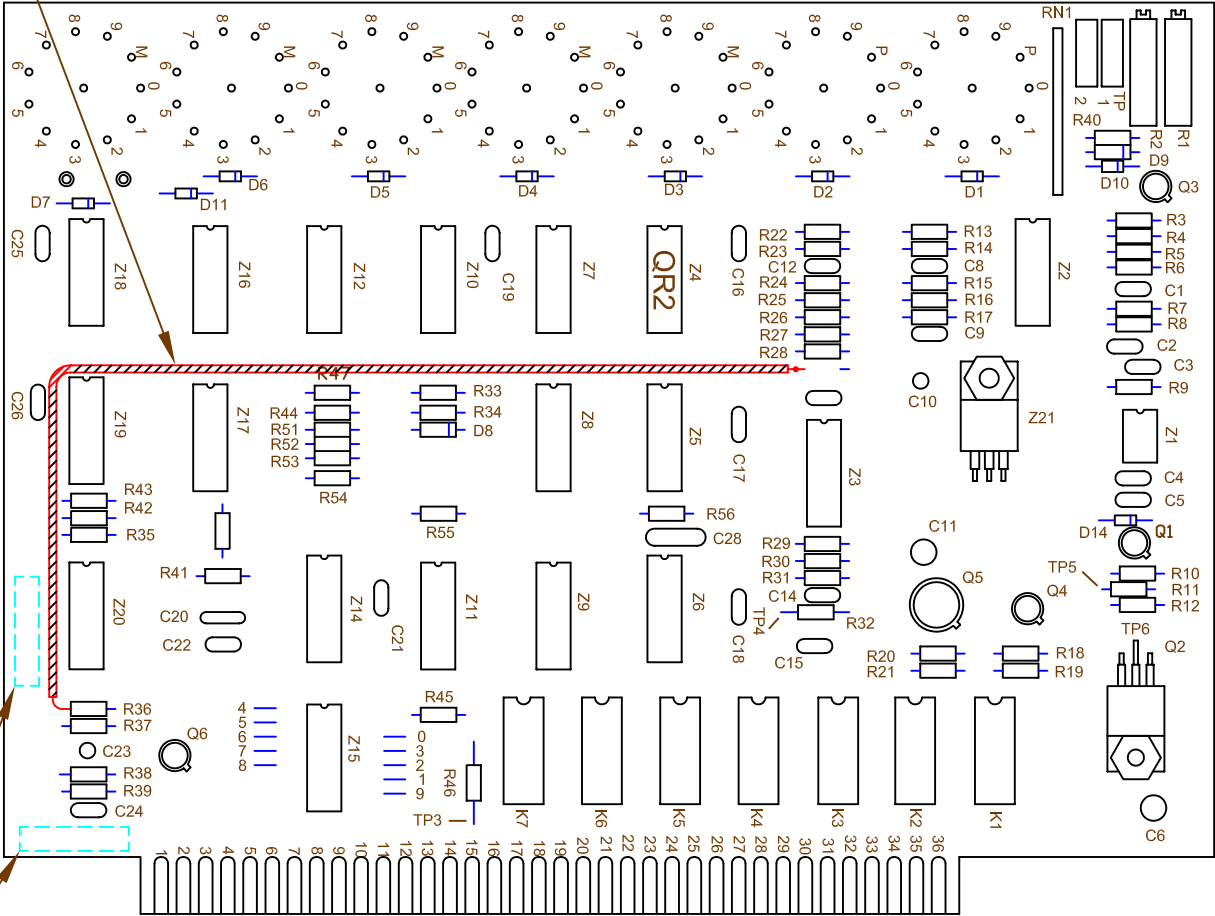
BOARD REVISION NUMBER AREA

DFT.	D.A.	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
CHK	D.A.	
APPD	D.A.	TITLE
DATE	1/30/97	TONE GEN. MOD. #16002 REV. 3 TO 7
SCALE	NONE	DWG. NO.
SHT	1 OF 1	75871-1

REVISIONS					
REV.	ECO	DESCRIPTION	DATE	DFT	APP
	119	NEW RELEASE	3/6/97	DA	DA

ADD JUMPER FROM W11 OR J1 TO R36 AS SHOWN ON COMPONENT
SIDE USING KF# 27181, 24AWG, SOLID GREEN WIRE.
(SEE NOTE #1)

KF# 66003-2 PC BOARD (2R) TONE GENERATOR & MODULATOR SHOWN.



NOTE: 1) THIS MODIFICATION MUST BE MADE TO ALL TONE GENERATOR
& MODULATOR BOARDS IN THE TRANSMITTER "CALL BOX",
FOR BOARD REVISION 16002-7.

BOARD REVISION NUMBER AREA

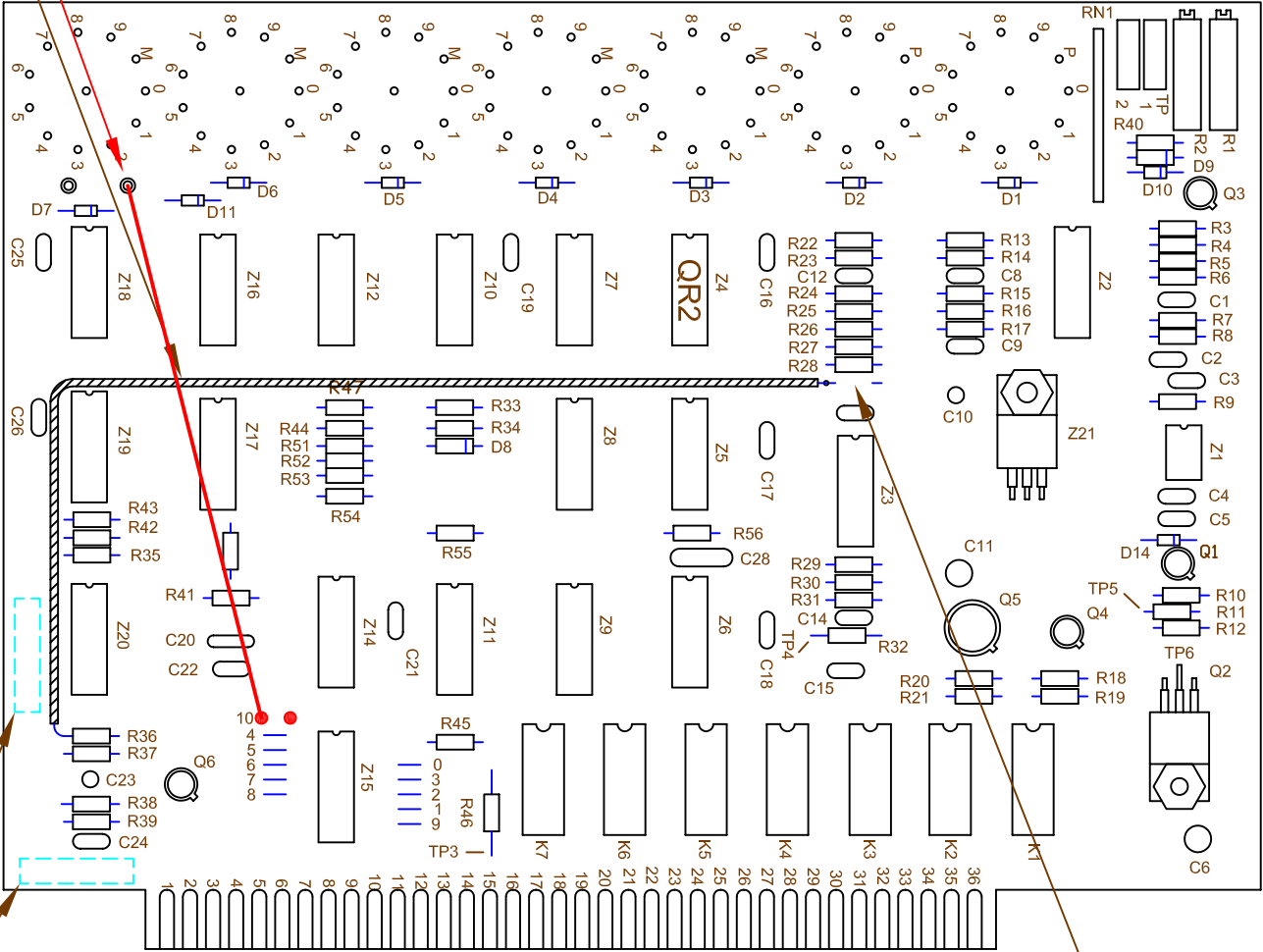
DFT.	D.A.	 KING-FISHER COMPANY
CHK	D.A.	
APPD	D.A.	TITLE
DATE	1/30/97	TONE GEN. MOD. #16002 REV. 7
SCALE	NONE	DWG. NO.
SHT	1 OF 1	75871-2

REVISIONS					
REV.	ECO	DESCRIPTION	DATE	DFT	APP
	119	NEW RELEASE	3/6/97	DA	DA

ADD JUMPER FROM W11 OR J1 TO R36 AS SHOWN ON COMPONENT SIDE USING KF# 27181, 24AWG, SOLID GREEN WIRE.
(SEE NOTE #2)

MOVE WIRE TO TOP HOLE, NEXT TO DIGIT "7"
TO MAKE AN OLDER BOARD WORK AS A 5 DIGIT DUAL FUNCTION

KF# 66003-2 PC BOARD (2R) TONE GENERATOR & MODULATOR SHOWN.



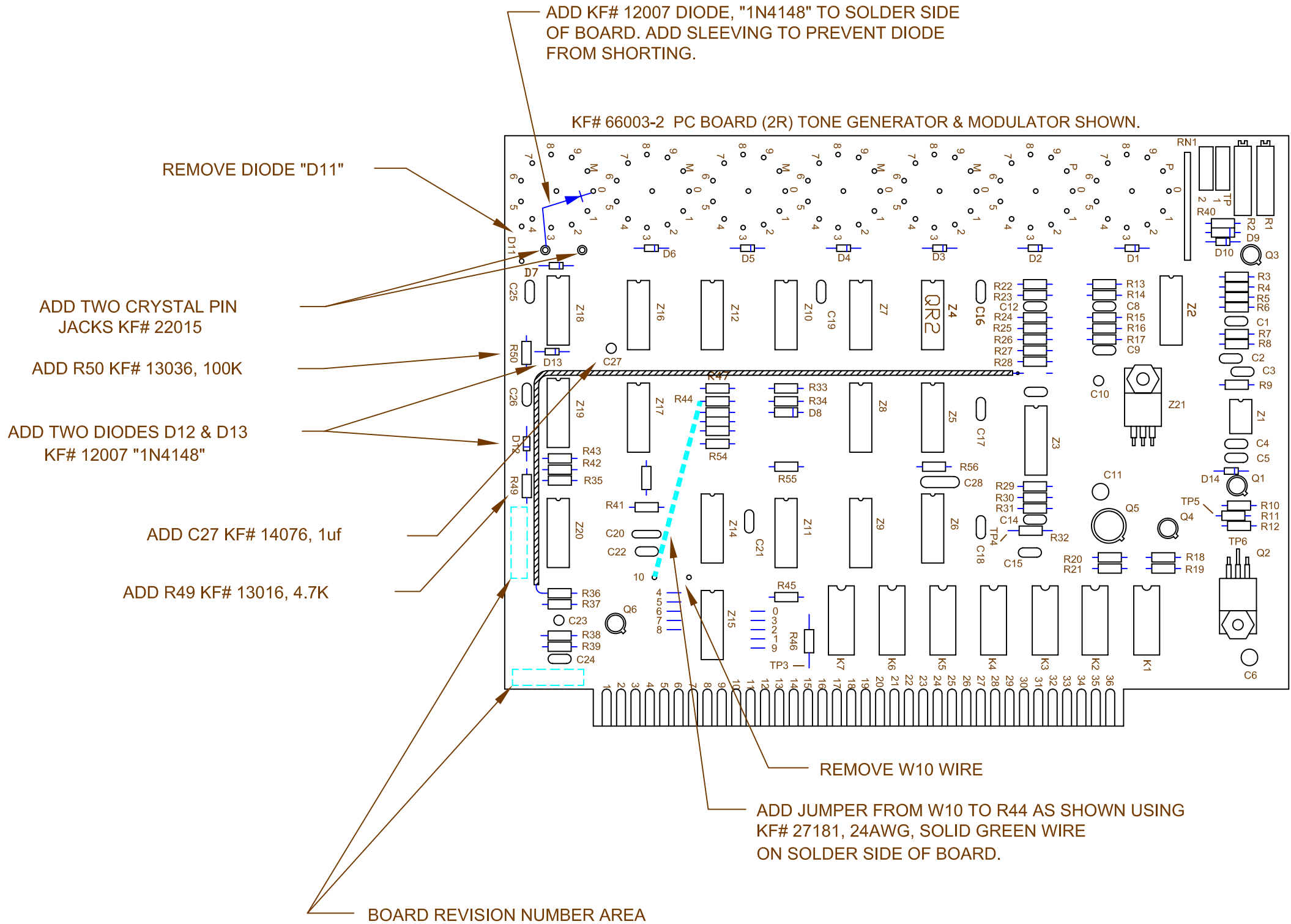
- NOTE: 1) THESE MODIFICATIONS MUST BE MADE TO ALL TONE GENERATOR & MODULATOR BOARDS IN THE TRANSMITTER "CALL BOX", FROM BOARD REVISION 16002-3 TO 16002-7.
- 2) A JUMPER WIRE MUST BE ADDED BETWEEN PIN 4 OF Z20 (JUNCTION OF R36) AND THE TERMINAL OF W11 WHICH CONNECTS TO PIN 14 OF Z4. THIS WIRE JUMPER WILL ALLOW THE ALTERNATE TONE SET TO BE SELECTED AND THE 507HZ. TONE TO BE GENERATED (INSTEAD OF "X" TONE) WHENEVER DIGIT "1" IS PROGRAMMED FOR "P" PREAMBLE TONE.
- 3) IF JUMPER WIRE W11 (BOARD REVISION 16002-4 TO 16002-7) OR, J1 (BOARD REVISION 3), IS INSTALLED, IT MUST BE CUT AND REMOVED.

BOARD REVISION NUMBER AREA
(SEE NOTE #1)

IF INSTALLED CUT W11 OR J1 ON REVISION 3 BOARDS
(SEE NOTE #3)

DFT.	D.A.	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
CHK	D.A.	
APPD	D.A.	TITLE
DATE	1/30/97	TONE GEN. MOD. #16002 REV. 3 TO 7
SCALE	NONE	DWG. NO.
SHT	1 OF 1	75871-3

REVISIONS					
REV.	ECO	DESCRIPTION		DATE	APP
	119	NEW RELEASE		3/6/97	DA DA

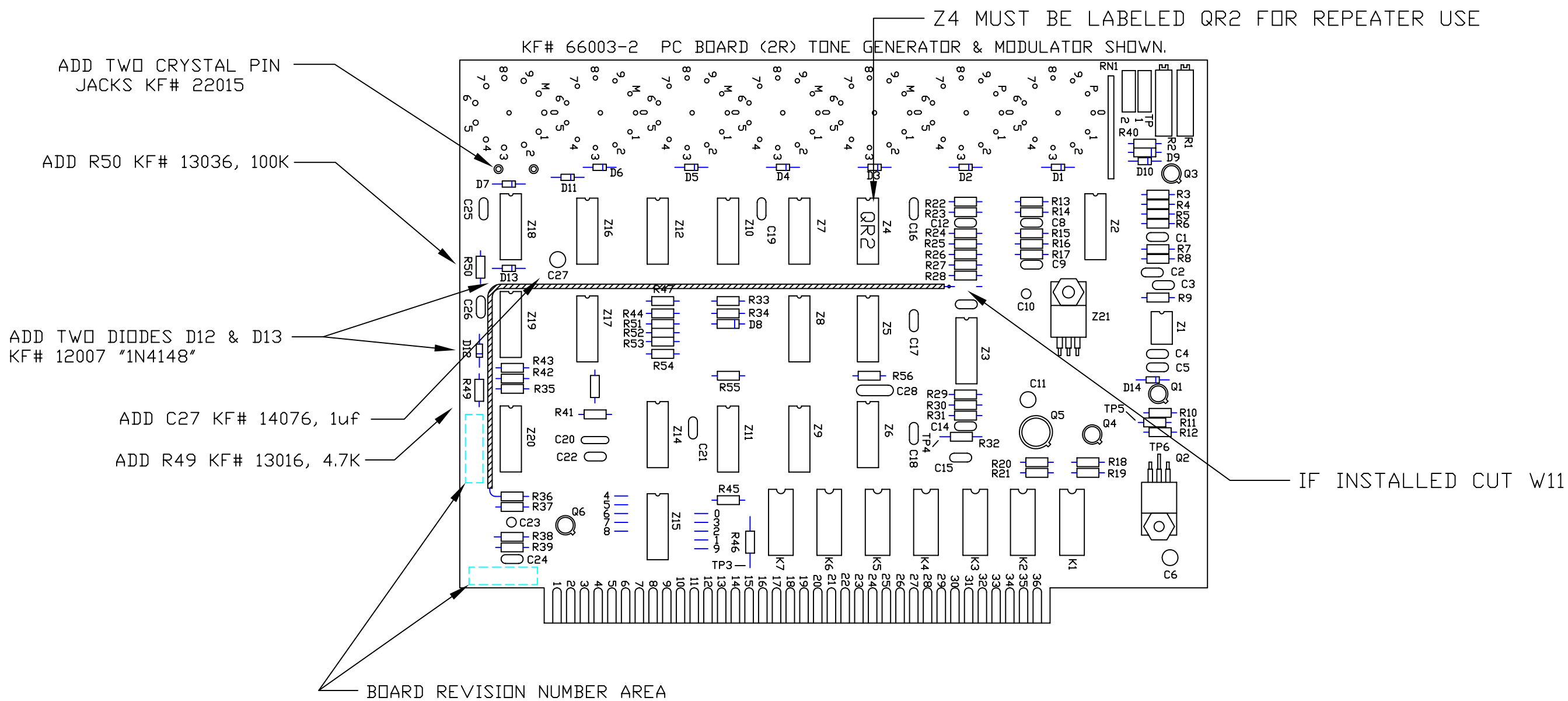


NOTE: 1) THESE MODIFICATIONS MUST BE MADE TO ALL TONE GENERATOR & MODULATOR BOARDS IN THE TRANSMITTER "CALL BOX" ON BOARD REVISION 16002-4 FOR A 5 DIGIT DUAL FUNCTION SYSTEM.

2) COMPLETE MODIFICATIONS PER KF# 75871 FIRST.

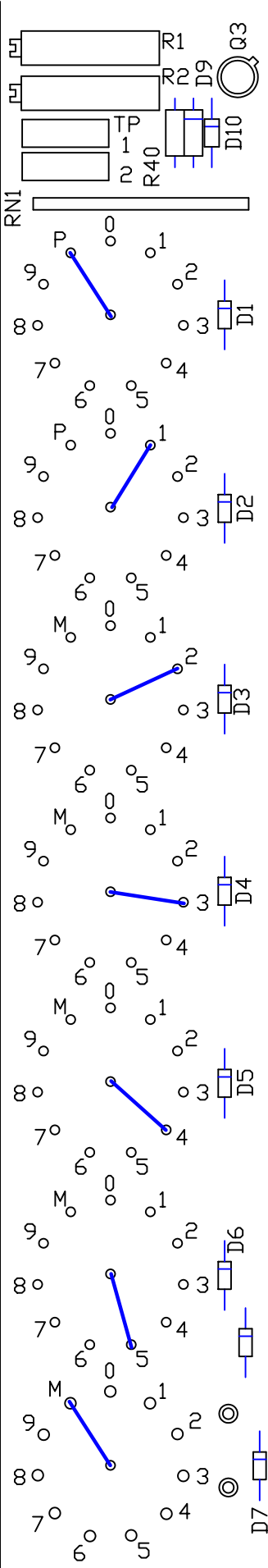
CAD FILE: 75875

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	TOLERANCES ON: FRACT. DECIM. ANGL. ±1/64 ±.01 ±1° ±.005	DFT.	D.A.	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
		CHK	D.A.	
		APPD	D.A.	
		DATE	1/30/97	
		SCALE	NONE	
MATERIAL		SHT	1 OF 1	TITLE TONE GEN. MOD. #16002-4 5 DIGIT, DUAL FUNCTION DWG. NO. 75875



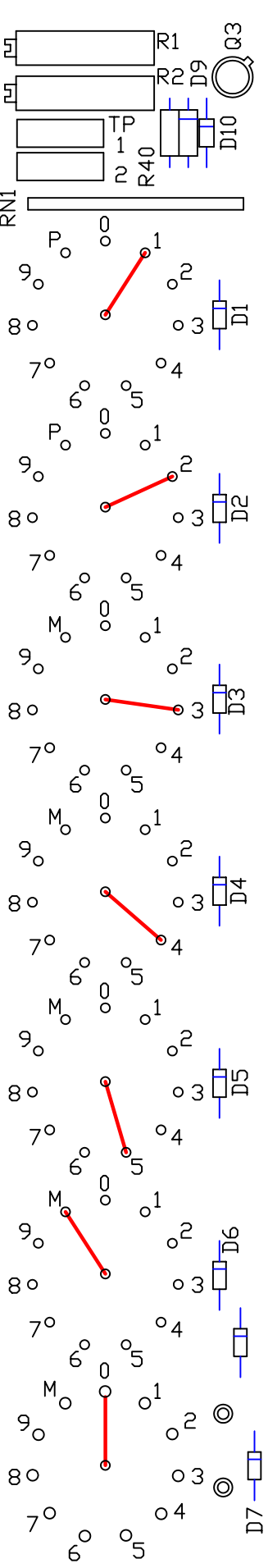
		 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
DATE	1/31/97	
SCALE	NONE	
SHT 1 OF 1		TITLE TONE GEN. MOD. #16002-5,6,7 5 DIGIT, DUAL FUNCTION DWG. NO. 75877

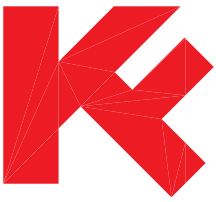
REPEATER BOX



5 DIGIT DUAL FUNCTION

NON REPEATER BOX





PROGRAMMABLE RECEIVER TRANSMITTER

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847•398•7100

f 847•255•1507

e-mail sales@kfco.com

PROGRAMMABLE RECEIVER TRANSMITTER

The Programmable Receiver/Transmitter is designed to reliably retransmit signals of the F.C.C. type accepted emergency radio transmitters. The Programmable Receiver/Transmitter receives and decodes the signals from the radio transmitter and then it verifies the transmitter number with the pre-loaded numbers and verifies the type of function tones with the preprogrammed transmitter type. Finally, the repeater will retransmit all tones of valid signals in the same modulation type and the same frequency after a 300 ms. time delay.

-CAUTION-

- RISK OF ELECTRICAL SHOCK.
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS.
- CHASSIS MUST BE CONNECTED TO EARTH GROUND.
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER.
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION.
- AVOID INSTALLATION IN DIRECT SUNLIGHT AND IN RAIN RUNOFF PATHS.-
- DO NOT INSTALL CONDUIT INTO THE TOP SURFACE OF THE CABINET.

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION.
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN THE CONDUIT FOR ZONE INPUTS, ANTENNA, AND AC POWER
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AND ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS.

King-Fisher Company

2350 Foster Ave., Wheeling, IL. 60090-6574

Manual 75895 10/98

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail service@kfco.com Internet: www.kfco.com

INSTALLATION OF ENCLOSURE

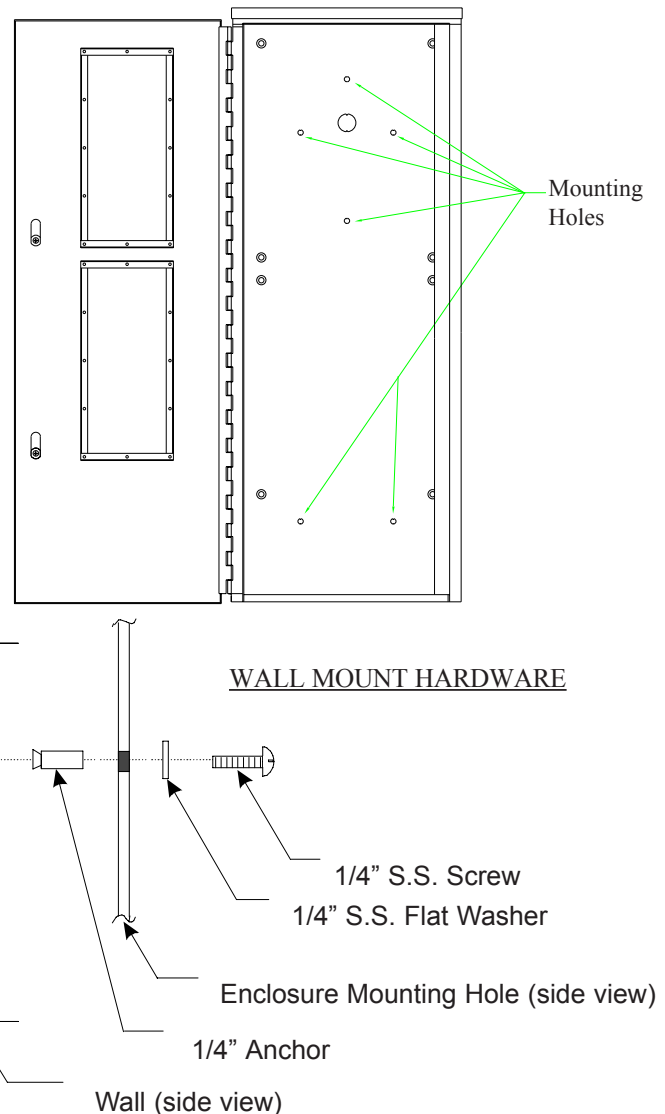
GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

- * Read all instructions first.
- * Do not connect batteries or apply power until wiring and installation is complete and checked.
- * King-Fisher Co. equipment must be installed in accordance with NFPA-72 / NFC codes, The National Electric Code, the Local Authority Having Jurisdiction and King-Fisher Co. manuals and drawings.
- * Locate a suitable position and structure for mounting the enclosure.

WALL MOUNTING

1. REMOVE the subplate assembly from the enclosure by removing the four nuts and washers located at each corner of the subplate. Place in a temporary protected location.
2. REMOVE the mounting hole knockouts located at the rear of the enclosure.
3. MOUNT the enclosure on a wall using appropriate hardware shown below. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.
4. RUN all conduit necessary to the enclosure. Conduit should not be attached to the top surface of the enclosure, as moisture from condensation or water may drip or leak on the internal electronic components. Knockouts are provided on the bottom of the enclosure. DO NOT remove knockouts with sub-plate installed. Attach conduit to enclosure using waterproof fittings with star locknuts. DO NOT use reducing washers. Separate conduit runs are required for:
 - AC Power
 - Antenna



PANEL WIRING

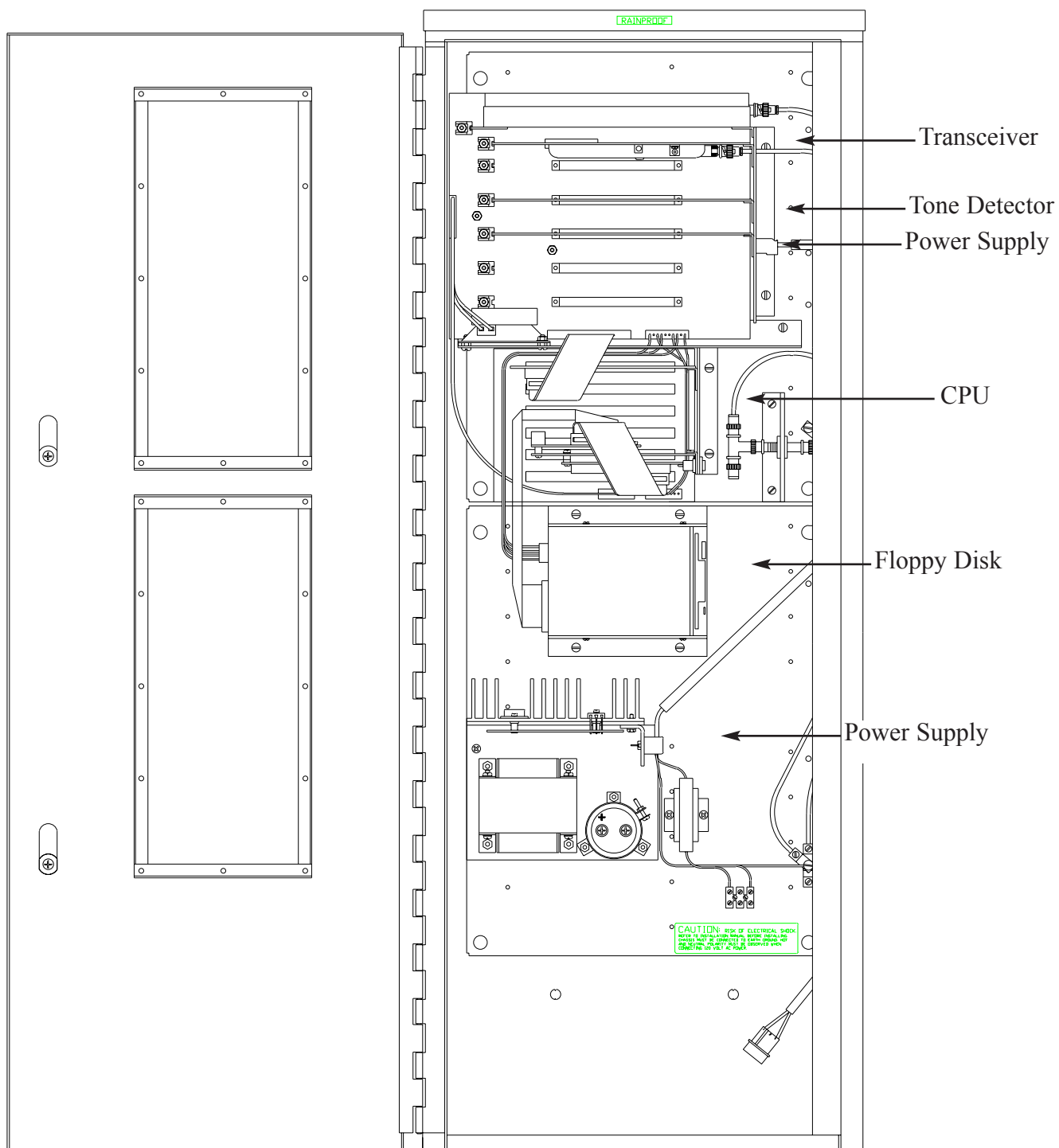
GENERAL

All wiring must be based on current NFPA (National Fire Protection Association) and NEC (National Electrical Code) standards. Due to varying local and/or other building, electric, and fire codes, it is highly recommended that the installer review all applicable codes in addition to NFC (National Fire Codes). Approval and final acceptance of system installation shall be subject to the authority having jurisdiction.

NOTE: *Dress field wiring around the perimeter of the enclosure. 120 VAC main power should be dressed to the lower right hand corner of the enclosure. Carefully re-install the subplate assembly in the enclosure using the four nuts.*

1. **AC wiring** - The Programmable Receiver/Transmitter panel operates on 120 VAC 50/60 Hz, single phase power. Connect Hot (H) and Neutral (N) as shown to the terminal block in the lower right hand corner of the subplate. This panel requires a 15 Amp/120 VAC circuit breaker or fused circuit to be installed external to the panel. Connect Earth Ground to the ground lug provided at the bottom of the subplate. The circuitry within the Programmable Receiver/Transmitter contains electronic filters and surge protectors to aid in suppressing spikes, noise and lightning strikes; and, requires ground connection to function.

<DO NOT APPLY POWER TO PANEL>



GENERAL

The Programmable Receiver/Transmitter panel is designed for monitoring and retransmission of virtually any type of remote alarm transmitter or device. At least one signal transmission must be recorded no less than every 60 minutes by NFPA 72. The **Programmable Receiver/Transmitter sends a daily test message once every 24 hours. This test message can be TEST 90 (normal) or TEST91(system is abnormal, and needs to be checked out).**

SPECIFICATIONS

- **ALARM FORMAT:** King-Fisher standard Tone format
- **ALARM SITES:** UP TO 999,999 Remote Alarm Sites with 9,999 Zones per Site.
- **ERROR CHECKING:** All received signals are checked for proper format, alarm site match and errors. Highly resistant to false alarm incidence due to noise, static or storm activity.
- **CONSTRUCTION:** All solid-state construction using modular plug-in cards designed for fast service and maintenance.
- **TEMPERATURE:** 0 to +49 deg. C. Operational. -20 to +50 deg. C. Storage.
- **DIMENSIONS:** Standard 16 inches x 42 inches x 6.125 inches inches. Other configurations are available. Weight 26 lbs.

ANTENNA SYSTEM

The antenna system should provide good reception from all remote sites (line-of-site wherever possible). The Programmable Receiver/Transmitter panel is designed for a 50 ohm antenna and 50 ohm coaxial cable.

The Programmable Receiver/Transmitter antenna, coax and must be checked for SWR prior to operation and periodically as part of a standard maintenance procedure.

RECEIVER CARD

The Programmable Receiver/Transmitter is a frequency-synthesized design which utilizes digital circuits to generate and control local oscillators for the received channel. The prime function of the transceiver is to convert RF signals on the channel into an audio signal which is further processed into alarm information. The incoming RF information is first amplified, then converted to a lower IF frequency where it is filtered to remove other frequencies which are not on the same channel. After additional amplification, it is sent to an AM detector or audio discriminator and converted to an audio signal.

NOTE: All active cards in th Programmable Receiver/Transmitter unit have been designed for extremely fast replacement or exchange. The best way to service the unit is to replace the defective assemblies with spare cards.

TONE FILTER/DETECTOR CARD

The Tone Filter/Detector gets the recovered audio from the receiver and sends it into a series of precision audio filters. The audio filters selectively amplify specific tones which comprise the alarm information. This allows the unit to reject noises and pulses which are not related to the system alarms. The filtered tones are then detected as digital signals and the information is sent to the CPU Card).

POWER SUPPLY CARD

The Power Supply Card is located in the center of the unit near the Tone Filter/Detector Card. It contains the main voltage supply regulators for +12 Volts, +5 Volts and -12 Volts. It has sophisticated battery charge circuits and power trouble detection circuits. It also has audible alarm circuits, audio monitor circuits and audio amplifier circuits.

CPU CARD

The CPU card contains a microprocessor, memory, serial ports, on-board batteries and a clock/calendar. It is specially designed for harsh industrial environments and demanding applications. Since it is an integral part of almost all functions, it would be difficult to list all problems which could be caused by a CPU malfunction. In real world testing, it has been proven to be extremely reliable and due to the self-testing nature of CPU subsystems, it is usually the last card to be changed in normal troubleshooting.

TRANSMITTER BOX NUMBERS / DESCRIPTION OF OPERATION

This manual provides a detailed explanation of how transmitter “box” numbers are stored in the receiver and how you can add or delete transmitters in your system.

The process of adding or deleting box numbers is accomplished through the floppy disk drive located on the front panel of the receiver (this is an optional module which can be field installed).

Every time the receiver is “powered-up” or “reset”, it checks to see if a floppy disk has been inserted into the drive. If the floppy disk is present, it checks for the file containing the list of box numbers. If the list is present, it loads the new numbers into the system (non-volatile) memory. If no list is present, it retains the previous set of numbers without any changes.

By simply loading the appropriate floppy disk into the drive and then “resetting” the repeater, an entirely different set of numbers can be quickly loaded in a matter of seconds. This is particularly convenient when a backup unit must be moved, changed or placed into service quickly. A pre-programmed disk is normally provided with the system.

Insert the floppy disk into the slot of the disk drive located in the middle of the repeater. Hold the disk with the metal side facing the drive and the top label facing you.

Press the eject button (on the drive) once to remove any floppies which might have been left inside. Gently slide the floppy disk into the drive (covered door) until the disk drops down and locks into position (disk clicks into place and the eject button pops out).

Power the repeater down (AC and battery), then power the unit back up. The LED should turn on for a few seconds while the disk drive spins the disk.

After a few more seconds, the repeater should resume normal operation including the new list of transmitter numbers.

Remove the floppy disk by pressing the eject button on the front of the disk drive.

Label and date the floppy disk, place in a plastic container and store in a dry steel file cabinet or steel box. Test the Programmable Receiver/Transmitter thoroughly to verify the added transmitter numbers are correct.

ADD - DELETE TRANSMITTER NUMBERS

REQUIREMENTS:

Adding or deleting transmitter numbers requires the use of a desktop or laptop computer running MS-DOS 5.0, 6.0 or 6.2 with a floppy disk drive capable of reading/writing 1.44 MB, 3.5 inch floppy disks.

COPY ORIGINAL BEFORE STARTING:

Before attempting to edit the list of transmitter numbers, a copy of the previous disk should be made. This can be done using the DISKCOPY command, your favorite utility program or copying everything to an empty directory on your hard disk. Before copying, it is always a good idea to flip the write protect switch on the floppy disk to the “open”, see-through position. This prevents damaging the original disk. Date and store the original in a safe location as previously described.

ADD-DELETE PROCEDURE:

Insert the new copy into the PC and change drives to the floppy drive as follows (example shown for A: floppy drive):

```
screen shows C:\> type A:      (Enter)
screen shows A:\> type DIR      (Enter)
```

Your screen display should now look similar to the example shown at the left (Directory Example).

Directory Example	
Directory of A:\	
EDIT.COM	69,886
KFRACNUM.DAT	12,535
TINDEXC.EXE	28,921
TINDEX.DAT	7,085
TDIGITS.DAT	6
ALM-CK.EXE	53,156
USRTYP.DAT	48
CHANGE.BAT	52

FILE DESCRIPTIONS:

TINDEX.DAT	Compiled Transmitter Numbers
CUSTNM.DAT	ASCII List of Customer Numbers (CUSTOM = Customer Name)
TINDEXC.EXE	Special Compiler Program

The list of transmitter numbers you will be required to edit is the file described as CUSTNM.DAT

The exact name will differ and will include an abbreviation of your location, city or government facility.

Example: NYCITY.DAT

1116A This is a standard "ASCII" file which contains a list of all transmitter numbers followed by a single character which describes each transmitter as a certain type (Street box, 4 Zone Master Box, 8 Zone Interior Box, 52 Zone Interior Box, etc.). Deleting a transmitter from the list consists of opening this file in an edit mode, deleting the entire line on which the transmitter number appears, reducing the quantity of transmitter entries and saving the file. Open the file as follows by carefully typing exactly as shown:

1153B

1154F *screen shows A:\>*
type **CHANGE** (Enter)

1155F

1156F The screen should fill with a list of transmitter numbers with a different number located on each line. See print-out at left. Your display should look similar to the one shown.

1157F

1158A NOTE:

1161C In the partial list at left, the transmitter numbers are 1149 and 1158.

1162C

1163B The 5th Character just to the right of the transmitter number is the transmitter type. In this case the following letters are used:

1164B

1215F C = a "KF1-3/KF3-3 Format" Master Box
with 4 Master Zones Available.

1223F

2127F A = an "8 zone Combo"

DELETE A TRANSMITTER:

To delete transmitter 1155, simply cursor down or up until the cursor is flashing on the line containing 1155. Now use the Del key to erase each character to the right of the cursor or use the Backspace to erase each character under or left of the cursor. When 1155 is completely gone, the next line should move up to take it's place.

SAVE THE FILE:

When you are though editing the list, you must SAVE the file by pressing Alt + F (file).

Then press the S (save) key. The screen should briefly indicate that the file was saved.

EXIT THE EDITOR:

Press Alt + F again. This time press the X key to exit the editor and the compiler runs automatically.

ADD TRANSMITTERS:

Adding transmitters is similar to the previous process of deleting transmitters except that the editor must be placed in the “Insert” mode (toggle the INSERT or INS key).

Keep the list of transmitters in numeric order so it is easy to edit. Cursor to the beginning of the line at the proper position for the new transmitter entry. The line above should be a lower transmitter number and the current line should be a larger transmitter number. Press the enter key once. If the insert mode is correct, a new blank line should be created with the larger transmitter number moving down. Carefully type the new transmitter number on this line, followed by the correct transmitter “type” designation. Review other similar transmitters on the list to ensure use of the correct type. When the list is correct and you are finished with the editing session, go back up to the top line and enter the new total of transmitters.

Save the file as previously described and exit the editor.

FLOPPY DISK:

Remove the floppy from the PC and follow the procedure for loading the floppy into the Repeater disk drive as previously described.

TROUBLESHOOTING

Antenna problems are usually the result of:

- * Defective connections.
- * Interfering objects, such as trees, gutters, etc.
- * Loose hardware.
- * Damage from wind, construction, or vandals.

TROUBLESHOOTING: If you notice a sudden shift in signal strength from all transmitters, the Receiver Card could be the reason.

There are no user-servicable adjustments or alignments on the Transceiver Card. If service is required, please return the card to the factory.

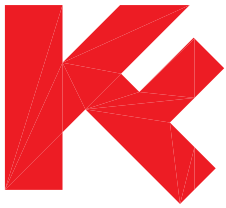
TROUBLESHOOTING: In order to simplify troubleshooting, the Tone Filter/Detector Card is equipped with “diagnostic LEDs” located along the entire top side of the card. As each tone in the transmission is detected, the appropriate LED will flash. For example: if the transmitter sends 1234, the LEDs will flash in sequence 1, 2, 3, and 4. Each of 11 LED and filter sections is labeled (0 to 9 inclusive plus X). If no LEDs flash, the problem could be the Receiver Card.

The easiest way to troubleshoot this card is to carefully view the LEDs and match the sequence with a known transmitter signal. A battery-powered call box is probably the best way to generate the transmitted signal. Send the same sequence over and over until you verify the proper sequence of LED flashes. Start with a simple sequence (2 or 3 digits) and continue changing the transmitter address code plugs until all tones have been checked and verified. Make certain only those LEDs which represent the tones transmitted illuminate.

TROUBLESHOOTING: Three LEDs are mounted on the CPU side of the chassis on the Aux. Mother Board located along the base of the chassis. Check these three red LEDs labelled +12, +5 and -12. If any LED is off, then the Power Supply Card may be defective.

TROUBLESHOOTING: The CPU Card should be checked/changed if any of the following symptoms are detected:

- * Unit dead, especially if Power Supply Card checks good.
- * All other boards seem to be working, but unit will not process any remote signal.
- * Can't load new transmitter numbers into memory.
- * Floppy Drive will not read.



TELEGRAPH RADIO LOOP DECODER



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100

f 847 • 255 • 1507

e-mail sales@kfco.com

Internet www.kfco.com

KF100 LOOP DECODER SPECIFICATIONS

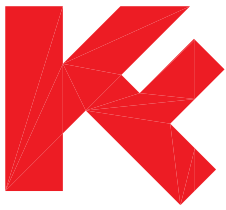
The KF100 Loop Decoder panel provides automatic decoding of wired master box alarms for computer-aided dispatch and Radio Fire and Security Alarm systems. Utilizing the latest hardware and software technology, the KF100 panel allows direct connection to the loop receiving console (or directly to the loop circuit). Once the KF100 panel decodes the alarm signal, the information is transmitted to the King-Fisher Radio Fire/Security Receiver where the code of the loop signal is verified. The KF100 utilizes the latest multi-tasking software techniques to monitor multiple 60 to 100 mA. loops, decode alarms, and control communication to the remote receiver. Daily test and trouble signals are included for constant supervision.

LAPTOP COMPUTER

CPU:	16 bit microprocessor
Speed:	4 MHz minimum
Software:	Basic & Assembly Language,
Storage:	Compiled, in hard drive
Power:	120 VAC Primary, 12 Volt DC Battery Secondary

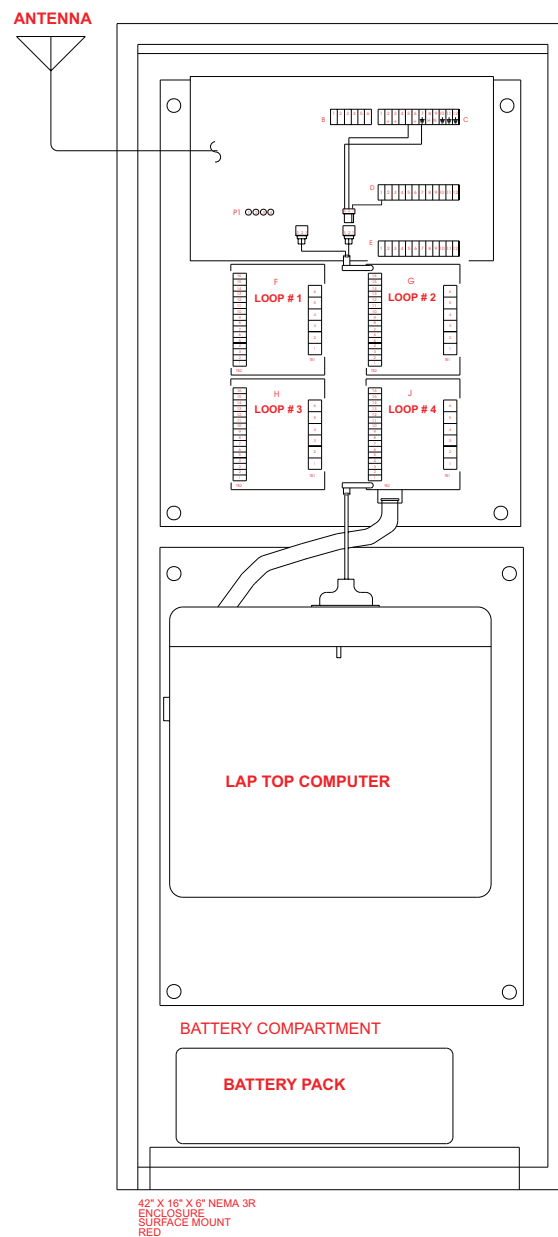
LOOP DECODER BOARD

Input Current:	60 to 100 mA nominal loop current direct loop circuit connection
Input Open:	18 mA or less for "loop open" pulse
Input V:	+16 to +28 VDC repeater bus connection for "loop open" pulse
Input Loss:	4.5 Volts DC or less in current mode
Overload:	1.0 Ampere maximum fault current with no permanent damage
Transients:	100 m.s. noise rejection filter
Breakdown:	1200 V. minimum dielectric isolation from loop circuits
Connections:	Standard screw barrier terminals: Wire size from 14 to 20 AWG.
Loop Speed:	0.25 to 5 second timing, auto-speed compensation software
Cabinet Size:	16" W X 6.2" D X 42" H, Nominal
Cabinet Rating:	NEMA 3R
Operating Temperature:	32 Deg. F. to 105 Deg. F.; 0 Deg. C. to +40 Deg. C.
Weight:	65 lbs.; 30 KG



TELEGRAPH RADIO LOOP DECODER

TECHNICAL MANUAL



KF-100

KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

PRECAUTIONS

The KF100 Loop Decoder Panel contains High Voltage: Observe safety precautions before attempting to service or work on panel.

Be familiar with MS-DOS and have an MS-DOS Manual available before moving or copying files.

When operating the computer, lift the computer shelf up and attach the shelf in the horizontal position by hooking the chain hook onto the upper left bracket support. The computer should be in a flat (horizontal) position when the chain is adjusted properly.

Secure the computer in the down position and lock enclosure for normal operation. Watchdog and Auto-boot will not work in up position. Normal service or maintenance should not be required. Refer all service to an authorized King-Fisher Service Agent or call the Factory.

Read this manual thoroughly before starting to test or service the unit.

This manual is subject to change without notice. Consult the Factory to determine if there has been a revision.

KF100 LOOP DECODER SPECIFICATIONS

The KF100 Loop Decoder panel provides automatic decoding of wired master box alarms for computer-aided dispatch and Radio Fire and Security Alarm systems. Utilizing the latest hardware and software technology, the KF100 panel allows direct connection to the loop receiving console (or directly to the loop circuit). Once the KF100 panel decodes the alarm signal, the information is transmitted to the King-Fisher Radio Fire/Security Receiver where the code of the loop signal is verified. The KF100 utilizes the latest multi-tasking software techniques to monitor multiple 60 to 100 mA. loops, decode alarms, and control communication to the remote receiver. Daily test and trouble signals are included for constant supervision.

LAPTOP COMPUTER

CPU:	16 bit microprocessor
Speed:	4 MHz minimum
Software:	Basic & Assembly Language,
Storage:	Compiled, in hard drive
Power:	120 VAC Primary, 12 Volt DC Battery Secondary

LOOP DECODER BOARD

Input Current:	60 to 100 mA nominal loop current direct loop circuit connection
Input Open:	18 mA or less for "loop open" pulse
Input V:	+16 to +28 VDC repeater bus connection for "loop open" pulse
Input Loss:	4.5 Volts DC or less in current mode
Overload:	1.0 Ampere maximum fault current with no permanent damage
Transients:	100 m.s. noise rejection filter
Breakdown:	1200 V. minimum dielectric isolation from loop circuits
Connections:	Standard screw barrier terminals: Wire size from 14 to 20 AWG.
Loop Speed:	0.25 to 5 second timing, auto-speed compensation software
Cabinet Size:	16" W X 6.2" D X 42" H, Nominal
Cabinet Rating:	NEMA 3R
Operating Temperature:	32 Deg. F. to 105 Deg. F.; 0 Deg. C. to +40 Deg. C.
Weight:	65 lbs.; 30 KG

INSTALLATION OF ENCLOSURE

GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

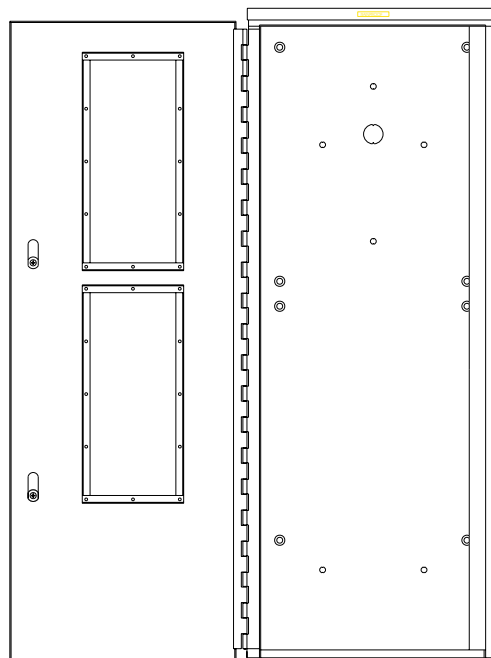
Read all instructions first.

Do not connect batteries or apply power until wiring and installation is complete and checked.

King-Fisher Co. equipment must be installed in accordance with NFPA-70, 72, 1221 and applicable NFPA codes, the Local Authority Having Jurisdiction, King-Fisher Co. manuals and drawings.

Locate a suitable position and structure for mounting the enclosure.

1. UNPLUG the flat cable from the loop board and the cable connected to the computer.
2. REMOVE the top subplate assembly from the enclosure by removing the four(4) nuts and washers located at each corner. Remove the four (4) bolts from the bottom subplate corners and remove the subplate and computer.
3. REMOVE the mounting hole knockouts located at the rear of the enclosure.
4. MOUNT the enclosure on a wall using stainless steel hardware (six (6) screws and washers) or appropriate hardware for the type of construction existing.
5. RUN all conduit necessary to the enclosure. To retain the Nema 3R rating, conduit must NOT enter through the top of the enclosure. Knockouts are provided on the bottom of the enclosure. DO NOT remove knockouts with sub-plates installed. Attach conduit to enclosure using waterproof fittings with star locknuts. DO NOT use reducing washers.



Separate conduit runs for the following are required for:

- AC Power
- Loop Inputs (1 - 4)
- Antenna

6. PULL loop wiring, 120 volt AC and antenna cable into the cabinet and connect as shown on

7. REINSTALL the top subplate and secure with the four (4) nuts and washers that were removed earlier. When installing the lower subplate push up when tightening to allow for battery clearance and use the four (4) bolts and washers that were removed.
8. CONNECT HOT and NEUTRAL as shown on DWG.KF100-1. This panel requires a dedicated fused disconnect panel with a 15 Amp circuit breaker or fused circuit to be installed external to the panel. Connect Earth ground to the ground lug(s) provided.
9. SEE specific wiring instructions and drawing (DWG.KF100-1).

INSPECTION NOTES

The tests should be performed by persons who are familiar with King-Fisher radio systems.

VISUALLY INSPECT

CHECK CABINET MOUNTING: The cabinet should be mounted to a wall using 6 screws. The door should open fully for easy access to all circuit boards, control switches.

CHECK TERMINAL CONNECTIONS: All wiring should be terminated at the terminal block. Tug on the wires to be sure they are secure and look for exposed metal wires sticking out of a terminal which might cause a short or later corrode.

CHECK BNC CONNECTION: Gently twist connector while holding cable secure. Connector should not rotate or come loose. The center tip should be flush with the outer sheath for good contact with the transmitter connector. Look for shorts between the ground sheath and the center conductor. Use an Ohm Meter to check the connector for shorts (Disconnect the coax from the antenna). Look for strayed ground wires sticking out of the connector connected to transmitter.

CHECK ALL PLUG-IN PC BOARDS: Make sure all three PC boards are fully inserted and seated properly (Power Supply, Transmitter and DC to DC Converter).

AC POWER FUSE: Check for voltage on power connector. RED to BLACK wires should be about 19.5 volts and 5 volts between the BLACK wire on the power connector and the ORANGE wire on the Transmitter connector. Remove the F2 fuse and connect the power connector to the matching jack, connect the ribbon cable from the computer to the connector on the Watchdog Board (decoder board), connect the DB 25 connector to the computer output port and then connect the Transmitter connector. Re-insert the F2 fuse. Observe the GREEN transmit light comes on.

BATTERY FUSE: The battery connectors are polarized, so do not try to force them together. Connect the battery and insert the F1 fuse.

TURN ON THE COMPUTER: With the computer in the down position it will start up by itself in about 2½ minutes and begin sending the TEST message. Go to the Receiving Console and ensure the mes-

sage was received. Additional TEST rounds can be sent by opening the Display on the Computer and pressing the "T" key. Three (3) rounds will be sent for each press of the key.

ENVIRONMENT

All software comes pre-installed in the Computer from the Factory.

The software is designed to run on any MS-DOS system from 2.1 and above. No special drivers or config.sys devices are required. In some cases, some of these device drivers may interfere with proper system operation. One way to detect this problem is to boot from a clean floppy disk which has no config.sys file or autoexec.bat file.

The computer should have at least 128k of RAM, and enough disk space to hold the files as shown below. The computer should be configured to boot off the C: drive. An Autoexec.bat file is used to start the loop system software upon each boot. A hardware "watchdog" circuit has been included to ensure that if the software fails for any reason (transient or static discharge), the computer will go into an automatic boot sequence until the software is running properly. The watchdog circuit is only activated when the computer is in the down position. If the computer needs service, make sure the computer

C:\LOOP>DIR

Volume in drive C has no label
Volume Serial Number is
Directory of C:\LOOP

.	<DIR>	01-13-94	10:22a	
..	<DIR>	01-13-94	10:22a	
KF100	EXE	15,853	01-15-94	12:07p
KF100	DAT	38	01-13-94	10:52a
4 file(s)		31,744 bytes		
		70,144 bytes free		

technician is fully aware of these special features. The following files should be included in your system:

MANUAL INSTALLATION OF SYSTEM FILES

*If for one reason or another the system files need to be manually installed, follow this procedure.

1. Make sure that DOS 2.1 or above is loaded on the harddrive and that the laptop boots to C drive.
2. Insert the disk that came with the KF100 Loop Decoder into the a: floppy drive.
3. Go to the A drive prompt A:\>

Type: A: [ENTER]

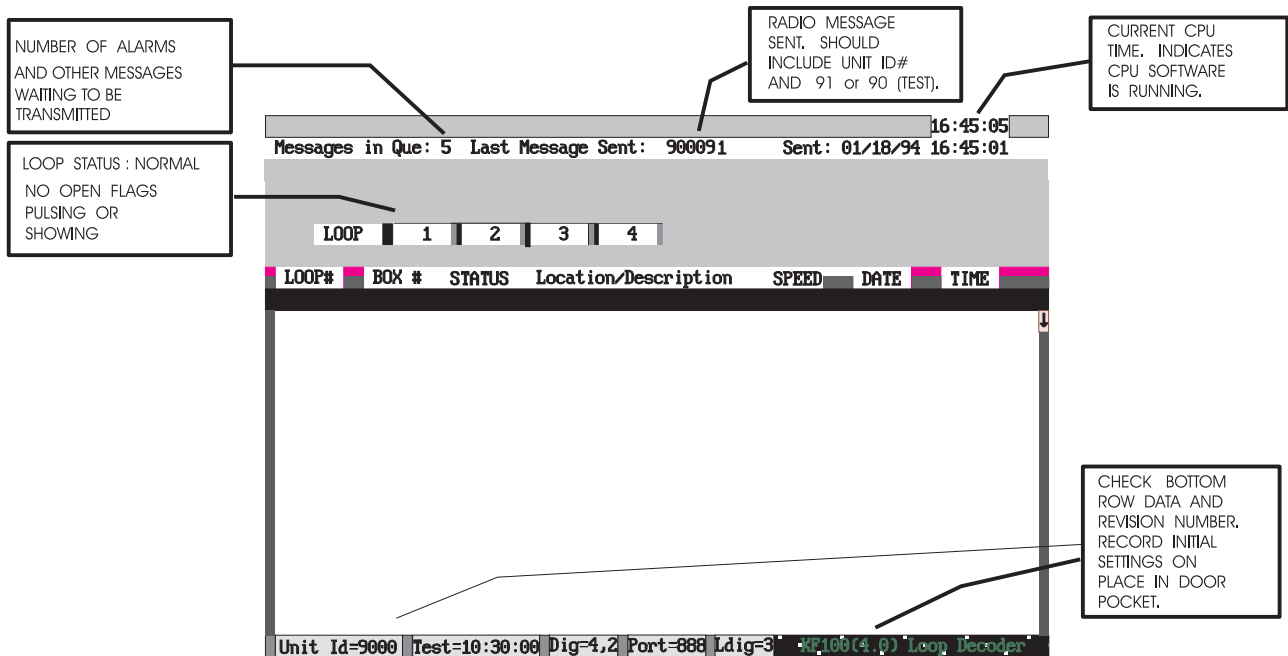
4. Type <install> [ENTER]
5. The KF100 Loop Decoder software will be installed on the C drive in a directory called C:\LOOP
6. When the install process is finished the loop decoder program will automatically start running.
7. Remove the floppy disk from the A drive and store in a safe place.

STARTING OR RE-BOOTING THE COMPUTER (SOFT BOOT)

Once all files have been installed, the system should be tried as follows:

1. Press {Alt} plus {Ctrl} plus {Del}, all three keys at the same time.
2. This should cause the computer screen to blank momentarily with a small - sign in the upper left corner.

- After a short delay, 15 to 25 seconds, the computer should begin to fill the screen with a few characters and the KF100 Loop Decoder Program should be running.



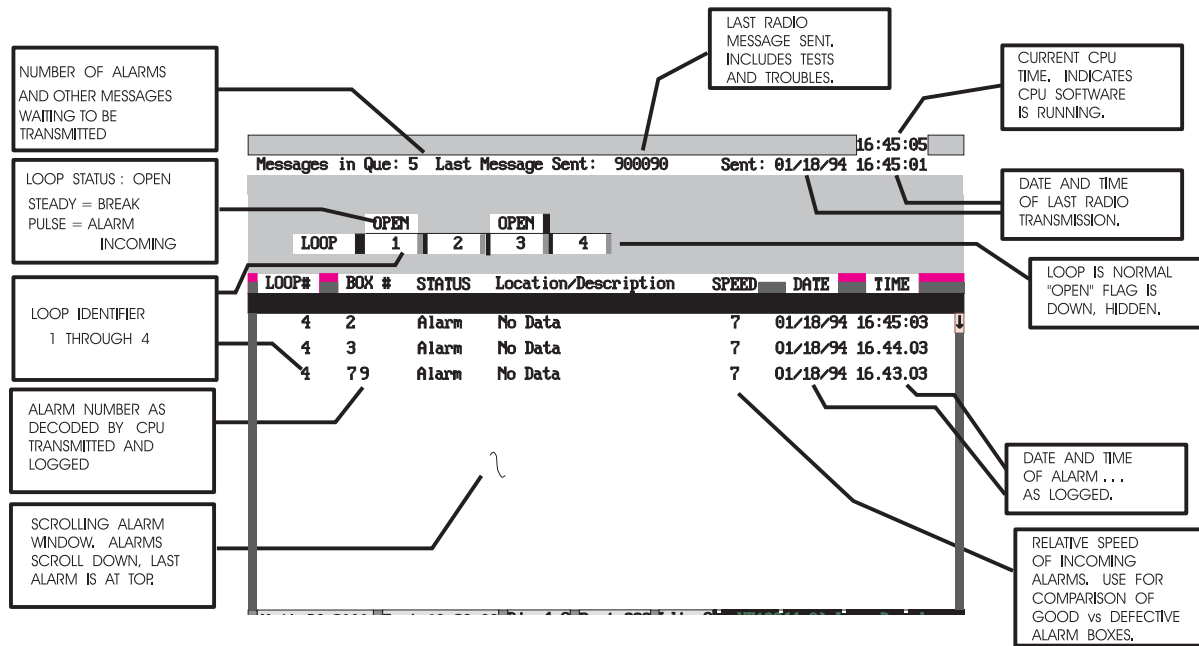
NORMAL OPERATION

Once the system boots and the King-Fisher Software is running, the following screen appears. Compare the following picture to the one running on your screen.

If this is the initial installation, please note the data parameters located on the bottom lines of the display. Please write these down and keep a copy in the door pocket of the unit. This information will be helpful for future service and maintenance requirements.

ALARM OPERATION

When any alarm begins to process on any loop, a “pop-up” flag should appear in the display above each loop status button. This flag is labeled “OPEN” and indicates whenever the loop is detected in the open circuit condition. This occurs as each alarm transmitter sends its coded signal. The alarm box places the loop in the open state to indicate the start of a coded digit. Watch the flag as an alarm is

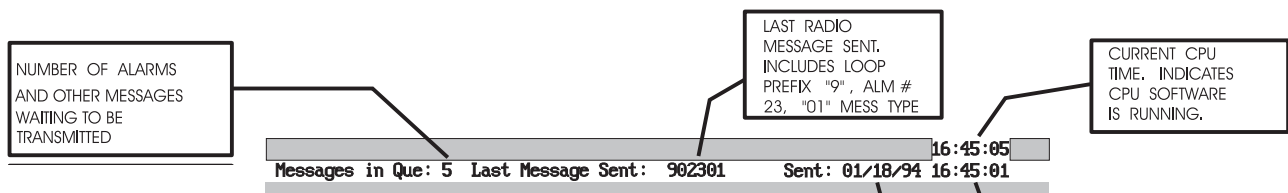


received and make sure that the flag pops up and down in cadence with the coded signals. This feature is provided to ensure that the loop interface wiring is correct and information is being transferred to the computer. When the alarm condition returns to normal, all “OPEN” flags must be in the down, hidden position, if the loop interface connections and setup are correct.

Once the alarm has finished processing, note how it appears in the scroll window section located on the

lower half of the display. The loop number, box number, status, location/description, speed, date and time of the alarm are recorded on the screen. As the next alarm is processed, the previous alarm moves down one line and the most current one appears at the top of the window. Check the recorded time on the right.

Check the top of the screen to see how the loop alarm has been decoded and converted to a radio alarm signal. The last radio message sent appears in the center of the top line of information. In this case, radio message 902301 appears. This indicates that loop box number 23 was decoded and was converted into a radio alarm with identification #9023. When this loop box is later upgraded to a full radio alarm transmitter, it will become #0023 in the radio system (without the leading "9"). In this manner, loop alarms and radio alarms can be mixed or converted with almost no change in dispatch routines. The top lines of the display also shows the total number of radio messages which are stacked in "QUE" and are waiting to be transmitted. The fully multi-tasking software continuously monitors all loop circuits, checks internal diagnostics, manages and formats each message, and controls each radio transmission all at the same time. If there are messages waiting in the "QUE", the software will hold off until a randomly calculated time has elapsed before sending the next message. This allows other



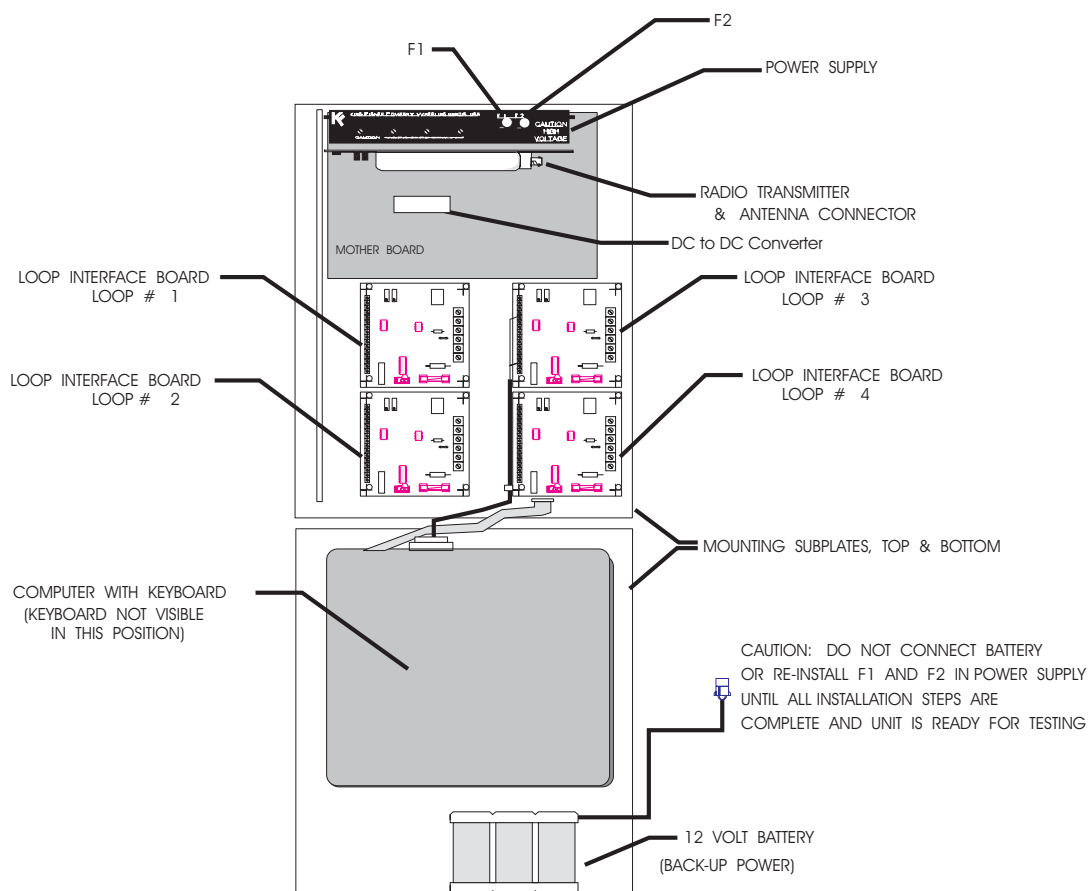
remote radio transmitters to report alarm, trouble or test messages. The right side of this display also shows the date and time of the last radio transmission. This is very helpful for diagnosing system problems.

TESTING OPERATIONS

Certain tests may be conducted locally at the KF100 unit:

1. Lift the computer shelf up and attach the shelf in the horizontal position by hooking the chain hook onto the upper left bracket support.
2. Open the computer lid (slide or press the lid lock releases).
3. The display light will be off, press the spacebar to turn it on, then adjust the display slide control for best clarity on the display.
4. If no alarms are being processed, press the "T" key on the keyboard. Messages should immediately appear on the top status line including a number in the "QUE" (type. 2) as well as the unit ID# followed by 90 in the Last Message Sent Field. This indicates that a test message has just been sent. Check with dispatch to see if a test transmission was received. Also have the dispatcher check the signal strength reading of the front of the Radio Alarm Receiver. A reading of 2 to 6 indicates that excellent signal strength is being produced by the KF100.

5. Temporarily loosen (turn counter-clockwise) fuse, F1 on the power supply unit. Wait at least two minutes. The KF100 should send 3 rounds of Unit ID# followed by 71. Check with dispatch and see if “Supervisory” signals were processed.
6. Restore F1 and repeat the test with F2. Check with dispatch as in 5.
7. Restore both fuses F1 and F2.
8. Check the computer display to make sure no messages are left in the “QUE” and make sure the clock has the correct time in the upper right hand corner. If the time appears to stop, the computer should be re-booted.
9. Check the loop status display to ensure that all loops are normal and none are frozen in the “OPEN” condition. If this occurs, the KF100 will send a trouble 72 (Supervisory 2).
10. If everything appears normal, carefully close the computer display until the lid locks, remove the chain hook on the left-hand edge and slowly lower the computer to the normal position.
11. Secure the computer shelf with the thumb screw and check all cables so none are pinched or wedged under the shelf.
12. Close the main front door and secure with the key and locks provided.
13. Check the Radio Receiver every day at the same time. The KF100 should send its daily test at the



KF100 LOOP DECODER SOFTWARE CHANGES FOR THE FIELD

If changes are required to any of the following parameters:

Line

- 1.) Loop transmitter number.
- 2.) 24 hour self-test time.
- 3.) Number of address digits.
- 5.) Do not change from 888 (Not used)
- 6.) Prefix added to the loop box number.
- 7.) Number of digits from the loop boxes.

Press CTRL + C to break out of the loop program.

Type: EDIT KF100.DAT then press ENTER.

To change the floppy disk Type: EDIT A:\KF100.DAT then press enter.

You will then see the following screen:

File	Edit	Search Options	Help
-KF100.DAT-			
1.)	9000		
2.)	10:30:00		
3.)	4		
4.)	2		
5.)	888		
6.)	9	'precedes incoming box number	
7.)	3		
8.)	0		

MS-DOS Editor <F1=Help> Press ALT to activate menus

CN 00001:001

Make the changes to the list then press ALT then "F" then "S" in sequence to save the changes. If all the changes are final REMEMBER to change the file on the backup disk in the pouch on the door through drive A as well. To restart the program type: KF100 then press Enter.

specified time and should not be recorded as a missing box (MB) on the Receiver.

14. If the KF100 sends a “Supervisory” or “Trouble” signal, the unit needs immediate service or a power/battery repair. Please respond immediately.

SPARE PARTS

Part No.	Description
66001	100mA. loop decoder board (additional circuits)
66096	100mA. loop decoder board (single circuit) with Timer
66118	Power Supply assembly board
66097	DC to DC Converter
74046	Enclosure
69210	Subplate assembly (with mother board)
40523-2	Bottom Window
40157	Black-out shield
66220	Transmitter (low band or high band; please specify)
97380	Computer, computer brackets and program modification
30004	4 Amp Fuse, 250V, 3AG
30013	3 Amp Fuse, 250V, 3AG, Slow Blow
30001	1/4 Amp Fuse, 250V, 3AG

KF-100 LOOP DECODER START-UP SUMMARY

Check each of the connectors for proper fit and location.

- 1) Connect the antenna to the transmitter card using the BNC connector supplied on the card.
- 2) Plug in the cable connectors into their color coded mates on the main mother board. The jack with the BLU, GRY, ORG wires goes to the plug with the BLU, WHT, ORG wires. The jack with the RED, BRN, BLK wires goes to the plug with the RED, BRN, BLK wires.
- 3) Connect the ribbon cable coming from the computer to the watchdog board located on the lower lefthand side of the highest numbered loop decoder board. Make sure the connector is completely inserted.
- 4) Connect the DB-25 connector into the computer printer port on the top of the computer. Tighten the hold-down screws.
- 5) Remove the fuses in the power supply.
- 6) Apply the AC power and plug in the battery.
- 7) Insert the AC fuse and observe the transmitter light comes on and stays on for about 2.5 minutes until the automatic initialization circuit starts the computer. The transmitter will be on the air for only ten seconds during this time.
- 8) Insert the battery fuse any time while waiting for start-up.
- 9) Once the computer starts to run it will transmitt a series of TEST signals. Go to the receiving station and check for signal reception. Test the decoders for proper signalling.

FILES CREATED ON DRIVE C: BY THE INSTALL PROGRAM

C:\

AUTOEXEC.BAT	72	12/08/98	3:24pm
COMMAND.COM	54,645	05/31/94	6:22am
CONFIG.SYS	49	01/30/98	4:13pm
DRVSPACE.BIN	66,294	05/31/94	6:22am
IO.SYS	40,774	05/31/94	6:22am
MSDOS.SYS	38,138	05/31/94	6:22am
read.me	411	12/08/98	3:44pm

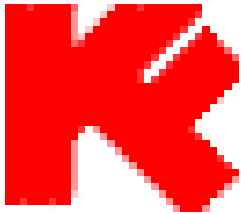
C:\LOOP

KF100.DAT	70	12/08/98	4:14pm
KF100.EXE	15,853	01/15/94	12:07pm

C:\DOS\T4400

CONFIG.DAT	93	02/11/90	2:00pm
FDCLN.COM	731	03/27/89	1:17pm
FDCPY.COM	2,320	07/14/90	12:20pm
FDDMP.COM	2,001	07/11/89	11:15am
FDFMT.COM	1,793	03/27/89	1:16pm
HDFAT.COM	5,833	06/03/91	1:34pm
HDFAT2.COM	5,457	12/04/90	9:01am
HDFXT.COM	2,733	03/27/89	1:15pm
TESTCE44.EXE	65,618	01/24/92	2:22pm

C:\DOS



RECHARGEABLE BATTERY PACKS



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

☎ 847 • 398 • 7100

☎ 847 • 255 • 1507

✉ sales@kfco.com

Internet www.kfco.com

CAUTION

Do not short battery leads. King-Fisher batteries are capable of extremely high short circuit currents, even when partially discharged. This high current can cause internal heating of the battery and permanent damage. A shorted battery can also be a fire and/or explosion hazard. Be sure to always use the polarized connectors supplied on batteries. Never remove wires from connector.

GENERAL DESCRIPTION

The construction of the King-Fisher Battery Pack is pressure sealed, allowing it to be charged and discharged in any position. Cylindrical spiral-wound plate design results in low internal impedance and the highest energy and power density of any lead-acid battery.

The sealed lead-acid cell offers superior performance with up to ten year life expectancy and true maintenance free characteristics. The King-Fisher Battery Pack permits faster charge and discharge rates and greater shelf life as compared to other types of batteries. In standby situations, King-Fisher Battery Packs exhibit low self-discharge rates, approximately 4 times less than sealed ni-cads, which render them ideal for long periods of standby usage.

Other features of the King-Fisher Battery Packs are:

Stable voltage over a wide temperature range.

Long life in float/constant current charge applications because of high purity grids

No “memory effect” so important for long standby application.

Every King-Fisher Battery Pack is thoroughly tested to guarantee its full potential for maximum service. Each Battery Pack is then given a simulated load of approximately ten times the expected field condition. In addition, all King-Fisher Battery Packs are charged to full capacity prior to shipping.

BATTERY RECHARGING

For proper battery recharging it is recommended that the King-Fisher 10-circuit battery charger Model KFCB-10M be used. The King-Fisher battery charger is specifically designed for recharging the KF17007 battery pack. These battery packs may be left on the King-Fisher 10-circuit battery charger indefinitely. The KFCB-10M can be factory modified to charge any of the King-Fisher Battery Packs.

King-Fisher Battery Packs in the maintenance mode will be kept at 100% state of charge as long as the battery is kept on the charger. Totally discharged batteries will normally be recharged to 100% state of charge within 48 hours.



King-Fisher Company

2350 Foster Ave., Wheeling, IL. 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail service@kfco.com Internet: www.kfco.com

Sales

Page 1

PERFORMANCE SPECIFICATIONS

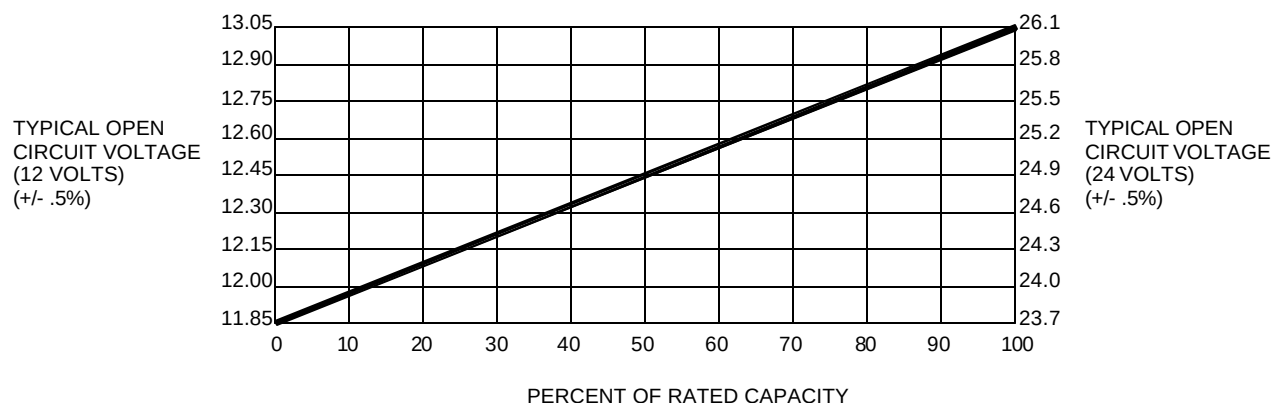
King-Fisher batteries are available in EIGHT basic sizes and may be combined to form batteries of varying sizes and capabilities. Each cell is encased in a metal can, electrically isolated to prevent accidental shorting, and incorporates a self-resealing safety valve which will vent under abusive overcharge conditions. Gold plated corrosion resistant connectors are shipped with each King-Fisher battery.

Product Number	17007	17014	17033	17012	17015	17122	17121	17123
Capacity Rating (10 hour rate)	2.5Ahr.	5.0Ahr.	8.0Ahr.	12.5Ahr.	25.0Ahr.	26.0Ahr.	42.0Ahr.	75.0Ahr.
Nominal Battery Voltage	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V	12.0V
Battery Charging								
Constant Voltage		14.3V	14.3V	14.3V	14.3V	14.3V	14.3V	14.3V
Constant Current		OR	OR					
- High Rate	.125A	.250A	.250A	.250A	.250A	.250A	.250A	.250A
- Low Rate	.005A	.010A	.010A	.010A	.010A	.010A	.010A	.010A
Life Expectancy*	4-8 Yrs.	4-8 Yrs.	4-8 Yrs.	6-10 Yrs.	8-12 Yrs.			
Dimensions (L x H x D)	8.2x2.8x1.6	10.6x3.1x1.9	10.5x4.25x2	6.2x5.7x4.2	8.0x7.2x5.5	6.5x5x7	7.75x7x6.5	10.25x9x6.75
Storage Temperature Range (90% State of Charge at Start)	-40deg. C > 5Yrs.: 20deg. C approx. 2Yrs.: 60deg. C approx. 1 Mo.							

* Battery Life is variable depending on physical abuse, number of discharge cycles, depth & duration of discharge, operating temperature, etc.

STATE OF CHARGE:

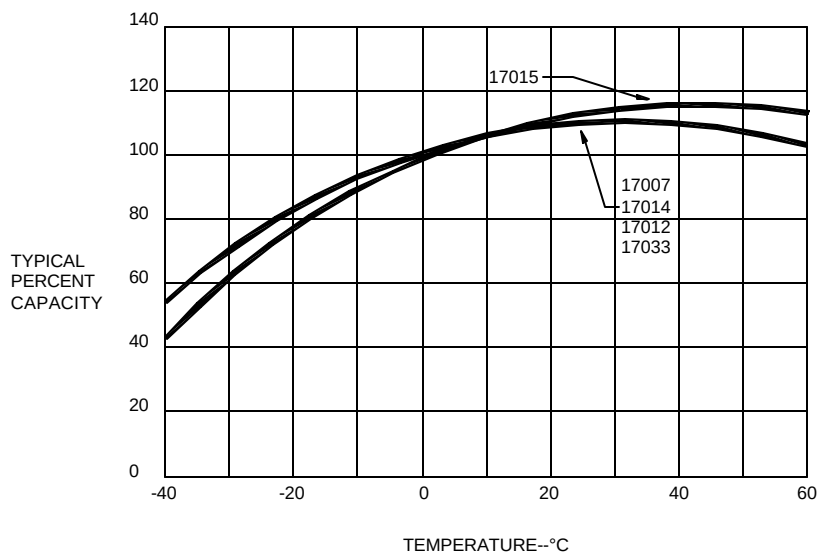
This curve of open voltage vs. state of charge, is accurate within 20% of the rated capacity of the battery being measured if it has not been charged or discharged within the past 24 hours. The accuracy increases to 5% if the cell has not been charged or discharged within the past 5 days.



TEMPERATURE CHARACTERISTICS:

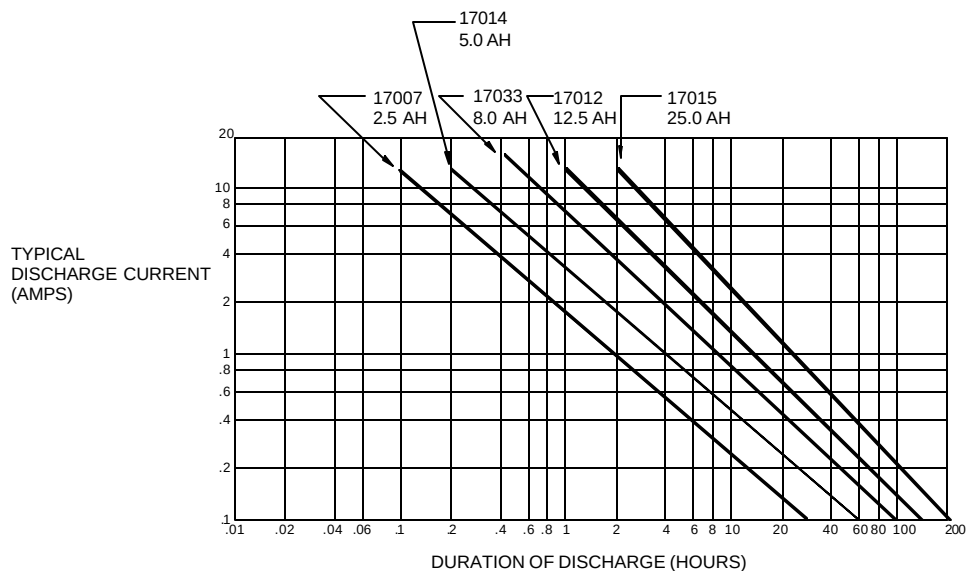
This graph illustrates the capacity available in a battery as a function of temperature.

(Discharge @ C/20 rate)



DISCHARGE CHARACTERISTICS:

New cells must be cycled appropriately before full rated capacity, as shown on this curve, is reached.



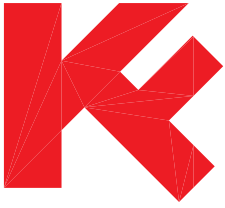
King-Fisher Battery Packs

Shipping Information

MODEL NUMBER	DESCRIPTION	Weight		CUBE	
		Lbs.	Kg.	Ft. ³	m ³
17007	BATTERY PACK, 12V/2.5 AH rechargeable, sealed lead acid, for use with Transmitter Boxes, Interface Units, and Combination units.	3	1.4	.02	.0006
17014	BATTERY PACK, 12V/5 AH rechargeable, sealed lead acid, for use with KFRTI-20/52, KFUCP, and Control Panels. See note 3.	5	2.3	.04	.001
17033	BATTERY PACK, 12V/8 AH rechargeable, sealed lead acid, for use with KFRTI-20/52 control panel/transmitter. See note 3.	7	3.2	.04	.001
17012	BATTERY PACK, 12V/12.5 AH rechargeable, sealed lead acid, for use with KFRTI-20/52 control panel/transmitter. See note 3.	11	5	.08	.002
17015	BATTERY PACK, 12V/25 AH rechargeable, sealed lead acid, for use with base station receiving equipment. Provides 24 hours for single console.	22	10	.18	.005
17122	BATTERY PACK, 12V/26 AH rechargeable, sealed lead acid, for use with Loop Decoder, and base station receiving equipment. Provides 24 hours for single console.	23	10.5	.13	.004
17121	BATTERY PACK, 12V/42 AH rechargeable, sealed lead acid, for use with Base Station Receiver, provides 36 hours for Single Console.	33	15	.2	.006

NOTES

1. For ordering information on open cell batteries, battery racks, fuse-terminal cabinets, or base station power supplies (chargers and recti-chargers), consult with the factory.
2. Before attempting to charge any King-Fisher battery with a battery charger other than Model KFCB-10M or other King-Fisher supplied charging equipment, consult with the factory for important additional information.
3. Use (2) batteries in series for 24 volt applications.



MODEL KFCB-10M



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com



FEATURES OF MODEL KFCB-10M BATTERY CHARGER

- * Charges TEN (10) batteries concurrently
- * Solid State circuitry
- * Convenient battery charging rack
- * Recharges “deeply” discharged sealed lead acid batteries to their normal peak
- * Continuous voltage and ampere monitoring
- * Compact - light weight

GENERAL DESCRIPTION

The King-Fisher 10-circuit battery charger **Model KFCB-10M** is specifically designed for recharging King-Fisher rechargeable 12 volt lead acid batteries with polarized connectors.

The Battery Charger operates on 115V AC source, has solid state circuitry construction, slow-fast rate charging, and a top loading battery charging rack.

The Battery Charger charges and monitors up to **TEN** battery packs simultaneously. It has a built-in meter for instant readings of the amperes and voltage of each battery on charge. In addition, each charging circuit has a built-in charge mode indicator. The Battery Charger recharges discharged sealed lead acid batteries to their “equalized” 100% state of charge condition.

The Battery Charger is equipped with a standard grounded line cord. This cord is covered with heavy duty material providing many years of service without any special attention. While the charger has been carefully designed to prevent any danger from electrical shock, it is proper (or recommended) safety procedure to use a properly grounded outlet for supply power.

There are two (2) versions of the **KFCB-10M** battery charger. Both versions are a two-level constant current charger. **Version 99024-0** provides 125 mA. of charge current in the high rate mode and 5 mA. in low rate mode. **Version 99026-0** provides 250 mA. in high rate mode and 10 mA. in low rate mode.

Version 99024-0 is used to re-charge 2.5 Ahr. batteries (P/N 17007) and **Version 99026-0** is used to re-charge 5Ahr. batteries ((P/N 17014). They will recharge a discharged battery in **48 hours** or less. Higher amp-hour batteries can also be recharged but the re-charge time will increase based on the amp-hour rating and the state of discharge.

When charging TEN batteries at a high rate, the charger draws less than 2 amps from a standard 117 volt circuit, so a special circuit is rarely needed.

CHARGING THE KING-FISHER BATTERY PACK

Batteries may be left on this battery charger indefinitely. A battery in the maintenance mode (see general operation instructions) will keep 100% state of charge as long as the battery is kept on the charger.

Fully charged batteries are indicated by the high rate indicator lamp remaining OFF for 30 minutes or more depending on ambient temperature. Each of the 10 charger circuits is totally independent and is equipped with its own rate indicator. This allows batteries of different states-of-charge to be charged side-by-side.

A battery to be charged, is placed in the battery rack located on the top of the charger unit and plugged into any of the ten charger outlets. Both the outlets and the King-Fisher battery connectors are polarized, so that they can be plugged together only in the correct position.

When the battery is initially charged, the high rate indicator light associated with that charger circuit will light for up to 12 hours. As the battery is left on the charger for several hours, the high rate indicator will continue to turn off and on. (However, it will be noted that the amount of time the light is on each time should slowly be getting shorter and the amount of time the light is off should be getting longer.)

When the high rate indicator stays off for more than 30 minutes, this is an indication that the battery is almost fully charged and is ready for service. If the battery is left on the battery charger for a sufficient period of time (a week or more), the indicator light will stay off. This indicates the charger is in its maintenance mode and that the battery is completely charged. It is recommended that the battery be left on the charger in its maintenance mode until it is needed.

The King-Fisher sealed lead-acid battery loses approximately 15% (at normal room temperature) of its capacity per month when stored on a shelf without maintenance charging. A battery stored for 3 months has already lost almost half of its charge. At 105 deg. F. it would have lost 80% of its charge. Batteries left on the charger in maintenance mode will always be kept at 100% state of charge. IF SPARE BATTERIES CANNOT BE LEFT ON THE CHARGER, THEN THEY SHOULD BE FULLY CHARGED AND STORED IN A REFRIGERATOR OR FREEZER AND THEN RECHARGED AT LEAST ONCE A YEAR.

BATTERY MONITORING CAPABILITIES

The **Model KFCB-10M** battery charger provides facilities for monitoring any of the batteries on charge. Both the voltage (under charge) and the charge current can be monitored.

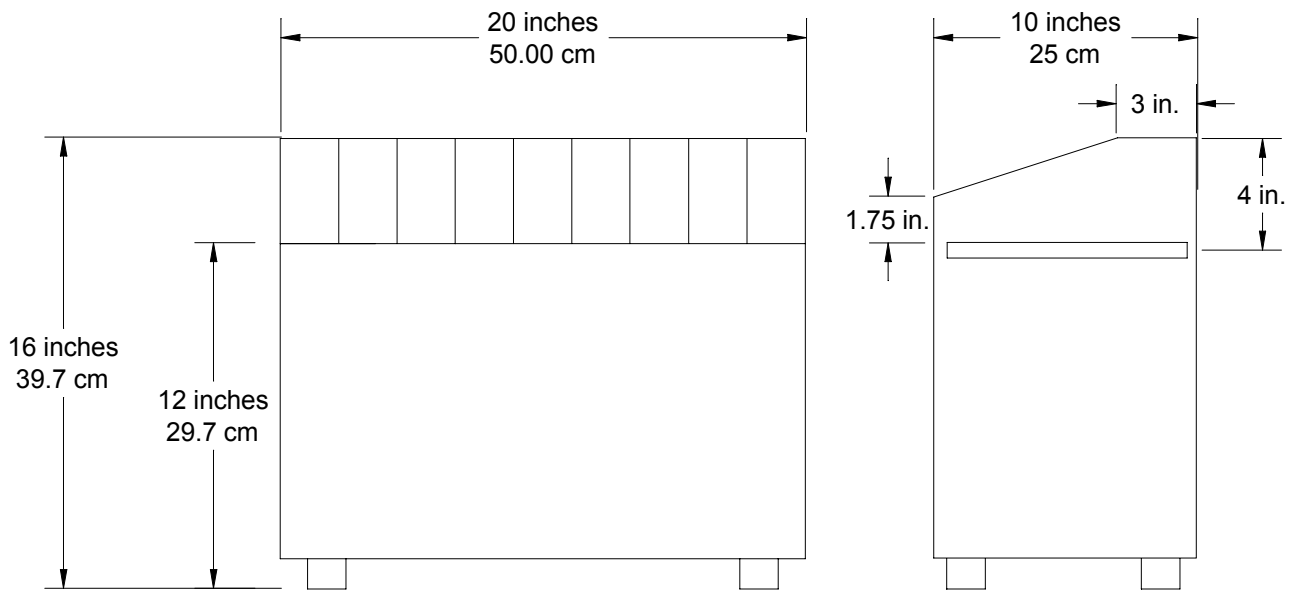
The charger is designed to provide approximately 125 mA. or 250 mA. of charge current with a charge voltage of up to 14.7 volts. When the voltage exceeds 14.7 volts, the charge current drops to approximately 5 mA. or 10 mA. This charge current of 5 mA. or 10 mA. is maintained until the battery voltage drops below 13.7 volts. The charger then automatically switches to the 125 mA. or 250 mA. charge rate.

A battery not accepting a charge can be monitored for a rise in its voltage. Voltage monitoring can also be used to check batteries being held in the maintenance mode. Batteries being held in the maintenance mode should show 5 mA. or 10 mA. of charge current and voltages as high as 16 volts. A voltage greater than 16 volts indicates an open circuit, either in the battery connector, cable, or internal to the battery itself. The rotary switch on the front panel selects which battery is being monitored but in no way affects the operation of the charger on the batteries that are not being monitored.

BATTERY DISCHARGE TEST

Occasionally, it may be desirable to discharge a battery to determine the actual capacity of a battery, or to condition a battery that has been abused. The discharge test provides a 1 amp load and metering terminals to monitor the output voltage of the battery. The only accurate procedure to determine the capacity of a sealed lead-acid battery is to discharge it and measure the length of time it takes to reach the discharged condition. You will then know what capacity the battery contains. A battery being discharge tested should be replaced when the voltage drops below 11 volts. The battery should be immediately put on charge after this test. Leaving a battery in its discharged state, even for a few hours can cause permanent damage to the battery.

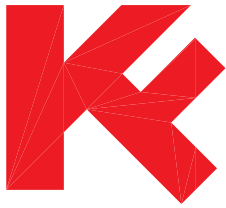
A battery that refuses to take a charge can sometimes be restored by charging the battery for 1 hour, discharging it to 10 volts, then charging the battery again. If no improvement in battery voltage or discharge time results, the battery is irreversibly damaged and should be replaced. A fully charged 2.5 ampere hour battery should be able to maintain a test load position discharge voltage of greater than 11 volts for at least 45 minutes.



Model KFCB-10M Dimensions

ORDERING INFORMATION

			HIGH RATE	LOW RATE	WEIGHT		CUBE	
RECHARGING UNIT for service/cycling box battery packs. Charges, monitors and test TEN (10) battery packs concurrently. Operates from 115 VAC source.	KFCB-10M							
		99024-0	125 mA.	5 mA.	36 lbs.	16.2 kg	1.4 ft. ³	66.5 cm
		99026-0	250 mA.	10 mA.	36 lbs.	16.2 kg	1.4 ft. ³	66.5 cm



KFCB-10M BATTERY CHARGER

OPERATIONS MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com

CAUTION

READ ALL INSTRUCTIONS BEFORE OPERATING CHARGER.

DO NOT SHORT BATTERY LEADS. KING-FISHER BATTERIES ARE CAPABLE OF EXTREMELY HIGH SHORT CIRCUIT CURRENTS, EVEN WHEN PARTIALLY DISCHARGED. THIS HIGH CURRENT CAN CAUSE INTERNAL HEATING OF THE BATTERY AND PERMANENT DAMAGE. A SHORTED BATTERY CAN ALSO BE A FIRE AND/OR EXPLOSION HAZARD. BE SURE TO ALWAYS USE THE POLARIZED CONNECTORS SUPPLIED ON BATTERIES. NEVER REMOVE WIRES FROM CONNECTOR.

ONLY USE THE POLARIZED CONNECTORS ATTACHED TO BATTERIES.

DO NOT PLACE ANY MATERIAL (SUCH AS PAPER, BOOKS, LIQUIDS, OR COMBUSTIBLES) ON TOP OF CHARGER.

USE 3-WIRE GROUNDED OUTLET ONLY.

DO NOT LEAVE BATTERIES IN DISCHARGE TEST IN EXCESS OF 30 MINUTES.

GENERAL

There are **TWO (2) VERSIONS** of the battery charger **Model KFCB-10M**.

99024-0 2.5 amps used to charge 17007 batteries

99026-0 5 amps used to charge 17014 batteries

The King-Fisher **KFCB-10M** Ten Circuit Battery Charger is designed to charge and monitor up to **TEN** King-Fisher Sealed lead-Acid Rechargeable Batteries. Use of this charger for any other function or battery type will void the warranty.

The **KFCB-10M** Battery Charger is essentially a solid-state two stage constant current charger. Depending on which version you have the charger will provide 125 mA. or 250 mA. in high rate mode and 5 mA. or 10 mA. in low rate mode. The charger can charge a discharged battery in approximately 48 hours or less, depending on the state of charge of the battery. Batteries to be charged are simply placed in the battery rack located on top of the charger, and plugged into the corresponding battery charger. Leaving the battery connected will keep them at a 100% state of charge.

This Operations Manual is divided into three separate sections:

CONTROLS AND INDICATORS-Gives a brief description of the front panel operation.

NORMAL OPERATION-Explains how to charge a normal 12 volt lead acid battery.

TESTING BATTERIES FOR DEFECTS-Explains what a defective battery is, and how to test it.

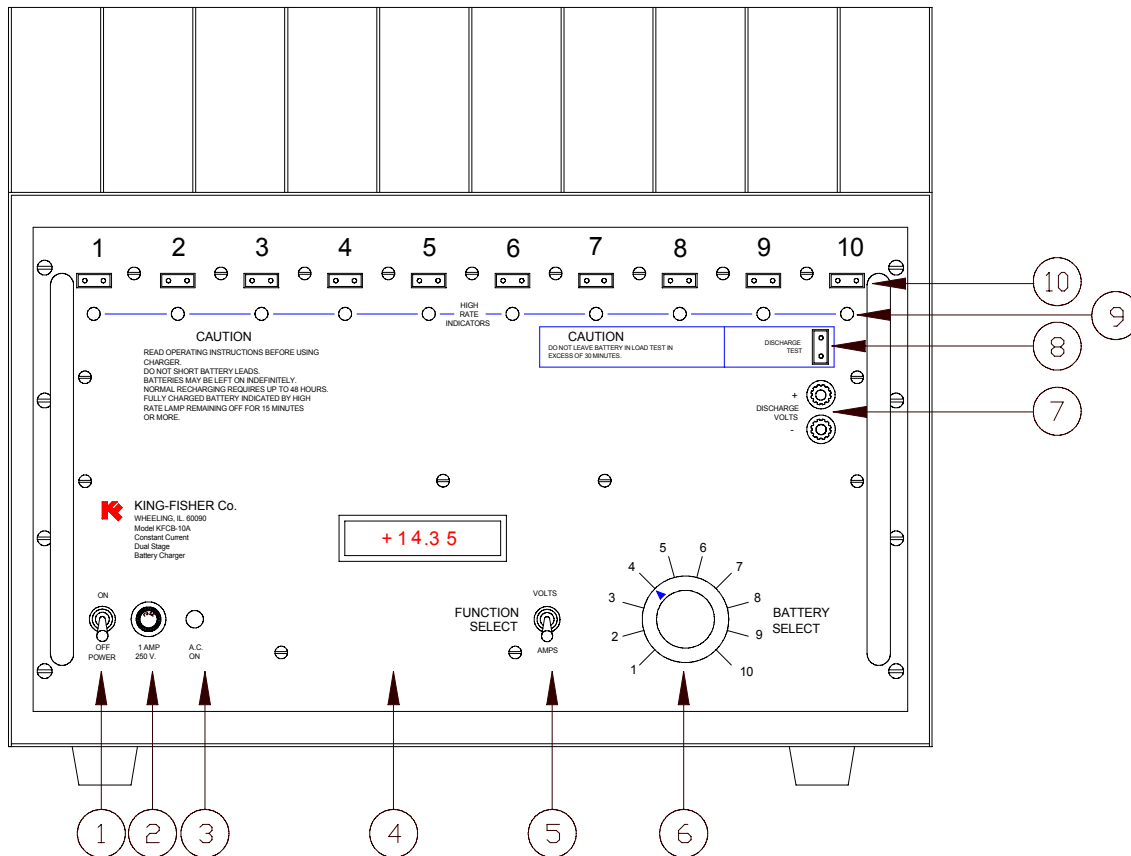


Figure 1 BATTERY CHARGER FRONT PANEL

CONTROLS AND INDICATORS

Refer to Figure 1 and the corresponding description below of each control and indicator.

1. ON/OFF Switch- Turns on/off the A.C. power.
2. INPUT FUSE- Primary input fuse. Check fuse if A.C. Lamp goes out. Use only a 1 amp, 125/250 volt slo-blo fuse. DO NOT substitute!
- 3 A.C. LAMP- Green light which illuminates when primary A.C. power is applied.

4. **DIGITAL VOLTAGE/CURRENT METER**- Displays either the current or the voltage being supplied to the batteries. The symbols “OFL”(overflow) on the display tells the operator that the voltage is too high for the meter to read when no batteries are connected. The meter can only display the status of 1 battery at a time.
5. **FUNCTION SELECT**- Switches the digital meter to either the current mode or voltage mode.
6. **BATTERY SELECT**- Selects a particular battery (1 to 10) which is to be monitored by the meter.
7. **DISCHARGE VOLTS**- Red and Black (banana) plugs used to monitor a battery on “Discharge Test” (8) with an external voltage meter.
8. **DISCHARGE TEST SOCKET**- Used to check the amp hour capacity of a potentially defective battery. See section **NORMAL OPERATION**.
9. **HIGH RATE INDICATORS**- Yellow lights below each battery terminal indicate which batteries are being charged at a high rate (125 mA. or 250 mA.). When this light is off, the corresponding battery is being charged at a low rate (5 mA. or 10 mA.).
10. **BATTERY SOCKETS**- Ten (10) Polarized Sockets used to charge King-Fisher lead-acid batteries.

NORMAL OPERATION

Initial AC Operation:

The **KFCB-10M** Charger operates from a standard 120 V.A.C. source and draws less than 2 amps of current.

- * Plug the charger in and Turn on the power switch (1) located in the lower left corner of the charger.
- * The green indicator lamp (3) should come on indicating that ac power has been applied to the charger. If the lamp does not come on. Unplug the charger, and check the 1 amp fuse (2) located on the front panel.

Quick Test:

After power has been applied to the charger, check out each zone to see if the high and low rate charging circuits are working.

- * Take a 12 volt battery and plug it into the “Discharge Test” socket (8) for approximately 30 seconds.
- * Now, briefly plug the discharged battery into each zone (1 to 10) and check that the high rate indicators (9) comes on at each zone. The high rate indicator tells the operator that the battery is being charged at 125 mA. or 250 mA. If the indicator lamp does not come on with a discharged battery, then service may be required.

Plug in the Batteries:

Place each battery to be charged into the bins and plug them into the charger's sockets. The batteries are supplied with a special plastic connector which fits into the charger's polarized sockets only one way. Do Not substitute this connector for any other type. **DO NOT TRY TO FORCE THE PLUGS INTO THE SOCKETS.**

- * When the battery is first plugged in, the high rate indicator light (9) should come on and stay on for up to five hours depending on the state of charge. If this light stays on continuously for more than five hours, remove the battery and see section TESTING THE BATTERIES FOR DEFECTS.
- * After a few hours, the high rate indicator (9) should go out, then on, and continue switching on and off for several hours until the battery is fully charged.

Monitor Each Battery:

The battery charger has facilities for monitoring any of the TEN batteries using the battery select switch. The charger provides 125 mA. or 250 mA. of charge current with a battery voltage of 14.7 volts or less. When the voltage exceeds this 14.7v threshold, the charge current drops to 5 mA. or 10 mA. low rate. This low rate charge is maintained until the battery voltage drops below 13.7 volts at which time the charge circuit switches back to a high rate.

The charger will continue cycling between high and low rate although the time that the battery is being charged at a high rate will slowly decrease as the battery reaches its fully charged point. When the high rate light stays off for more than 30 minutes, this indicates that the battery is fully charged and can be put back into service. Lead-acid batteries lose 15% of their charge per month just sitting on a shelf and should be left on the charger when not in use. Batteries may be left on the charger indefinitely, if they are checked periodically.

Using the Digital Meter:

The digital meter (4) is designed to monitor the batteries of each of the TEN zones. To observe a battery's Voltage or Current parameters:

- * Select the function to be monitored (Volts or Amps) by operating the Function Select switch (5)
- * Select the battery to be monitored (1 to 10) by operating the Battery Select switch (6).
- * Observe the digital meter (4). Voltage will be in Volts and Current will be in milli-amps. If no battery is plugged into the zone you are monitoring, then the meter will read 0 milli-amps in the current mode or OFL (overflow) in the voltage mode.

TESTING BATTERIES FOR DEFECTS

Defective batteries:

Batteries, which have been discharged below the 11.0 volt threshold level, dropped, or frozen, may be permanently damaged. If a defective battery is found, plug it into the charger immediately. Monitor the high rate light. If the light stays on constantly for more than an hour, remove the battery, and measure the voltage across the terminals. If the battery voltage is less than 11.0 volts, then the battery is defective and should not be returned to service. If the battery voltage is above 11.0 volts, return it to the charger for 48 hours and perform the discharge test.

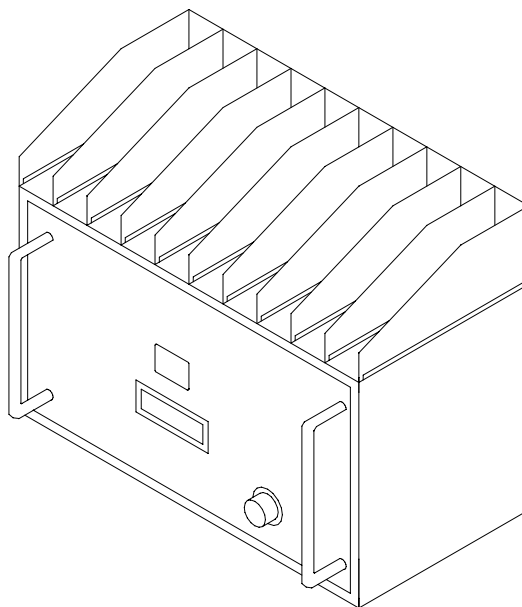
Battery Discharge Test:

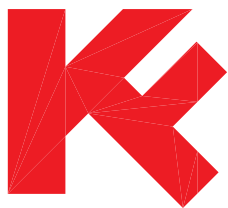
The following discharge test is designed to check the charge capacity of a possibly defective 2.5 amp-hour battery. Do Not discharge a battery below 11.6 volts. The **KFCB-10M** provides a 1 amp load (8) and volt meter terminals (7) to monitor the discharge rate.

To discharge a battery:

- * Connect a volt meter to the terminals labeled “Discharge Volts” (7).
- * Plug the battery into the socket labeled “Discharge Test” (8).
- * Discharge the battery for 30 minutes and record the voltage before and after discharge. The batteries should discharge at approximately 1 volt per hour or 0.5 volts in 30 minutes on the load test. Be sure to check the battery voltage periodically to be sure it hasn’t dropped below the 11.0 volt threshold level.
- * If the battery fails this test, then it should be placed on the battery charger for one week and retested. If it fails again, then the battery is defective and should be replaced with a new battery.

CAUTION: Leaving the battery in a discharged state, even for a few hours, can permanently damage the battery.





QUAKE ALERTING SYSTEM

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com

QUAKE ALERTING SYSTEM

The King-Fisher Quake Alerting System is used to sense a Seismic event or earthquake prior to the actual destructive tremor. This information is used to alert everyone with a pre-recorded voice message and a audible tone. The King-Fisher Quake Alerting system can be used to automatically open fire station doors allowing the vehicles to be moved outside the building for emergency services after an earthquake.

We believe that this unit has huge potential. We recently received one of the first prototypes after waiting for it for over a year. The Light Industrial unit consists of three (3) pieces including two (2) slaves and a master control module. the two (2) slaves must “shake hands” before activating the master unit which has the capability to turn “on” and shut “off” systems. It has an RS232 port and several dry contact closures. Some of the more obvious applications:

- * Open overhead doors before they become jammed and inoperable. This would permit emergency vehicles to exit. Shut down pressurized fueling in gas stations, and airports.
- * Warn airline pilots not to land or take off.
- * Archive data running on a computer.
- * Activate a universal “duck and cover” alert command throughout classrooms.
- * Shut down the flow of dangerous industrial chemicals
- * Shut off gas valves before the destructive waves arrive.
- * Send wireless commands to a myriad of systems.

Quake Guard reacts to vertical ground movements caused by vibrations in the form of waves. The typical consumer, or commercial entity, of a **Quake Guard** detector can rest assured of being alerted as the first arrival waves or “P” waves reach the surface of the earth, thereby giving themselves precious time to react before the arrival of more destructive waves. This early warning is possible through the use of a special transducing element set, adjusted to the specific frequency of the first arrival waves (“P”). The detector is extremely accurate and will sound only when a vertical displacement above a certain level occurs. For the Light and Heavy Industrial applications, redundancy of several units is employed.

Quake Guard consumes relatively little power while in standby mode because the unit triggers only at a specific range of frequencies of the “P” wave, as modified by various building harmonics. This specific triggering range virtually eliminates false alarms due to the presence of electromechanical filtration devices. The product also features a variable sensitivity control which provides a choice to the user in terms of building harmonic alarm and/or their individual degree of concern.

There are two (2) separate alarm signals, one high and the other low frequency. Each alarm employs a separate driver so as to create a distinctive alarm rhythm. The combination of harmonics and rhythm provide for an exceptionally distinctive alarm sound not to be mistaken with other appliances or alarms. The findings relating to the testing show conclusively that the product and technology is scientifically sound. The results outline and elaborate on the series of four (4) field and lab tests conducted to date.

The principle of “P” (primary vertical waves) and “S” (shear primary horizontal) wave separation follows: It has been established that the “P” wave travels 1.68 times faster than the “S” wave. In a deep earthquake situation a significant warning time is possible, especially when considering an extremely large magnitude earthquake at 40-50 miles in depth and a distance of 200-300 miles away from a major city. The basic rule of thumb when calculating “P” and “S” separation is 1 second separation for each 8km (4.97 mile) of distance traveled. Therefore, if an earthquake occurred at a depth of 50 miles and the epicenter was at a distance of 300 miles away from a city, a 72 second warning would be possible. It is apparent, of course, that if the earthquake was substantially deeper, larger in terms of magnitude and further away, an even longer warning time would follow. We have only discussed “P” and “S” waves above. There are also “R” waves to consider. “R” waves are different than “P” and “S” waves because they begin on the surface of the earth as compared to “P” and “S” waves which originate at the hypocenter. “R” waves travel even slower than “S” waves and are extremely dangerous because they possess both vertical and horizontal components. In practical terms, if a building has suffered structural damage as a result of the arrival of “S” waves, it will probably not withstand the final volley of “R” waves. This having been said and when considered in the context of the aforementioned example, [Quake Guard](#) may give the user a warning time up to 160 seconds in advance of the arrival of “R” waves.

-CAUTION-

- RISK OF ELECTRICAL SHOCK
- READ THIS INSTALLATION MANUAL COMPLETELY BEFORE INSTALLING OR SERVICING PANELS
- CHASSIS MUST BE CONNECTED TO EARTH GROUND
- OBSERVE HOT AND NEUTRAL POLARITY WHEN CONNECTING AC POWER
- DO NOT APPLY AC OR BATTERY POWER DURING INSTALLATION

-SITE SELECTION-

- LOCATE AND INSTALL THE PANEL SO THAT VIBRATION OR JARRING WILL NOT CAUSE ACCIDENTAL OPERATION
- MOUNT PANEL ON A STRUCTURALLY SOUND WALL. GENERALLY, THE LOCATION IS A WALL AREA CONVENIENT TO RUN AC POWER, SPEAKER CABLES AND QUAKE GUARD CABLES
- THE PANEL SHOULD BE LOCATED TO PROVIDE; A CLEAR VIEW OF INDICATORS, AND ARC OF 16" FOR PANEL DOOR CLEARANCE, OPERATION OF SWITCHES, AND MAINTENANCE OPERATIONS

INSTALLATION OF ENCLOSURE

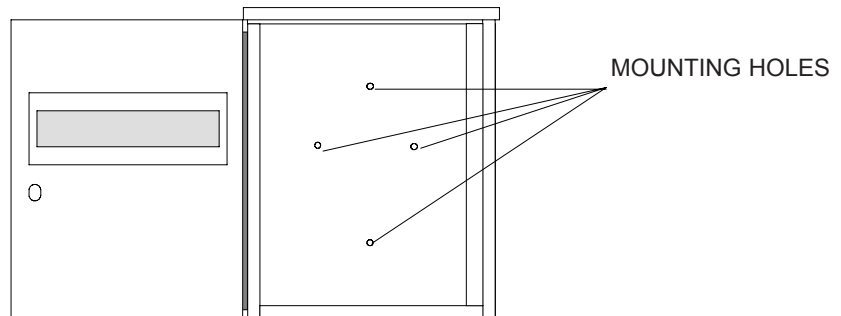
GENERAL

Installation shall be undertaken only by properly skilled, trained and qualified professionals who are experienced in modern industrial installations and all applicable codes and requirements.

- * Read all instructions first.
- * Do not connect batteries or apply power until wiring and installation is complete and checked.
- * Locate a suitable position and structure for mounting the enclosure.

WALL MOUNTING

1. REMOVE the subplate assembly from the enclosure by removing the four screws or nuts and washers located at each corner of the subplate. Place in a temporary protected location.



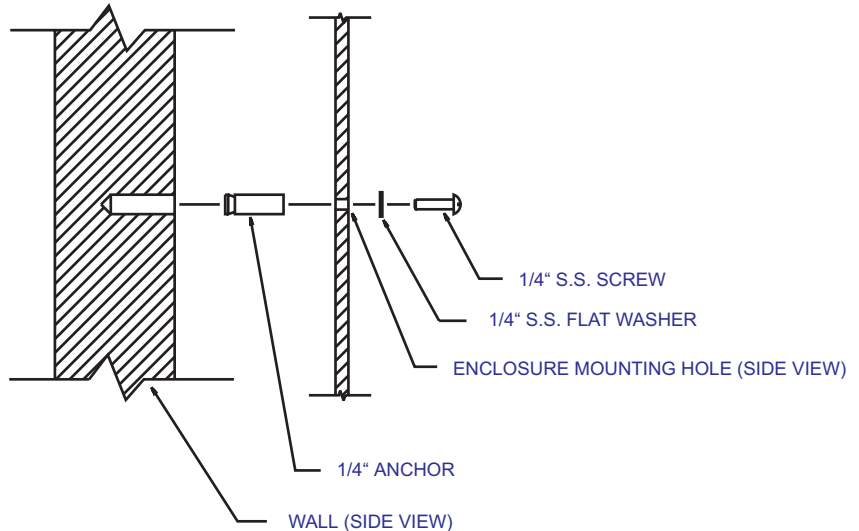
2. REMOVE the mounting hole knockouts located at the rear of the enclosure.

3. MOUNT the enclosure on a wall using appropriate hardware shown below. Use stainless steel hardware for mounting the enclosure in accordance with proper installation requirements.

WALL MOUNT HARDWARE

4. Run the speaker cable, Quake Guard cables and AC power to the enclosure at the bottom, using the 1/2" knockouts and cable clamps.

5. Re-install the subplate.



PANEL WIRING

1. Connect the AC power to the terminal strip labeled AC.
2. Remove the black cover plate from the Evax unit.
3. Connect the speaker cable to terminals (5) and (6) on TB1.
4. Attach two (2) RJ11 connectors to the Quake Guard cables and plug them into the bottom of the [Quake Guard](#) master unit.

QUAKE GUARD SLAVE UNITS INSTALLATION

The slave units should be mounted on a load bearing wall away from windows or doors. They should be as secure as possible and vertically plumb to best transmit any vertical movement of the wall. The two (2) units should be mounted on two (2) different load bearing walls. The height should be eye level so the LED's can be seen and the reset button on the top accessible.

Attach a RJ11 connector to the cable and plug it into the unit.

SPEAKER INSTALLATION

The speakers should be installed in parallel in a continuous line. A 10k end of line resistor must be installed at the last speaker in the line.

OPERATION

The two (2) sensors are mounted on two (2) different walls and connected to the master unit. The master unit monitors the two (2) slaves and both slaves must sense movement before the master activates. This prevents false activations due to something other than (P) waves.

When the slaves activate, a loud audio tone is turned on at each of the slaves and the master unit.

When the master unit activates the system will perform two (2) functions.

1. A pre-recorded message is activated that announces that a seismic event has been detected.
2. It will also activate circuitry to automatically open the bay doors.

To cancel the activation, the small button located on top of each slave unit and master unit should be depressed. It is important not to cancel this until the bay doors are completely open and the vehicles are out of the building. If it is cancelled before and another (P) wave is sensed, it is possible that the bay doors will begin to close.

BATTERY BACKUP

The system comes with batteries to keep completely operational even if AC power is lost. The batteries will backup the system for approximately thirty (30) hours.

TROUBLESHOOTING

Thru the window on the system cabinet, three (3) LED's can be seen:

YELLOW FAULT

GREEN NORMAL

RED ALARM

The GREEN (NORMAL) LED is on when everything is operating correctly.

The RED (ALARM) LED is on when an earthquake is detected.

The YELLOW (FAULT) LED comes on when the system senses a problem. When the YELLOW LED comes on the GREEN LED will flash. The number of flashes will indicate the nature of the trouble.

1 flash = loss of AC power

2 flashes = open speaker circuit

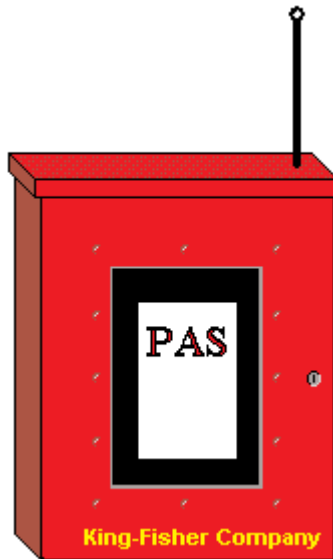
4 flashes = shorted speaker circuit

8 flashes = amplifier trouble

32 flashes = battery trouble

Multiple faults will add to create longer flash counts.

King-Fisher Radio Fire/Security Alarm Indoor/Outdoor Warning Systems



J-34 TESTED
AND
ACCEPTED



KING-FISHER COMPANY

2350 Foster Avenue
Wheeling, Illinois 60090-6574

tel 847-398-7100 fax 847-255-1507 e-mail sales@kfco.com

KING-FISHER COMPANY

History

King-Fisher was founded as **Carl J. King and Company** in 1967 by Mr. Carl J. King. When Mr. Emerson B. Fisher became a partner in 1970, the company was renamed **King-Fisher Company**. Both partners had experience within the radio, fire and security communications, evacuation systems, fire protection and alarm detection equipment industry prior to their involvement with **King-Fisher**. Since the early 1970's, the company has been involved in developing radio alarm systems, including customized panels, detection equipment and control panel systems. Keeping abreast of new technological developments, the Company continually updates its systems and components.

In 1981, the Company relocated to a newly constructed custom building in Wheeling, Illinois. Shortly thereafter, **King-Fisher** developed a line of emergency dispatching and fire management software programs. Development of the computer-aided dispatch (**CAD**) and computer fire management and dispatch (**PC-CAD**) software products began between 1983 and 1984. The software products have served to enhance **King-Fisher's** product line and broaden **King-Fisher's** position in the market.

Products / Services

King-Fisher designs, develops and manufactures state-of-the-art emergency communication and fire detection and protection systems. The Company sells complete systems as well as components for existing systems. It also provides installation services for customers. Components of a typical system sold by the Company might include one or more receivers/processors, radio call boxes, interfaces, evacuation devices, antennas, battery chargers and batteries.

BASE RECEIVING STATIONS

King-Fisher's KFRA-C Base Receiving Station is one of the latest state-of-the-art emergency radio receiver and signal processors on the market. The unit detects and processes radio transmissions from FCC-approved emergency radio call box transmitters. The KFRA-C is designed to interface with numerous detection and alerting devices as well as many computer-aided dispatch management systems. Units are powered by 12 volt DC, 50 ampere-per-hour batteries for 24 hours of standby power. Memory units in the KFRA-C enable the station to store up to 500 address identity numbers of radio call box transmitters used with the system. The unit visually displays emergency messages. In addition, a permanent record of received signals is printed by a digital impact printer. The unit is available in a variety of configurations.

RADIO TRANSMITTERS (BOXES)

Transmitter boxes are capable of transmitting emergency messages, including Fire, Security, Evacuation, HazMat and Medical Aid. The boxes have the capacity for 10 different messages, including a test message. Messages are transmitted either by push button or automatically through the **King-Fisher** radio master box circuitry, which is configured to transmit any pre-programmed message. King-Fisher manufactures a variety of different call box models, and can adapt the transmitters for automatic or manual tripping.

COMBINATION RADIO/FIRE ALARM KFRTI-20/52 CONTROL PANEL

The KFRTI-20/52 control panel detects the operation of any approved signal-initiating device; indicates by annunciator lamps the area of the alarm condition; and operates all alarms, auxiliary and approved releasing devices. The KFRTI-20/52 control panel has a capacity of up to 52 zones.

King-Fisher's leading edge communications systems are based upon radio transmission technology. Radio-based systems tend to be much more economical than traditional hard-wired systems. In addition, radio alarm transmitting facilitates rapid transmission of signals, saving critical minutes during emergency situations. Existing radio systems can also

be easily expanded due to the absence of hard-wired connections. The receiving station has an AM receiver which is specially designed for radio call box applications. Transmitted signals from up to 25 miles away can be received and decoded by the receiver and processor, without the need of a repeater. Repeaters, of course, can extend the range to any required distance, or may be used in severe terrain locations.

In the event of an emergency, signals are sent either manually by a remote hand-held unit, or automatically. Call box push buttons (designated for Fire, Security, etc.) may be pushed manually. Central control detection panels, which monitor heat, smoke, other approved detectors or special functions (i.e. Medical, Security, etc.), will automatically transmit signals to the receiving base station. Received signals are then decoded and indicated with an audio signal and visual display, along with a written message which is printed and displayed by the base station.

SOFTWARE

Software is also an important part of **King-Fisher's** product line. **King-Fisher** has developed and published a wide variety of emergency fire dispatch and management programs. Dispatch and management programs sold by the company are described briefly below:

Fire Dispatch - Facilitates the dispatching of personnel during emergency situations

PrePlan - Displays information to the dispatcher regarding, for example, location of hydrants, area hazards, temporary construction projects, etc.

Equipment Status - Provides current status of all available emergency equipment

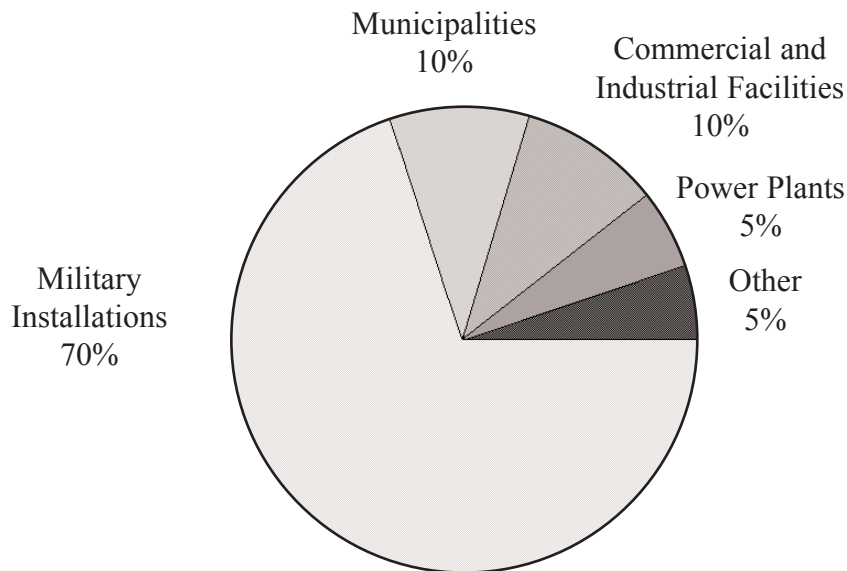
HazMat - Provides instant access to emergency response information for over 2,500 hazardous materials

Automatic Alarm Interconnect - Integrates **King-Fisher's CAD/PC-CAD** system into present radio or wire alarm systems

Markets

King-Fisher sells to a diversified customer base, which includes military installations, municipalities, power plants, and commercial and industrial facilities. Due to the nature of the industry and market, the composition of the Company's market base varies from year to year depending upon the economy, the present administration and other external factors. The graph which follows illustrates the general market segments which are served by the Company, as well as their current contribution to total Company sales.

MARKET SEGMENTS BY CONTRIBUTION TO REVENUE: 1997



As illustrated in this graph, a large portion of total sales is currently to military customers. Military sales are made independently to a large number of military bases and facilities within all branches of the Armed Forces. Overall, the Company has an estimated 2000 active accounts, none of which accounts for greater than 10% of total sales. Organizations which are now customers of **King-Fisher** include Fort Belvoir, Aberdeen Proving Grounds, the Defense Logistics Agency, Charleston Naval Weapons Center, the Village of Rockville Center, the Belmont Race Track and Grand Forks Air Force Base.

King-Fisher derives about 90% of its total sales from domestic customers. The Company's customers are dispersed throughout the entire United States. King-Fisher also sells systems to international customers, from Alaska to Antarctica, Diego Garcia, Guam, Hawaii, Johnson Island, Saudi Arabia, Japan and the Caribbean.

Approvals

The **King-Fisher Company** has **FCC-type acceptance**, **Underwriters Laboratories**, **California State Fire Marshal** and/or **Factory Mutual Research** approvals and listings on many of its products. These approvals are important in the marketing of the radio and detection systems, as they are often a requirement.

Strengths / Niche

King-Fisher is considered a leader in the radio-dispatched emergency communications systems and the fire detection industry. Several factors have enabled the Company to attain this leadership position.

- An outstanding reputation for reliable, quality products acquired through over 31 years of doing business (founded in 1967)
- Extensive experience of management within the fire detection and suppression and emergency communications systems industry
- The Company's long-standing relationships with many of its customers
- Large and diversified existing customer base which is reliable in terms of payment
- Modern, well-maintained and spacious facilities
- Positioning of the Company within a high-growth segment of the industry and market
- Reputation for providing high-quality, state-of-the-art products at reasonable prices

Objective

The System should have worldwide applicability, to include desert, tropical and urban environments; it should be adaptable to any building or structure that military and civilian personnel may occupy.

King-Fisher Company presently has RIPAS, ROPAS, and Radio Fire/Security/Evacuation reporting systems in operation world-wide.

Please refer to Section 6 for a list of our experience, references and what our users say about us.

Ease of Installation

Where the system requires installation, it should not require special tools, modifications to, or interfere with existing wiring or electrical circuitry of host structures.

King-Fisher's RIPAS, ROPAS or Emergency Radio Systems can easily be installed in any indoor or outdoor environment. Our systems are relatively small, and can easily be installed on a portable basis, with a minimum amount of mounting hardware and wiring. The major supplies needed are antenna cable, mounting screws, a small amount of wire and conduit.

Removal and Reinstallation

The system(s) should allow for removal and reinstallation without permanent damage to the remaining structure(s).

King-Fisher Radio Fire/Security/Evacuation major components are self-contained and can be easily removed and installed in another location.

Self-test and/or Built-in Test

The system should have the capability of self-testing, or alerting personnel to a faulty condition.

King-Fisher RIPAS, ROPAS, KFRTI-20/52 transmitters, and KF1 street box transmitters have an automatic test built in. The automatic test feature is in accordance with NFPA 72 and NFPA 1221, which require that all transmitters automatically report to the dual model KFRA-C base receivers with a test message at least once every 24 hours. The automatic test message can be set for 12 hours, 4 hours or 15 minutes, as desired.

*The **King-Fisher** KF1 transmitter has a tamper switch which responds with a “Tamper” message when tilted approximately 20 degrees. The KFRTI-20/52 transmitter can optionally send a “Tamper” message when the door is opened.*

Alerting Capability

The system shall be capable of alerting (military and civilian) personnel of a pending or specific danger. The system shall also be capable of providing intelligible communications on essential actions.

*We offer automatic tripping of a **King-Fisher** RIPAS, ROPAS, or Fire/Security or Evacuation system on either an automatic or manual configuration.*

King-Fisher Fire/Security and/or Evacuation systems may also operate initiating devices such as smoke and heat detectors, UV/IR detectors, manual pull stations or hand-held push-button transmitters.

Our RIPAS or ROPAS Evacuation Audio System(s) can be operated automatically and/or manually, with a capability of

- *Six (6) standard warning tones;*
- *Up to 16 (depending on the model selected) customized user pre-recorded digital voice messages; and*
- *Public address capability (RIPAS and ROPAS) for specific instructions or information during a specific danger.*

Areas Requiring Protection

The system shall be installed in areas where there is a high concentration of personnel typically in places of work, living, recreational, shopping and community areas.

Both the RIPAS, ROPAS or Fire/Security and the Evacuation system(s) can be quickly positioned in interior buildings, or outside locations such as open areas and parking lots.

Noise Levels

The alerting portion of the system shall be capable of overcoming normal noise levels associated with such areas.

The noise level(s) of the alerting portion generated within the Evacuation or Fire/Security system(s) are within the established guidelines discussed in the FEMA publication CPG 1-17, “Guide to Outdoor Warning Systems.”

Typically acceptable levels range from 70dB at 1300' to 5300'. If a greater dB range is desired, there is a wider range of models offered, with suitable configurations to accomplish higher dB levels.

In addition, King-Fisher has established dB levels to conform with J-34 requirements.

The Solution?

A King-Fisher Radio Fire/Security/Evacuation Reporting System!

Field Surveys

Installation

Field Check-out

Field & Factory Training

***King-Fisher Company** offers a variety of services ranging from Factory Certification on our products, to a complete turn-key installation. Each specific location's needs can be tailored with what it takes to get the job done!*

Field Surveys

A field survey can be performed by a **King-Fisher** Certified Field Engineer(s) to assist in the product selection, and design of the facility. The Field Survey is usually coordinated between the design engineer and the end user.

Installation

King-Fisher Company offers the installation of our RIPAS, ROPAS or Radio Fire/Security/Evacuation systems and associated products anywhere in the world. Our installation crews are **King-Fisher** employees, all of whom have been on DoD government facilities, and are familiar with the government's requirements.



KING-FISHER RADIO FIRE/SECURITY ALARM INDOOR/OUTDOOR WARNING SYSTEM OPERATION & MAINTENANCE MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847•398•7100 f 847•255•1507 e-mail kfco@mail.earthlink.net

GETTING STARTED

The King-Fisher KFRTI-20/52 Control Unit consists of various modules which can be combined to achieve client desired features.

The Fire/Security/Evacuation system configuration in this manual consists of:

Fire, Security, Pre-Recorded Voice and Public Address, Voice Evacuation Signals

Fire/Security Alarm and Trouble Indications

Audible Alarm Devices

Remote operation of Transmitter(s) and Public Address Voice Commands

Supervision of Devices/Panel

Wireless Alarm and Trouble Signals to KFRA-C Radio Fire Alarm Receiver(s) up to 25 miles away

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION
1	1	KFRTI-20/52 Unit w/2 Class "A" Zone Cards
	1	Class "B" Zone Card
	1	Dan Module
	1	Auxillary Power Supply
	1	#92010-VOC-10 (Ritron Receiver)
2	1	#92014 (Evax-50)
3	1	#92012-DCSP-R (FA416DR Receiver)
4	1	Battery Back-Up Enclosure w/Battery
5	1	#92009-VOC-10(Ritron Patriot Radio) Transmitter
6	2	#92006-FA214 (4 button transmitter)
7	1	#92005-FA575 (Repeater)
8	1	#92007 EVX-RM Remote Microphone
9	1	#81063 Speaker/Strobe
10	1	#80105 WS 30T Electronic Siren/Voice
11	1	#82002 (Aames) Pull Station
12	1	#84055 (Fenwal) Smoke Detector
13	1	#85003 (Edwards) Fixed Temperature RoR Heat Detector 135°F
14	1	80-140vac 40-70Hz.; 2amp max. Disconnect
15	1	Spare Power Supply (#66115-12 KFRTI-20/52)
16	1 can	Smoke Detector Tester
17	300ft.	Plenium 14 gauge, 2 conductor wire
18	2	10 ft. Ground Rod
19	200ft.	Coax Cable
20	2	#50037 Stainless Steel Omni-Directional Antenna

INSTALLATION

The Installer must insure that all wiring and devices installed in the system meet the following standards:

National Electric Code (NFPA 70)

NFPA Standard 72

Life Safety Code (NFPA 101)

Install equipment in a clean, dry environment, avoiding installation where equipment could be subjected to vibration. Remove electronic assemblies from the enclosure prior to drilling or punching holes in the enclosure. Before making any modifications to the enclosure, be certain that they will not interfere with assemblies or batteries.

Prior to starting the installation, we highly recommend the following manuals be refereed to which are part of this Installation Section. These manuals can be located at the end of this “King-Fisher Radio Fire/Security Alarm Indoor/Outdoor Warning Systems” titled “Operation & Maintenance Manual”.

ELECTRICAL POINT-TO POINT SCHEMATIC DRAWINGS

A Point-to-Point electrical schematic drawing is provided for your specific requirements with regards to the panel configuration needed for your installation.

This schematic drawing is included as a separate item, independent of the “Operation & Maintenance Manual”.

The following modules and components are also part of this “King-Fisher Radio Fire/Security Alarm Indoor/Outdoor Warning Systems” and can be found in this manual.

#92014 - Evax-50 Voice Evacuation Interface
#92012 - DCSP-R FA416R Wireless Receiver
#92005 - FA575 Wireless Repeater
#92006 - FA214 Four Button Transmitter
#92009 - VOC-10 (Ritron Patriot) Portable Radio
#81063 - Speaker/Strobe Device
#84055 - Smoke Detector
#82002 - Manual Pull Station
#85003 - Fixed Temperature RoR Heat Detector
#80105 - WS-30T Electronic Siren/Voice

The KING-FISHER KFRTI-20/52 Control Unit monitors and reports the alarm and trouble conditions of the fire/security/evacuation detection devices and controls the operation of the Evacuation Alert System.

KFRTI-20/52 CONTROL UNIT

GENERAL

The KFRTI-20/52 Unit is capable of monitoring and transmitting up to 52 zones of detection devices or switch contacts. It also monitors itself for trouble and sends a daily test message including the Unit's current status. Provides up to 3 amps of current for audible power and meets all NFPA requirements pertaining to a Fire Alarm Control Unit.

Power Requirements: 80–140 vac.; 40–70 cycles which is transformed into 24vdc. and then used for all operations. It also requires two 12v. batteries wired in series for secondary power.

Operation of the KFRTI-20/52 Unit is simple and free from complicated controls and indicators. The control unit, switches, and LED indicators have been human engineered for ease of operation.

Fuses: There are 4 fuses protecting the KFRTI-20/52 from damage. The Power Supply has 2 fuses; (1) 4amp fuse in the battery charging circuit and (1) 3amp fuse used in the AC circuit. There is (1) 2amp fuse located on the mother board used for smoke-power output and (1) 2amp fuse located on the Alarm Control Board, used for audible circuit protection. When using a Class "A" board with release there are (2) 2amp fuses located on it. These are protecting the 24vdc. output.

Transmitter Address Code: Programmed at the factory

Interrogation: This is part of the auto test or manual test. It is the process of scanning the current status of the Unit and reporting that status to the receiving console. At the Console a message of TEST 0 means Unit is in normal condition. A message of TEST 1 followed by TROUBLE 1 or TROUBLE 2, or Master 1-52, then TEST 0 means that all information between TEST 1 and TEST 0 is the status of Unit at this time.

Battery Charging Circuit: A 2 stage constant current charger. In high rate it will put out 250 mA. of current. In low rate or idle it puts out 10 ma. of current. This method always keeps the batteries in top condition.

SWITCH CONTROLS

There are seven front controls which are grouped in three categories: Silencing, Restoration, and Testing.

SILENCING SWITCHES

Alarm Silence: Momentary-contact switch which silences all alarm indicating devices (bells, horns, strobes, etc.) and the internal buzzer subsequent to a zone alarm. The indicating devices will be re-triggered by succeeding zone alarms.

Trouble Silence: Two-position switch which silences trouble audible devices and the internal pulsing buzzer subsequent to a trouble condition.

RESTORATION SWITCHES

Acknowledge: Momentary-contact switch which changes all flashing red LEDs in alarm, to a non-flashing steady state. Any subsequent alarm will cause the corresponding zone alarm and common alarm LEDs to flash until acknowledged again.

Reset: Momentary-contact switch which restores all circuits to their normal stand-by condition and resets each zone device unless they are locked in alarm. However, the transmitter will continue sending all messages which were latched into the CPU's memory, until complete.

TESTING SWITCHES

Drill: Momentary-contact switch which operates alarm indicating circuits for testing horns, bells, strobes, and the internal buzzer. No message is transmitted when using the Drill switch.

Lamp Test: Momentarily illuminates all control Unit LED indicators except for the green transmitter LED and the Green CPU Busy LED.

Manual Test: Push-button located on the right side of the CPU board, used to interrogate the unit and/or transmit two rounds of test.

LED INDICATORS

There are seven LED indicators located on the boards listed below:

Zone Board

Zone Alarm LED: Red LEDs which pulse when a zone has an alarm condition caused by a short placed across the zone wiring. Steadies when acknowledged.

Zone Trouble LED: Amber LEDs which illuminate when a zone has a trouble condition caused by a ground fault or broken wire. The LED will stay lit until the trouble is corrected.

Alarm Control Board

Common Alarm: Red LED which pulses when one or more zones are in alarm. Steadies when acknowledged. Also flashes if re-triggered by a new alarm.

Common Trouble: Amber LED which pulses when; one or more zones are in trouble, a low or no battery condition, loss of primary power, a board failure, or a board not seated properly. The LED will flash until the trouble is corrected.

AC Power: Green LED which is lit while primary ac power is on. This LED will not be illuminated while on secondary power only.

CPU Board

CPU Busy: Green LED which lights while the CPU is processing instructions. Waits until all messages have been sent and Unit has timed out before it clears.

Transmitter Board

Transmitter LED: Green LED which lights while the transmitter is sending a message. Lights momentarily for all three message rounds sent.

SINGLE TONE BUZZER

The internal buzzer is located on the mother board and will sound when one of the following conditions occur:

Alarm: A constant buzzer sound when a zone alarm is tripped or while pressing Drill. Can only be turned off by flipping the alarm silence switch or by resetting the Unit.

Trouble: A pulsing buzzer sound when a zone or unit is in trouble. Can only be turned off by putting the trouble silence switch in the up position or by correcting the problem.

Transmit: A momentary buzzer sound during a transmission of a message.

ALARM CONDITION

An Alarm condition will occur when a detection device or pull station has imposed a short across the zone's field wiring. The alarm detection devices may be a smoke detector, manual pull station, heat detector, etc., depending on the system specifications.

INITIAL ALARM CONDITIONS

When an alarm condition exists on one of the zones, the Unit will latch into alarm and indicate the following:

The respective RED Zone Alarm LED will begin flashing.

The RED Common Alarm LED will begin flashing.

The Audible Alarm Device(s) will operate (horns, bells, strobes, speakers).

The CPU Green LED will light.

The Transmit LED will momentarily light during the three rounds of emergency message transmission.

OPERATOR ACKNOWLEDGMENT

Upon arrival at the Unit perform the following tasks:

Observe all annunciated status indicators and record their current states.

Press the Acknowledge switch to steady the Alarm LEDs. The common alarm LED will begin flashing again if any other zone alarm is tripped and the alarm indicating devices will be switched on again.

If desired, silence the alarm indicating devices by switching the Alarm Silence Switch momentarily up. Reset the Unit once all zones are cleared of alarm and the Unit has stopped transmitting.

Note: All Alarm LEDs can be turned off by pressing the Reset Switch. Any zone whose field devices are locked in alarm will cause these zones to re-alarm.

TEST CONDITIONS

MANUAL TEST

The KFRTI-20/52 Unit has a test push-button located on the CPU board which, when pressed, will transmit two rounds of test plus all current Unit status (alarms and troubles) to the base receiving station. The internal buzzer will momentarily sound during each message transmitted, but none of the external alarm indicating devices will operate.

AUTOMATIC TEST

The KFRTI-20/52 Unit will automatically transmit two rounds of test plus current Unit status each day to show that it is operating correctly. The exact time automatic daily test is sent depends upon the time the Unit's internal clock was reset. The test clock can be reset by operating ACKNOWLEDGE and LAMP TEST switches simultaneously. Once the internal clock is reset, the Unit will send TEST after 12 hours, and then TEST every 24 hours thereafter.

TROUBLE CONDITIONS

The KFRTI-20/52 Unit is normally programmed to send three kinds of supervisory messages.

Trouble 1 Message is sent when the Unit has a problem with a PC Board, switch, audible device, power.

Trouble 2 Message is sent when the Unit has a zone or disconnect switch in trouble.

Trouble 3 Message is sent prior to the Unit shutting down due to a low battery voltage being detected while on battery backup. This signal (3) indicates that the Unit will be non-operational at the end of this message.

ZONE TROUBLE

A zone trouble condition occurs when the zone's field wiring, disconnect switch or zone device has an open state or a ground fault, possibly causing the zone to be inoperative. Whenever a trouble condition does exist on one of the zones, the following will occur:

The respective AMBER Zone or Disconnect Trouble LED will illuminate on the Zone Board.

The AMBER Common Trouble LED will pulse on the Alarm Control Board.

The Audible Trouble Device(s) and Internal Buzzer will pulse

The Transmitter will send three rounds of TROUBLE 2 message

AUDIBLE TROUBLE

The KFRTI-20/52 Unit monitors all alarm indicating devices. When there is a trouble condition on the alarm indicating wiring, the following will happen to the Unit:

The AMBER Common Trouble LED will pulse on the Alarm Control Board.

The Unit's Internal Buzzer will pulse

The Transmitter will send three rounds of TROUBLE 1 message

PC BOARD TROUBLE

PC Board Trouble is when a circuit board is out of place, malfunctioning, or loses it's power. The following will occur when there is a board trouble:

The AMBER Common Trouble LED will pulse on the Alarm Control Board

The Unit's Internal Buzzer will pulse

The Transmitter will send three rounds of TROUBLE 1 message

SWITCH UNIT TROUBLE

Switch Unit trouble can occur when one or more of the Unit's switches are out of position or a wire is broken leading to the switches. The following will happen when there is switch trouble:

The AMBER Common Trouble LED will pulse on the Alarm Control Board

The Unit's Internal Buzzer will pulse

The Transmitter will send three rounds of TROUBLE 1 message

POWER TROUBLE

Power trouble can occur at any time, and is probably the most critical supervisory feature of the KFRTI-20/52. The following will happen if primary AC power is lost:

The AC Power LED will go off

After a 70 second time delay, the AMBER Common Trouble LED will pulse

The Unit's Internal Buzzer will pulse

The Unit will Transmit three rounds of TROUBLE 1 message

If the battery voltage drops below the 24.0 volt Low Battery Threshold, the Unit will send three rounds of TROUBLE 3 message with LOW BATTERY message (LB)

If the battery voltage drops down to 22.3 volts, the panel will send four to six rounds of TROUBLE 3-message with LOW BATTERY message (LB) and then shut off all power completely until the batteries are replaced and/or the AC power is re-applied.

EVAX-50 (#92014) VOICE EVACUATION ALERT UNIT

The Evax-50 (#92014) is a self-contained amplifier, tone generator/digital message repeater/supervisory interface. It is designed to be used in conjunction with a KFRTI-20/52 Control Unit to provide an Evacuation Alert Alarm System.

The KFRTI-20/52 provides all initiating circuitry and a signaling circuit to the Evax-50 (#92014). The Evax-50 provides its own internal supervision as well as supervision for its speaker lines. Any fault is reported back to the KFRTI-20/52. In normal standby the supervisory circuit from the unit is connected to a matching EOL resistor. Should the Evax-50 suffer an internal failure or should there be any fault on the speaker line a contact would open and the KFRTI-20/52 would report it as an open fault for that circuit.

The Evax-50 (#92014) is designed to be powered by a 24 VDC source. It will provide 50W to the speaker circuit. Speakers may be 25 or 70 VRMS.

OPERATION

In normal standby the Evax-50 (#92014) will maintain the Green LED.

In alarm condition the Red LED will remain on as long as the unit is in alarm. Green LED will also remain on.

Alarm Sequence Settings:

Alarm Tone - Alarm Signal 5 seconds / Digital Message plays / Alarm Signal 5 seconds / Digital Message plays / Alarm Signal 5 seconds / Digital Message plays / unit reverts to Alarm signal until alarm condition is cleared. If the Microphone is keyed it will override both the tone and the message so a direct broadcast may be made. If this occurs during the initial sequence, the digital message will be reset and will not play.

An Emergency Paging Microphone with “Press-to-talk” switch is an integral component. When the Microphone is keyed or when the message is played the Green LED will dim. The intensity of the Green LED will vary with the level of the broadcast audio. This is true in Alarm condition as well. Under a fault condition, the Yellow LED will remain on. The Green LED will flash. The number of flashes display a code depending on the specific type of fault. When there is a fault condition the contact connecting the KFRTI-20/52 signal circuit to the EOL resistor will open indicating the fault to the panel which will provide annunciation and cause a signal to be transmitted to the receiving console.

#92005-FA575 Repeater, Receiver and 4 Button Transmitter

The #92005-FA575 repeater is a microprocessor-controlled transceiver which identifies signals from the #92006-FA214 transmitter and re-broadcasts those signals at full power to the #92012-FA416DR receiver. The repeater may be used alone or with additional repeaters to extend transmission range and to overcome site RF problems.

The #92005-FA575 repeater may be deployed as a basic “plug and play” unit to repeat signals, or in addition may be programmed into the control unit as a supervised point. The repeater can be supervised for low backup battery and inactive status, and can be wired for case tamper detection.

Operation

The #92005-FA575 repeater can be used to create multiple and redundant pathways between transmitters and receivers. Transmissions can be shuttled around obstacles, such as intervening terrain.

Redundant transmission pathways provide an RF link even when some paths are temporarily blocked. Adequate repeater coverage provides reliable transmission from virtually anywhere within the secured area.

Supervised vs. Unsupervised Operation

The #92005-FA575 repeater status can be supervised or unsupervised. Supervision includes low back-up battery warning and inactive status. Case tamper detection is also available, if magnetic contacts are installed and the tamper disable jumper is removed. Inactive monitoring applies only to the transmitter section of the repeater. Repeater performance, as such, is not supervised.

Unsupervised operation requires only that the repeater be mounted and powered. No programming is required. Supervised operation requires that the repeater be programmed to the control unit receiver as a unique point. With a control unit, the repeater should be programmed as a 24-hour point. Check-in and other parameters should be assigned as desired.

Locating Repeaters and Installation

The most important decision regarding the use of repeaters is where they should be located. In most cases, practical considerations—such as power availability—will affect the final placement of the repeater. The installer needs to determine the optimal site for placement of the repeater. A thorough RF survey of new or proposed sites is indispensable. Avoid the temptation to over-extend or “stretch” transmitter links. It is preferable to over-estimate the need for repeaters.

Proceed methodically when identifying locations for repeaters. Transmitter-by-transmitter, repeater-by-repeater, the installer should verify RF links. The interactive effects of repeaters upon each other must be considered.

When measuring signal strength with a receiver, we recommend that corrective action—including repeater deployment—be considered when transmitter signals consistently show a “Weak” signal margin. Look for obstructions to the RF path.

#92006-FA214 Four button Transmitter Operation

The #92012-FA416DR (DCSP-R) receiver will see the #92006-FA214 transmitter as 4 separate units (Fire - Evacuation - Bio-Chemical - etc.). Pressing one of the buttons activates the specific output programmed to that point. Activation signals are transmitted multiple times, and are indicated by the blinking transmission indicator LED.

ATTENTION: KingFisher Company recommends that the transmitter be programmed as a supervised device if used for life safety applications and should be tested weekly.

#92012-FA416DR (DCSP-R) RECEIVER OVERVIEW

The #92012-FA416DR (DCSP-R) receiver is a high performance wireless receiver with 4 relay outputs and display.

Features include:

- Fully supervising up to 16 transmitters
- Outputs can be configured normally open or normally closed
- Global fault output for tamper, low battery and inactive transmitters
- Manual and/or electronic reset of the receiver
- Factory default programming: “Alarm” and “Inactive” outputs are programmed to follow transmitter status; “Tamper” and “Low Battery” outputs are latching
- Form C relays for alarm and fault outputs
- Terminal block for adding case tamper switch

#92012-FA416DR RECEIVER OPERATION

Outputs will open or close upon activation of the point. Activation of an output is indicated by the corresponding output LED. By default, the global fault output will activate upon recognition of a trouble condition. Tamper and Low Battery signals will cause the global fault output to latch. Inactive conditions will follow the current state of the transmitter.

A point is declared inactive as follows: the receiver looks for at least one supervisory transmission from each supervised transmitter during the period of time programmed as the supervisory window. The first time the receiver gets a supervisory signal from a transmitter within a new window, it considers the transmitter active for the remainder of the window. If it fails to receive a signal in the following supervisory window, it declares the point inactive at the end of the window. The actual time between a transmitter becoming inactive and being reported inactive will range from slightly more than the supervisory window value to slightly less than twice the window period. For example, the default supervisory window is 4 hours. If a transmitter becomes inactive, the inactive fault output will be triggered in 4 to 8 hours.

Point and type can identify faults. Trouble conditions will be indicated by LED's and the point will be shown on the channel display. The display will show multiple faults, by stepping through each trouble type in sequence, showing points affected. If a point is activated and/or in trouble the output led will indicate which output is assigned to the activated and/or troubled point.

#92009-VOC-10 (RITRON PATRIOT) PORTABLE RADIO

Rugged screw mount molded antenna provides superior durability under adverse conditions.

Versatile audio accessory jacks allow the use of optional remote speaker/microphone and earphone.

Channel monitor button disables coded signaling on the selected channel and allows the unit to operate in carrier squelch.

High-efficiency speaker delivers excellent received audio quality in low and high noise environments.

Low distortion condenser microphone provides high-quality transmitted audio.

Ergonomic contemporary styling.

Protective cover seals accessory jacks from dust and dirt when not in use.

Easy to locate volume and channel controls allow fast, simple operation of the radio.

Dual function LED will glow red continuously, indicating that the transmitter is activated. A flashing green LED indicates that the channel is busy.

Rugged construction, strong “Uni-Body” housing is made of Lexan, a tough impact resistant polycarbonate material.

Designed to meet Mil-Std. 310 C&D shock and vibration test.

Battery saver feature temporarily turns off certain circuits of the radio when they are not in use, to extend the time between charges.

Low battery alert automatically alerts user with a short beep if battery requires charging.

RF output is 2 watts.

#81063 (SERIES ET70) SPEAKER/STROBE

The #81063 (Series ET70) speaker/strobe incorporates a low profile design which results in more space when installed in standard electrical backboxes.

The #81063 (Series ET70) speaker/strobe has a speaker mounting plate for faster and easier installations. It also has a built-in level adjustment feature along with an aesthetic (two screw) grill cover.

Synchronization of the strobe flash is achieved when used with the DSM sync module.

The #81063 (Series ET70) speaker is designed for a maximum output at minimum wattage across a 400-4000 Hz. frequency range. The #81063 (Series ET70) has a 110 candella output, and produces 78-96dB through its speaker.

#80105-WS-30T SIREN/VOICE UNIT

The #80105-WS-30T is a wide angle, 30 watt loudspeaker capable of providing electronic warning signals, pre-recorded voice announcements, and public address voice. The #80105-WS-30T is capable of generating electronic warning signals, and voice to the 116dB level.

For the #80105-WS-30T Siren/Voice unit, the line impedance transformer is built into the speaker and is selected using a rotary switch numbered 1 through 6. The switch when set on 1 will have an impedance of 4000 ohms resulting with an output sound level (dB(A)@500Hz) of 93.7dB, and when the switch is set for 6, the unit will have an impedance of 167 ohms with an output sound level (dB(A)@500Hz) of 106.9dB. Indoor applications with various conditions will have a lesser or greater effect on the dB level.

#84055 (Fenwal psd-7155) smoke detector

The #84055 (Fenwal PSD-7155) smoke detector is a dual-chamber, ionization-type detector designed to sense both visible and invisible products of combustion. The #84055 (Fenwal PSD-7155) smoke detector incorporates advanced solid-state, low-voltage circuitry and is designed for 4-wire installation.

A pulsing LED (approximately every 4 seconds) allows for visual supervision of the detector. Under an alarm condition, the LED lights continuously at full brilliance.

The detector head is installed into the base with a simple twist-lock action. A locking feature is provided for vandal resistant security.

Standby voltage, 10.2 to 36.8vdc. Normal operating temperature range, 32°F (0°C) to 100° F (38° C).

#82002 (Aames sp-1-tb) manual pull station

The #82002 (Aames SP-1-TB) manual pull station features a “T” handle manual pull lever for ease of operation. The #82002 (Aames SP-1-TB) manual pull station contains a switch, enclosed in the Fire Alarm Box shell, which is activated by pulling the “T” handle marked “PULL”. The pull lever is normally retained in an up-right position. The pull handle remains visibly activated in the down position until reset by an authorized person. Resetting the #82002 (Aames SP-1-TB) manual pull station is accomplished by a key-lock above the pull lever.

#85003 (Edwards 281b) fixed temperature RoR heat detector

The #85003 (Edwards 281B) fixed temperature heat detector is designed to operate when the ambient temperature surrounding the heat detector reaches and exceeds 135°F. The #85003 (Edwards 281B) has one normally open circuit and is designed to operate at 6 to 28vdc., at 0.3amps. The #85003 (Edwards 281B) heat detector can also be operated on the RoR (rate of rise) principle.

Battery-backup system

The KFRTI-20/52 Unit normally operates directly from 120vac. line voltage, and in the event of AC power outage, automatically switches to a 24 volt DC back-up battery power supply. Loss of AC power does not cause a trouble signal until one (1) to two (2) minutes after failure.

The emergency battery back-up system shall consist of a two stage programmable constant recharging system built into the panel power supply. Batteries shall be of the rechargeable sealed lead acid type.

INSPECTION, TESTING, AND MAINTENANCE PROGRAM

The owner or his designated representative shall be responsible for inspection, testing, and maintenance of the system including any alterations to the system. Before doing any testing, notify all personnel in the area and the system should be in a normal operational condition.

1. Control Equipment:

a. Functions:	All functions of the system, including operations of the system in various alarm and trouble modes for which it is designed (e.g., open circuit, grounded circuits, power outage, etc.), shall be tested in accordance with the manufacturer's instructions.
b. Fuses:	Remove fuse and verify rating supervision.
c. Lamps and LEDs:	Lamps and LEDs shall be illuminated.

d. Primary (Main)

Power Supply:

All secondary (standby) power shall be disconnected and tested under maximum load, including all alarm appliances requiring simultaneous operation. All secondary (standby) power shall be reconnected at end of test. For redundant power supplies, each shall be tested separately.

2. Secondary (Standby)

Power Supply:

Disconnect all primary (main) power supplies and verify that required trouble indication for loss of primary power occurs. Measure or verify system's standby and alarm current demand and, using manufacturer's data, verify whether batteries are adequate to meet standby and alarm requirements. Operate general alarm systems for a minimum of five minutes and emergency voice communication systems for a minimum of fifteen minutes. Reconnect primary (main) power supply at end of test.

3. Batteries-General Tests:

a. Visual Inspection:

Inspect batteries for corrosion or leakage. Check and ensure tightness of connections. If necessary, clean and coat the battery terminals or connections.

b. Battery Replacement:

Batteries shall be replaced in accordance with the recommendations of the equipment manufacturer, or when the recharged battery voltage or current falls below the manufacturer's recommendations.

4. Transient Suppressors:

Lightning protection equipment shall be inspected and maintained per manufacturer's specifications. Additional inspections shall be required after any lightning strikes. Equipment located in moderate to severe areas outlined in NFPA 780, Lightning Protection Code, Appendix 1, shall be inspected semi-annually and after any lightning strikes.

5. Control Panel Trouble Signals:

a. Audible and Visual:

Verify operation of panel trouble signals and ring back feature for systems using a trouble silencing switch that requires resetting.

b. Disconnect Switches:

When control unit has disconnect or isolating switches, verify that each switch performs its intended function and a trouble signal is received when a supervised function is disconnected.

c. Ground-Fault

Monitoring Circuit:

When system has ground detection feature, verify that a ground fault indication is given whenever any installation conductor is grounded.

d. Transmission of
Signals to Off- Premises

Location: Actuate an appropriate initiating device and verify that alarm signal is received at the receiving location. Create a trouble condition and verify that a trouble signal is received at the receiving location. Actuate a supervisory device and verify that a supervisory signal is received at the receiving location. If transmission carrier is capable of operation under a single or multiple fault condition, activate an initiating device during such fault condition and verify that a trouble signal is received at the off-premises location in addition to the alarm signal.

6. Conductors/Metallic:

- a. Stray Voltage: All installation conductors shall be tested with a volt/ohm meter to verify that there are no stray (unwanted) voltages between installation conductors or between installation conductors and ground. Unless a different threshold is specified in the system manufacturer's documentation, the maximum allowable stray voltage shall not exceed 1 volt ac/dc.
- b. Ground Faults: All installation conductors other than those intentionally and permanently grounded shall be tested for isolation from ground per the manufacturer's recommendations.
- c. Short Circuit Faults: All installation conductors other than those intentionally connected together shall be tested for conductor-to-conductor isolation per the manufacturer's recommendations. These same circuits shall be tested conductor-to-ground, also.
- d. Loop Resistance: With each initiating and indicating circuit installation conductor pair short-circuited at the far end, measure and record the resistance of each circuit. Verify that the loop resistance does not exceed the manufacturer's specified limits.

7. Conductors/Non-Metallic:

- a. Circuits' Integrity: Test each initiating device, indicating appliance, and signaling line circuit to confirm that the integrity of installation conductors are being properly supervised.
- b. Supervision: Introduction of a fault in any supervised circuit shall result in a suitable trouble indication at the control unit. One connection shall be opened at no less than 10 percent of the initiating device, indicating appliance, and signaling line circuits.

8. Initiating Devices:

- a. Alarm Switch: Mechanically or electrically operate the switch and verify receipt of signal by the control unit.

- b. Heat Detector: Heat test with a heat source per manufacturer's recommendations for response within 1 minute. Precaution should be taken to avoid damage to the nonrestorable fixed-temperature element of a combination rate-of-rise/fixed-temperature element.

9. Alarm Notification
Appliances:

- a. Audible/Visible: Measure sound pressure level with sound level meter meeting ANSI-S1.4a, Sound Level Meters, Type 2 requirements. Measure and record levels throughout protected area. Test in accordance with manufacturer's instructions. Verify device locations as per approved layout and confirm that no floor plan changes affect the approved layout.

10. Testing Zones for
Alarm:

Put one device in alarm per zone: The following sequence should follow: Zone alarm red LED is on steady - Common alarm red LED is on steady - CPU green LED is on steady - Transmitter green LED will flash 3 times (this represents the alarm message being transmitted to the King-Fisher Receiving Console). The pre-recorded message will start playing over the speakers and the strobes will be flashing.

Reset the device to normal, then reset the KFRTI-20/52.

11. Testing Zones for
Trouble:

Open the zone wiring by removing a device or opening a wire connection: The following sequence should follow: Zone trouble amber LED is on steady - Common trouble amber LED is on steady - CPU green LED is on steady - Transmitter green LED will flash 3 times (this represents the supervisory message being transmitted to the King-Fisher Receiving Console).

Install missing device or reconnect wires, KFRTI-20/52 should go back to normal operating condition.

12. Testing 4 button
Transmitter:

Push each button and verify that the button starts the sequence that it is programmed for.

13. Testing Portable
Radio:

Key the portable radio, and repeat the message that you want to come over the speakers. Verify that the message was broadcasted

DEFINITIONS

Active Multiplex System: A multiplexing system in which transponders are employed to transmit status signals of each initiating device circuit within a prescribed time interval.

Active Signaling Element: A component within a circuit interface such as a transistor, silicon controlled rectifier, or relay whose function is to impress a signal on the multiplexed signaling line circuit.

Addressable Device: A fire alarm system component with discreet identification that can have its status individually identified or that is used to individually control other functions.

Adverse Conditions: Any occurrence to a communications or transmission channel that interferes with the proper transmission and/or interpretation of status change signals at the supervising station.

Alarm: A warning of fire or danger.

Alarm Service: The service required following the receipt of an alarm signal.

Alarm Signal: A signal indicating an emergency requiring immediate action, such as a signal indicative of fire.

Alarm Verification Feature: A feature of automatic fire detection and alarm systems to reduce unwanted alarms wherein smoke detectors must report alarm conditions for a minimum period of time, or confirm alarm conditions within a given time period, after being reset to be accepted as a valid alarm initiation signal.

Alert Tone: An attention-getting signal to alert occupants of the pending transmission of a voice message.

Analog Initiating Device (Sensor): An initiating device that transmits a signal indicating varying degrees of condition as contrasted with a conventional initiating device, which can only indicate an on/off condition.

Annunciator: A unit containing two or more indicator lamps, alpha-numeric displays, or other equivalent means in which each indication provides status information about a circuit, condition, or location.

Approved: Acceptable to the "authority having jurisdiction."

Authority Having Jurisdiction: The "authority having jurisdiction" is the organization, office or individual responsible for "approving" equipment, an installation or a procedure.

Automatic Extinguishing System Operation Detector: A device that detects the operation of an extinguishing system by means appropriate to the system employed.

Fire: Fire is a phenomenon that occurs when a substance reaches a critical temperature and reacts chemically with oxygen (for example) to produce heat, flame, light, smoke, water vapor, carbon monoxide, carbon dioxide, or other products and effects.

Heat Detector: A device that detects abnormally high temperature or rate-of-temperature rise.

Other Fire Detectors: Devices that detect a phenomenon other than heat, smoke, flame, or gases produced by a fire.

Smoke Detector: A device that detects visible or invisible particles of combustion.

Auxiliary Box: A fire alarm box that can be operated from one or more remote actuating devices.

Box Battery: The battery supplying power for an individual fire alarm box where radio signals are used for the transmission of box alarms.

Ceiling: The upper surface of a space, regardless of height. Areas with a suspended ceiling would have two ceilings, one visible from the floor and one above the suspended ceiling.

Ceiling Height: The height from the continuous floor of a room to the continuous ceiling of a room or space.

Ceiling Surface: Ceiling surfaces referred to in conjunction with the locations of initiating devices are as follows:

- a. **Beam Construction:** Ceilings having solid structural or solid nonstructural members projecting down from the ceiling surface more than 4 in. (100 mm) and spaced more than 3 ft. (0.9 m), center to center.
- b. **Girders:** Girders support beams or joists and run at right angles to the beams or joists. When the top of girders are within 4 in. (100 mm) of the ceiling, they are a factor in determining the number of detectors and are to be considered as beams. When the top of the girder is more than 4 in. (100 mm) from the ceiling, it is not a factor in detector location.

Central Station Fire Alarm System: A system or group of systems in which the operations of circuits and devices are transmitted automatically to, recorded in, maintained by, and supervised from a listed central station having competent and experienced servers and operators who, upon receipt of a signal, take such action as required by this code. Such service is to be controlled and operated by a person, firm, or corporation whose business is the furnishing, maintaining, or monitoring of supervised fire alarm systems.

Certificate of Completion: A document that acknowledges the features of installation, operation (performance), service, and equipment with representation by the property owner, system installer, system supplier, service organization, and the authority having jurisdiction.

Certification: A systematic program using randomly selected follow-up inspections of the certified systems installed under the program, which allows the listing organization to verify that a fire alarm system complies with all the requirements of this code. A system installed under such a program is identified by the issuance of a certificate and is designated as a certificated system.

Certificate of Personnel: A formal program of related instruction and testing as provided by a recognized organization or the authority having jurisdiction.

Channel: A path for voice or signal transmission utilizing modulation of light or alternating current with a frequency band.

Circuit Interface: A circuit component that interfaces initiating devices and/or control circuits, indicating appliances and/or circuits, system control outputs, and other signaling line circuits to a signaling line circuit.

Combination Detector: A device that either responds to more than one of the fire phenomenon or employs more than one operating principle to sense of these phenomenon. Typical examples are a combination of a heat detector with a smoke detector or a combination rate-of-rise and fixed-temperature heat detector.

Communication Channel: A circuit or path connecting subsidiary station(s) to supervising station(s) over which signals are carried.

Compatibility Listed: A specific listing process that applies only to two-wire devices (such as smoke detectors) designed to operate with certain control equipment.

Compatible (Equipment): Equipment that interfaces mechanically or electrically together as manufactured without field modification.

Control Unit: A system component that monitors inputs and controls outputs through various types of circuits.

Digital Alarm Communicator Receiver (DACR): A system component that will accept and display signals from digital alarm communicator transmitters (DACTs) sent over the public switched telephone network.

Digital Alarm Communicator Transmitter (DACT): A system component at the protected premises to which initiating devices or groups of devices are connected. The DACT will seize the connected telephone line, dial a pre-selected number to connect to a DACR, and transmit signals indicating a status change of the initiating device.

Digital Alarm Radio System (DARS): A system in which signals are transmitted from a digital alarm radio transmitter (DART) located at a protected premises through a radio channel to a digital alarm radio receiver (DARR).

Digital Alarm Radio Transmitter (DART): A system component connected to or an integral part of a DACT that is used to provide an alternate radio transmission channel.

Display: The visual representation of output data other than printed copy.

Dual Control: The use of two primary trunk facilities over separate routes or different methods to control one communication channel.

Evacuation: The withdrawal of occupants from a building.

Evacuation Signal: Distinctive signal intended to be recognized by the occupants as requiring evacuation of the building.

Exit Plan: Plan for the emergency evacuation of the premises.

Fire Alarm Control Unit (Unit): A system component that receives inputs from automatic and manual fire alarm devices and may supply power to detection devices and transponder(s) or off-premises transmitter(s). The control unit may also provide transfer of power to the notification appliances and transfer of condition to relays or devices connected to the control unit. The fire alarm control unit can be a local fire alarm control unit or master control unit.

Fire Alarm Signal: A signal initiated by a fire alarm initiating device such as a manual fire alarm box, automatic fire detector, water flow switch, or other device whose activation is indicative of the presence of a fire or fire signature.

Fire Command Center: The principal manned or unmanned location where the status of the detection, alarm communications, and control systems is displayed and from which the system(s) can be manually controlled.

Fire Rating: The classification indicating in time (hours) the ability of a structure or component to withstand fire conditions.

Fire Safety Function Control Device: The fire alarm system component that directly interfaces with the control system that controls the fire safety function.

Fire Safety Functions: Building and fire control functions that are intended to increase the level of life safety for occupants or to control the spread of harmful effects of fire.

Guard Signal: A supervisory signal monitoring the performance of guard patrols.

Initiating Device: A system component that originates transmission of a change of state condition, such as a smoke detector, manual fire alarm box, supervisory switch, etc.

Initiating Device Circuit: A circuit to which automatic or manual initiating devices are connected where the signal received does not identify the individual device operated.

Integrated System: A computer-based control system, listed for use as a fire alarm system, in which certain components are common to non-fire monitoring and control functions.

Intermediate Fire Alarm or Fire Supervisory Control Unit: A control unit used to provide area fire alarm or area supervisory service that, when connected to the proprietary fire alarm system, becomes a part of that system.

Labeled: Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Level Ceilings: Those ceilings that are actually level or have a slope of 1-1/2 in. or less per foot (41.7 mm per m).

Line-Type Detector: A device in which detection is continuous along a path. Typical examples are rate-of-rise pneumatic tubing detectors, projected beam smoke detectors, and heat-sensitive cable.

Listed: Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

Loading Capacity: The maximum number of discrete elements of fire alarm systems permitted to be used in a particular organization.

Local Control Unit (Unit): A control unit that serves the protected premises or a portion of the protected premises and indicates the alarm via notification appliances inside the protected premises.

Local Fire Alarm System: A local system sounding an alarm at the protected premises as the result of the manual operation of a fire alarm box or the operation of protection equipment or systems, such as water flowing in a sprinkler system, the discharge of carbon dioxide, the detection of smoke, or the detection of heat.

Local Supervisory System: A local system arranged to supervise the performance of a guard's tours, or the operative condition of automatic sprinkler systems or other systems for the protection of life and property against a fire hazard.

Local System: A system that produces a signal at the premises protected.

Loss of Power: The reduction of available voltage at the load below the point at which equipment will function as designed.

Maintenance: Repair service, including periodically recurrent inspections and tests, required to keep the fire alarm system and its component parts in an operative condition at all times, together with replacement of the system or of its components, when for any reason they become undependable or inoperable.

Manual Fire Alarm Box: A manually operated device used to initiate an alarm signal.

Master Box: A municipal fire alarm box that may also be operated by remote means.

Master Control Unit (Unit): A control unit that serves the protected premises or portion of the protected premises as a local control unit and accepts inputs from other fire alarm control units.

Multiple Station Alarm Device: Two or more single-station alarm devices that may be interconnected so that actuation of one causes all integral or separate audible alarms to operate. It may also consist of one single-station alarm device having connections for other detectors or manual fire alarm box.

Multiplexing: A signaling method characterized by simultaneous or sequential transmission, or both, and reception of multiple signals on a signaling line circuit or a communication channel including means for positively identifying each signal.

Municipal Fire Alarm Box (Street Box): An enclosure housing a manually operated transmitter used to send an alarm to the public fire service communication center.

Municipal Fire Alarm System: A system of alarm initiating devices, receiving equipment, and connecting circuits (other than a public telephone network) used to transmit alarms from street locations to the public fire service communication center.

Municipal Transmitter: A transmitter that can only be tripped remotely, used to send an alarm to the public fire service communications center.

Non-restorable Initiating Device: A device whose sensing element is designed to be destroyed in the process operation.

Notification Appliance: A fire alarm system component such as a bell, horn, speaker, strobe, printer, etc. that provides an audible or visible output, or both.

Ownership: Any property, building, contents, etc., under legal control by occupant, by contract, or by holding of title or deed.

Plant: One or more buildings under the same ownership or control on a single property.

Power Supply: A source of electrical operating power including the circuits and terminations connecting it to the dependent system components.

Primary Battery (Dry Cell): A non-rechargeable battery requiring periodic replacing.

Proprietary Fire Alarm System: An installation of fire alarm systems that serve contiguous and non-contiguous properties under one ownership form a proprietary supervising station located at the protected property, where trained, competent personnel are in constant attendance. This includes the proprietary supervising station; power supplies; signal initiating devices; initiating device circuits; signal notification appliances; equipment for the automatic, permanent visual recording of signals; and equipment for initiating the operation of emergency building control services.

Proprietary Supervising Station: A location to which alarm or supervisory signaling devices on proprietary fire alarm systems are connected and where personnel are in attendance at all times to supervise operation and investigate signals.

Protected Premises: The physical location protected by a fire alarm system.

Radio Alarm Central Station Receiver (RACSR): A system component that receives data and annunciates that data at the central location.

Radio Alarm System (RAS): A system in which signals are transmitted from a radio alarm transmitter (RAT) located at a protected premise through a radio channel to two or more radio alarm satellite station receivers (RASSR), and that are annunciated by a radio alarm central station receiver (RACSR) located at the central station.

Radio Channel: A band of frequencies of a width sufficient to permit its use for radio communicators.

Remote Station Fire Alarm System: A system installed in accordance with this code to transmit alarm, supervisory, and trouble signals from one or more protected premises to a remote location at which appropriate action is taken.

Repeater Facility: Equipment needed to relay signals between supervisory stations, subsidiary stations, and protected premises.

Separate Sleeping Area: The area or areas of the family living unit in which the bedrooms (or sleeping rooms) are located. For the purpose of this code, bedrooms (or sleeping rooms) separated by other use areas, such as kitchens or living rooms (but not bathrooms), shall be considered as separate sleeping areas.

Shall: Indicates a mandatory requirement.

Shapes of Ceilings: The shapes of ceilings are classified as follows:

Smooth Ceiling: A surface uninterrupted by continuous projections, such as solid joists, beams, or ducts, extending more than 4 in. (100 mm) below the ceiling surface.

Should: Indicates a recommendation or that which is advised but not required.

Signal: A status indication communicated by electrical or other means.

Spacing: A horizontally measured dimension relating to the allowable coverage of fire detectors.

Spot-Type Detectors: A device whose detecting element is concentrated at a particular location. Typical examples are bi-metallic detectors, fusible alloy detectors, certain pneumatic rate-of-rise detectors, certain smoke detectors, and thermoelectric detectors.

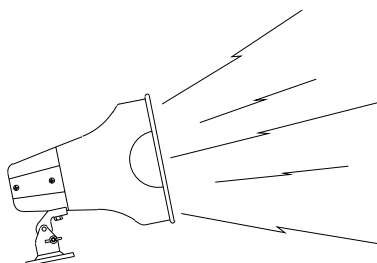
Supervisory Signal: A signal indicating the need of action in connection with the supervision of guard tours, fire suppression systems or equipment, or with the maintenance features of related systems.

Trouble Signal: A signal initiated by the fire alarm system, indicative of a fault in a monitored circuit or component.

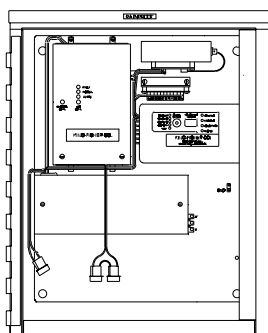
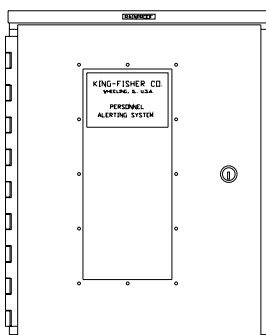
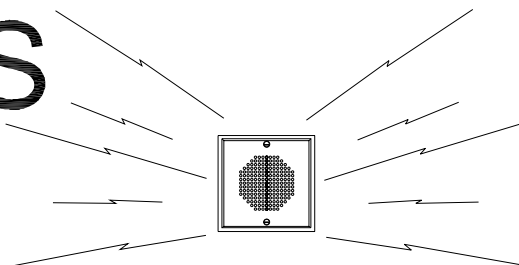
Zone: A defined area within the protected premises. A zone may define an area from which a signal can be received, an area to which a signal can be sent, or an area in which a form of control can be executed.



RADIO INDOOR PERSONNEL ALERTING SYSTEM

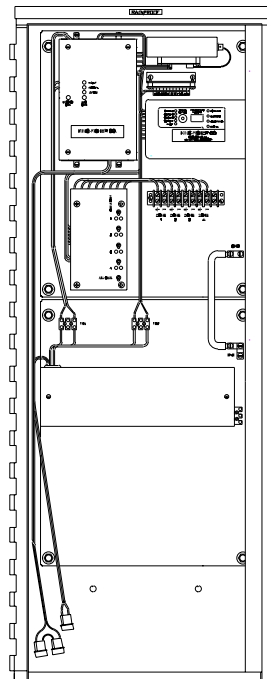
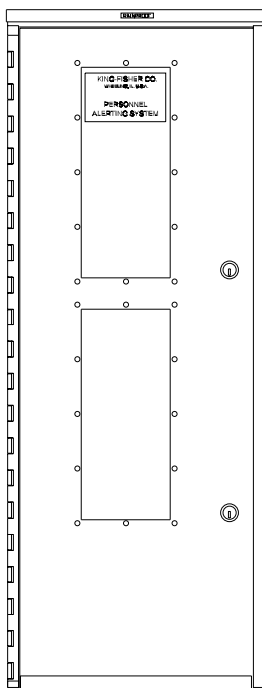


RIPAS



RIPAS-50A

RIPAS-100A



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com

INTRODUCTION

The King-Fisher Radio Personnel Alerting System (PAS) contains the latest state of the art technology to provide a warning for real or potential emergencies.

ACTIVATING THE SYSTEM:

There are two methods for activating the system.

Real Time Voice (92009): Using the portable transmitter, a real time voice message can be transmitted over the system.

Pendant Transmitter (92006): A four button pendant transmitter is provided that can be used to activate three pre-recorded messages.

PORTABLE TRANSMITTER

GENERAL

The Portable Real Time Transmitter is a programmable, 11-channel two-way radio that operates in a professional FM communications Narrow band. This portable radio transmitter includes an on-off/volume control knob and a channel select knob, both located on the radio case top. Transmit and monitor push-buttons are built into the side.(See Figure 1)

OBSERVE THE FOLLOWING SAFETY GUIDELINES:

DO NOT position the radio antenna near the face, eyes or other exposed parts of the body while transmitting. Keep the radio vertical, two to three inches away while talking into the front panel.

DO NOT press the Push-To-Talk button except when you intend to transmit.

DO NOT operate radio equipment near electrical blasting caps or in an explosive atmosphere, or in HERO SAFE, or unsafe areas.

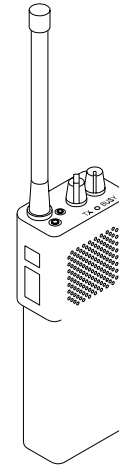
OPERATION:

Real Time Voice: The portable transmitter is programmed to operate at 139.575 Mhz. (also available between 134-174Mhz.). There are eleven (11) channels available on this transmitter and they are all programmed for the same frequency, to prevent accidental selection of a wrong channel.

To operate the transmitter, turn the on-off/volume control knob on top of the unit, to the on position. Depress the keying button on the left side of the unit. The keying button is the larger of the two buttons. Hold the unit about 2 inches from your mouth while speaking.

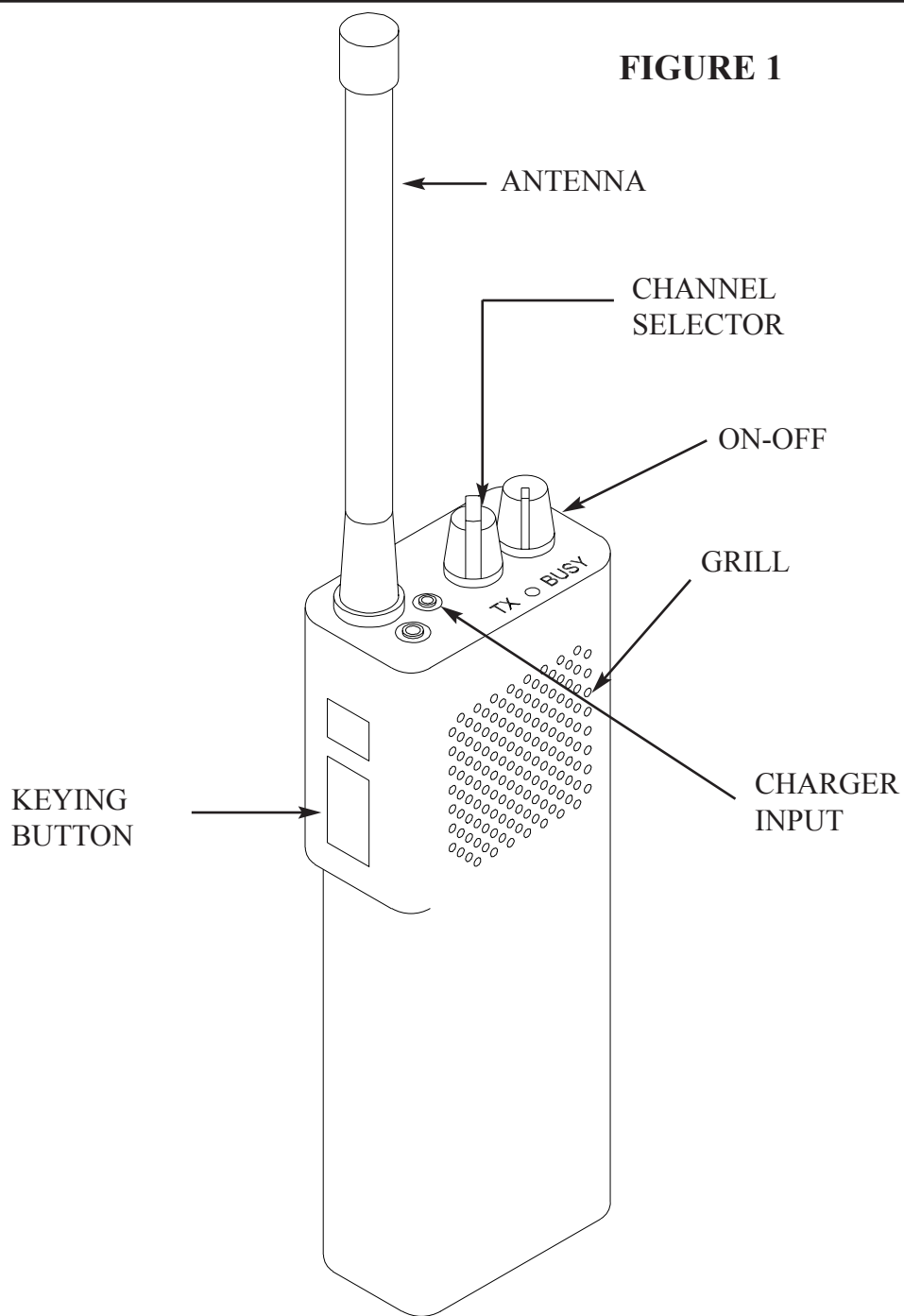
Speak into the grill located at the top of the unit, when finished speaking, release the keying button.

When operating the unit, make sure you are not in the vicinity of a speaker. If you are in the vicinity of a speaker, feedback may result which can be identified as a loud squealing noise that can be heard over the speakers.



PORTABLE VOICE
TRANSMITTER
(PART No. 92009)

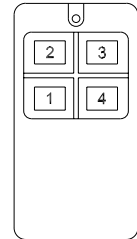
FIGURE 1



**PORTABLE VOICE TRANSMITTER
(PART No. 92009)**

Pendant Transmitter: This transmitter is a spread spectrum frequency-hopping 900 MHZ unit. This technique provides for an extremely reliable and secure system.

The Pendant Transmitter is powered by a 3.0 vdc. LITHIUM battery (CR-2). The battery should last from 3-5 years.



There are four (4) buttons on this transmitter. Three (3) buttons (1-3) are used to activate three (3) recorded messages. The fourth (4th) button is used to cancel the playing of the messages.

FOUR BUTTON PENDANT
TRANSMITTER
(PART No. 92006)

The three messages are:

BUTTON
1

“Attention Please, there has been a report of an emergency. Proceed calmly to the nearest exit and leave the building immediately. Use the stairwells where necessary.”

BUTTON
2

“We have an emergency in our building. Please stay in your classroom and keep your door closed. Keep your windows shut and leave all fire doors closed. Standby for further information from the principal’s office.”

BUTTON
3

“Attention! Attention! Attention! An emergency has been reported in the building. Please exit using the stairwells. Do not use the elevators.”

BUTTON
4

Reset Button: After pressing buttons on the Pendant Transmitter the person **MUST RESET** (button #4) the system before using the Portable Transmitter.

When one (1) of these three (3) buttons is depressed, three (3) temporal whoops will transmit followed by the message. Three (3) more temporal whoops will be heard and the message repeated. This will continue until button four (4) is depressed to cancel the message. To select a different message, BUT-TON 4 must be depressed to cancel the playing message before a new one is selected.

REPEATERS (92005):

To extend the range of the four-button (4) transmitters, repeaters may be used. There will be three (3) to five (5) repeaters placed in strategic locations to guarantee that all receivers will receive the transmitted signals (see drawing 92005-FLD).

The repeaters are battery operated and the batteries will be re-charged using a solar cell. Once a month, the following maintenance should be performed on the repeaters:

Make sure the solar cell face is free of dirt, snow or anything else that would block out the sunrays.

Disconnect one lead connected from the solar cell to the battery. Measure the battery voltage. If it reads 11.5 vdc or less, the battery should be replaced with a fully charged battery. The discharged battery can be recharged and used as a spare.

RIPAS RECEIVERS (RIPAS-50A (98004) (RIPAS-100A (98008)

The RIPAS Receivers are self- contained units located in the various buildings. Built-in batteries provide up to 48 hours of operation in the event of loss of AC power.

The RIPAS Receivers receive the signal from the portable real time voice transmitter or the four-button Spread Spectrum transmitters and transmit the real time voice transmission or pre-recorded messages to the speaker circuits.

The speaker amplifier is located in the receiver cabinet in the upper left side (see drawing 98101-FLD and 98100-FLD). There are three (3) LEDS located on this unit, **YELLOW**, **GREEN** and **RED**. (See Figure 2) The **GREEN LED** on indicates that the system is in a normal state. The **RED LED** on indicates that an alarm came in. This **LED** will turn on whenever the four-button transmitter is activated or the portable voice transmitter is keyed. The **YELLOW LED** on indicates that some type of trouble exists. When the **YELLOW LED** is on, the **GREEN LED** will flash to indicate what type of trouble exists. The **GREEN LED** will flash the number of times to indicate the type of trouble, delay then repeat the number of flashes.

1 FLASH	POWER TROUBLE AC
2 FLASHES	OPEN SPEAKER CIRCUIT
4 FLASHES	SHORTED SPEAKER CIRCUIT
8 FLASHES	AMPLIFIER TROUBLE
32 FLASHES	BATTERY TROUBLE

Multiple faults will add up to create a longer flash count.

RIPAS-100A RECEIVER

The RIPAS-100A Receiver is a 100 watt unit which has the speaker outputs separated into four (4) zones. The four (4) zone splitter is in the center left of the unit and can be recognized by the five (5) toggle switches (see drawing 98100-FLD).

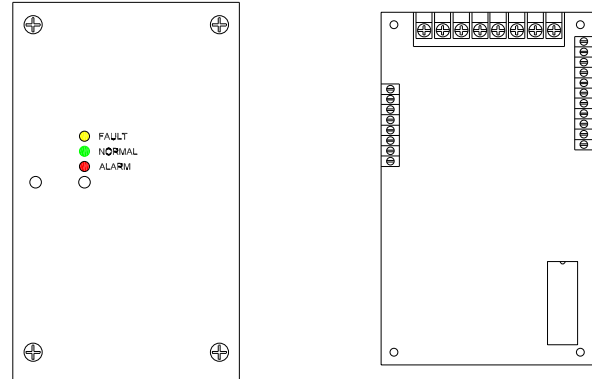
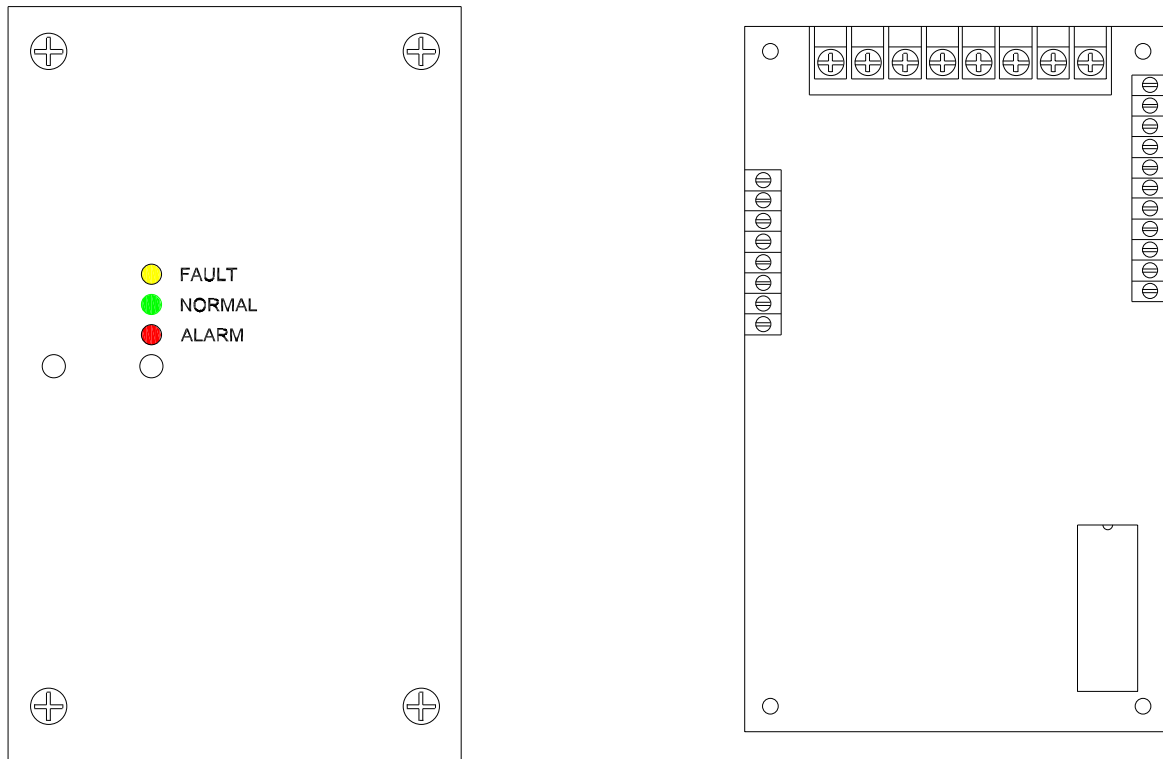


FIGURE 2



When this unit receives a signal from the portable voice transmitter or the four (4) button transmitter, all zones will be activated and the **RED LEDS** will turn on.

All four (4) zones are supervised. When one (1) of the **YELLOW LEDS** lights, this is an indication that a zone(s) has a short or an open. The wiring should be checked and corrected.

CHANGING MESSAGES

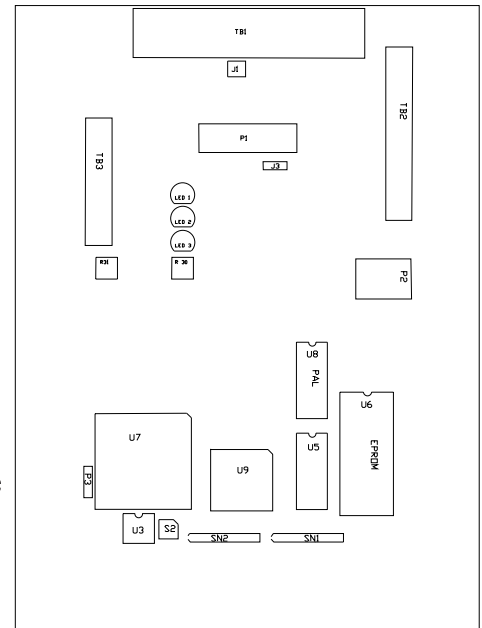
If different messages are required, programming of new messages onto a new EPROM is done at the Factory. Contact King-Fisher Company.

When the new EPROMS are received, the following steps should be taken to exchange the EPROMS. (See Figure 3)

1. Disconnect all power to the unit including the batteries.
2. Remove 4 screws securing the cover to the unit.
3. Locate **U6**, a 32 pin chip at the lower right corner of the unit. It will have a small label on the chip, identifying its program version. Look at how the chip is seated, this is how the new chip should look when you are done. Using a thin bladed screwdriver, carefully pry the chip out of its socket. It is usually best to start from the bottom and work your way up slowly.

CAUTION: Parts are static sensitive, before removing new EPROM from its packaging, make sure you have grounded yourself to the unit. (Simply touching the metal standoffs will discharge any static charge between you and the module).

4. Take the new EPROM and carefully seat the pins into the socket. Insure that the chip is properly oriented. Pin 1 must be in the upper left position. Pin 1 is the top left pin with the chip orientated vertically, it is usually marked with a dot adjacent to the pin or by a notch showing the top of the chip. Insure that all pins are aligned before applying pressure to seat completely.
5. Restore power and test to insure that the new messages are functioning properly.



SPREAD SPECTRUM RECEIVERS (92012)

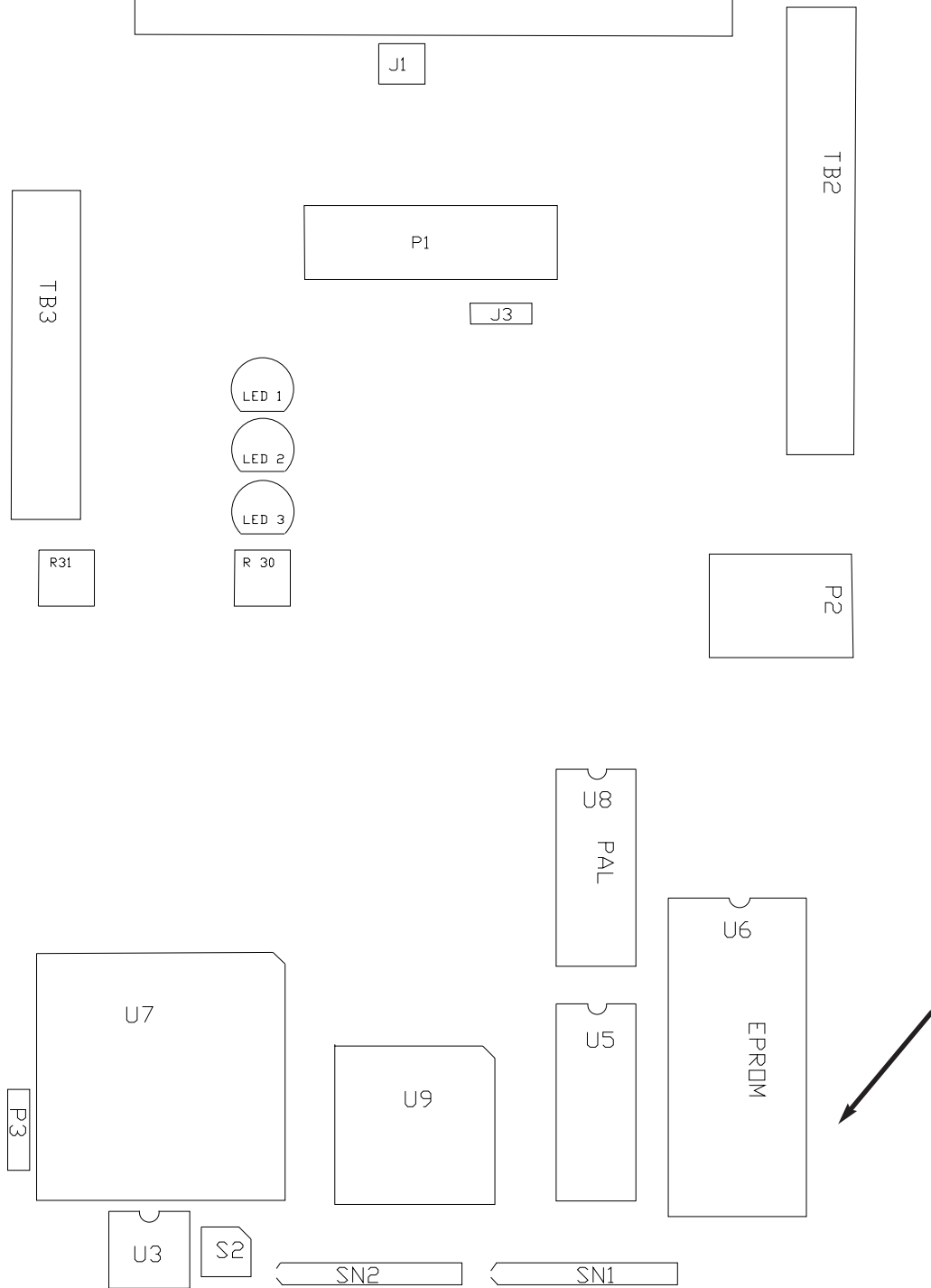
This unit is located in the center right of the RIPAS-50 and the upper center right in the RIPAS-100. This unit receives signals from the four button transmitter and activates contacts to enable the pre-recorded messages. It will display the button number and the output that was activated.

RADIO CARE

GENERAL

MOISTURE

FIGURE 3



The transmitter is not waterproof and should not be immersed in water or exposed to excessive moisture.

EXTREME HEAT

Like all electronic equipment, the radio should not be subjected to extreme heat, such as being left in direct sunlight inside of a closed vehicle.

VIBRATIONS/SHOCKS

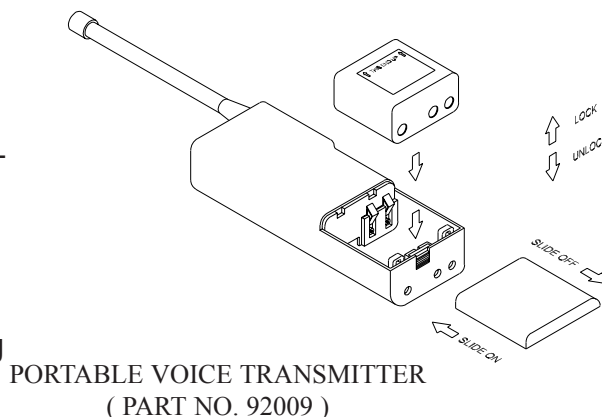
Though the transmitter is designed to be rugged, it cannot be expected to survive abuse.

CHEMICALS

Detergents, alcohol, aerosol sprays or petroleum products might damage the radio case. Clean the case using a soft cloth moistened with clear water.

BATTERY

IMPORTANT: Charge the battery before using the radio for the first time.



The Portable Real Time Voice Transmitter is powered by a 9.6 vdc.NiCad rechargeable battery which fits into the radio case battery compartment. A door and latch hold the battery in place.

CHARGING

Over time, the battery pack can lose its charge during storage and shipment, and should be fully charged using the charger that was supplied, before, the radio is used. Thereafter, the battery should be charged (using the charger that was supplied) overnight after each day of use, to ensure peak radio performance for the next day.

BATTERY REMOVAL

The battery is easy to remove. Unlock the door latch. Then press down on the door and slide it off of the radio. Turn the portable over and tap the battery compartment against the palm of your free hand until the pack drops into your hand. (See Figure 4)

RADIO CONTROLS AND ACCESSORY CONNECTORS

ANTENNA

The flexible antenna radiates radio signals. Before using the radio, make sure the antenna base is threaded fully into the radio's antenna bushing.

ON-OFF/VOLUME CONTROL

To switch on the unit, rotate this knob CW (clockwise) out of the "click" position. Rotate this control CCW (counterclockwise) to the off position if the radio is not being used.

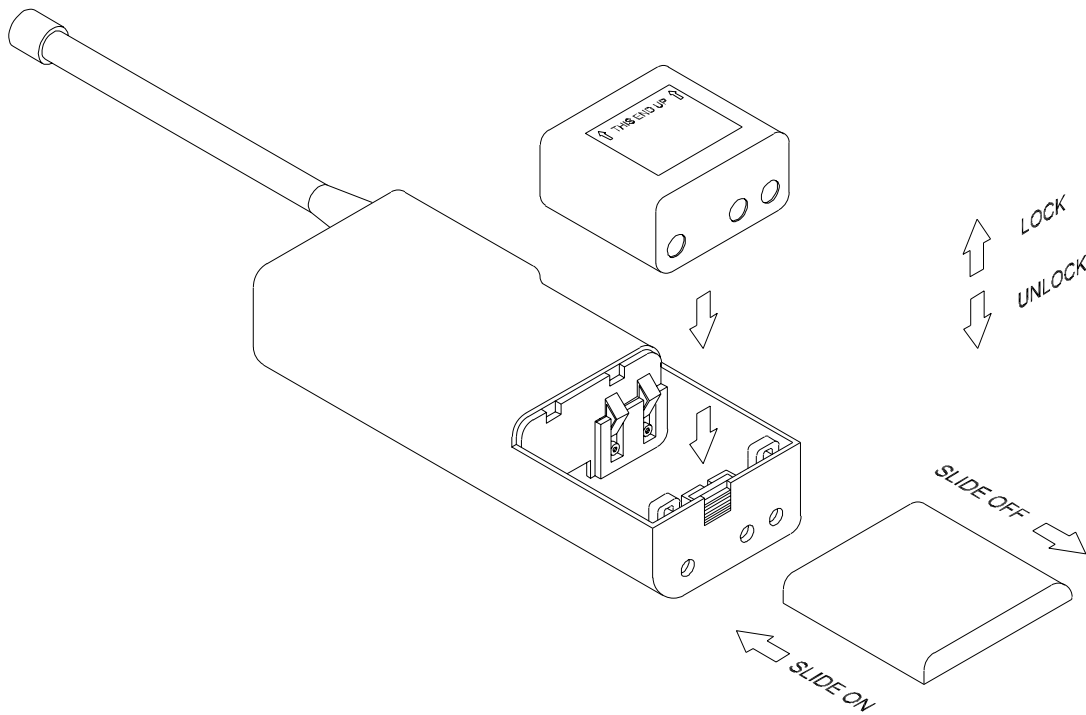
TRANSMIT/BUSY LAMP

The transmit/busy lamp lights red while the transmitter is activated.

PUSH-TO-TALK BUTTON

FIGURE 4

Battery replacement:



PORTABLE VOICE TRANSMITTER
(PART NO. 92009)

This push-button to talk switch activates the transmitter, and must be held down while you talk into the radio. Release the PTT button when finished transmitting.

WHAT THE RADIO TONES MEAN

POWER ON/SELF CHECK “OK”

Switch on the portable by rotating the on-off/volume control knob clockwise out of the “click” position. The unit then runs a quick “self test.” When the internal system checks confirm basic functions, the radio sounds a brief “confirmation tone” to indicate that the handheld portable transmitter is ready for use.

ERROR TONES

If the self test detects a diagnostic error, an error tone sounds. One low-pitched tone means that the radio microcontroller is not working as it should. Alternating tones (the second is lower pitched) indicate that the radio frequency synthesizer is malfunctioning. If you get one of these messages, turn off the radio and try again.

If you cannot correct a problem, then consult King-Fisher Company.

One low tone sounds, and the transmitter automatically shuts off if you hold the PTT button down continuously for a specified time (normally, 30 seconds).

BATTERY LOW ALERT

When the battery charge drops below a certain level, a short warning tone sounds every 15 seconds (while the radio is turned on). You should then charge the battery. A final, longer tone means the battery is discharged and the radio has shut itself off.

BATTERY SAVER

The radio has a “battery saver” feature that conserves battery power. The battery saver constantly monitors the radio’s transmitter, receiver and controls for activity. If ten seconds pass without the user operating a control, this feature removes power from a portion of the radio electronics.

MAINTENANCE/TROUBLESHOOTING

PENDANT TRANSMITTER

The pendant transmitters should be tested weekly. This is accomplished by depressing one of the message buttons and confirming that the pre-recorded message was activated.

If the message does not activate, perform the same test using a different pendant transmitter. If the message still does not activate, the problem may be with the receivers and not the pendant.

If the message does activate, the battery in the first pendant must be replaced.

BATTERY REPLACEMENT

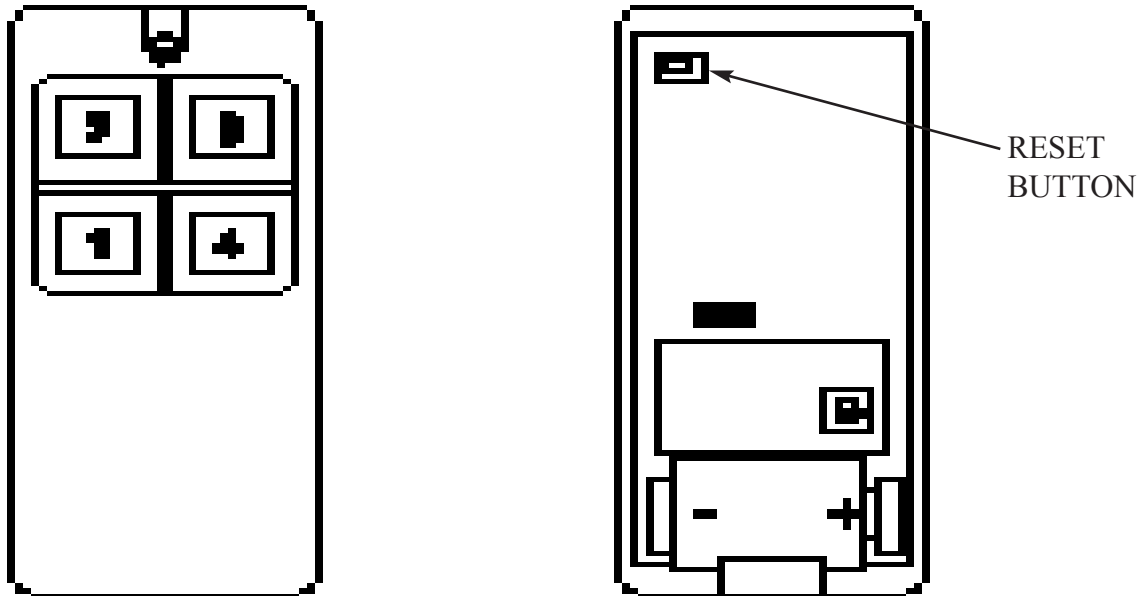
Hold the pendant face down.

Place a small screwdriver in the slot at the top of the unit and push down. The back will pop off.

Remove the battery and replace with a new one. Make sure the new battery is inserted in the same orientation as the one removed. (see figure 5).

After the new battery is inserted, the reset button must be depressed to re-initialize the transmitter.

FIGURE 5



Replace the back on the transmitter.

Test the unit. If the message still does not activate, the pendant transmitter is defective and must be replaced.

PROBLEM	POSSIBLE SOLUTIONS
The battery does not work at all.	Make sure that the battery is installed correctly. Recharge or replace the battery.
The Transmit/Busy lamp does not light or is dim when you transmit.	Recharge the battery.
An error tone sounds when the radio is first switched on.	See “Error Tones.”
An error tone sounds while you are talking (and the transmitter shuts off).	See “Error Tones.”
The battery loses its charge sooner than expected.	If the radio is used in extreme cold, warm the radio under your coat. Replace the battery.

PORTABLE TRANSMITTER

If you encounter trouble operating the handheld, review the radio controls and operation sections. If you think the radio is malfunctioning, check the table below.

TROUBLESHOOTING NOTES

Try a battery pack from a working radio. If the radio in question works with that pack, the original battery is suspect. Charge the suspect battery as recommended. Then, if the charged original battery cannot power the handheld, try charging again with another charger. If the battery still doesn't hold a charge, the pack should probably be replaced. However, if the battery appears to be "good" after you try the second charger, the first charger might be faulty.

Maximum power drain occurs while the radio transmits, so don't hold down the Push-To-Talk button more than necessary. Battery power is used while the handheld is left on to receive calls. If practical, switch off the unit.

In extreme cold, a battery's charge capacity is greatly reduced. If you use the radio in very cold weather, periodically warm the portable underneath your coat if possible.

MODEL CCU-D Central Control Unit

SYSTEM FEATURES:

- One way communication system to control ROPAS-D equipment
- Real time voice
- Five (5) distinct alarm tones
- Silent system test
- Cancel activation
- VHF high band-narrow band radio with Antenna
- Desk top cabinet
- Alarm screen touchpad and display
- Hand-held microphone set
- Antenna surge suppressor
- 7 Ahr. standby battery and Battery Charger

Independent alarm activation can be configured by:

- Tone type
- Tone duration
- Number of cycles
- Pre-recorded messages.



OPTIONS

- Standard group activation of a single unit
- Group or all units included for on demand grouping
- Remote LED Message Display unit
- Message Display Remote Controller with Interface to LED Message unit

OPTIONS (continued)

- Trunked Radio, or Fiber Optics Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Field Programmable Customized Tone or Real Time Voice message



Description

The CCU-D Central Control Unit (CCU-D) is used to activate a system via the push buttons on its front panel or through the optionally selected system software running on a connected computer. The CCU-D communicates via radio frequency with all of the system's Remote Controllers (RCs).

Message Security

Data communications between the CCU-D and RC is accomplished using a Frequency Shift Keying (FSK) encoding/decoding format transmitted over any two-way radio. For data error detection, an extended parity check and redundant messages are used. Each eight bit block of data in the message is transmitted along with an eight bit parity code. If the data does not match the parity code, the message is ignored. Each data packet consists of three copies of the message so at least one good message will be received.

Added security is obtained by use of a synchronization code. When the CCU-D is powered up, it sends a sync code to all RCs. This sync code is time dependent (it changes every second); but is unrelated to the time of day. RCs independently keep track of the sync code and only needs to be re-synched if they lose power.

A transmitted message contains the current sync code from the CCU-D which the RC compares to its current sync code. If the sync code does not match, the sirens will not activate. This prevents someone from recording a transmitted message and playing it back later with the intention of activating the sirens.

KING-FISHER Company 2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 f 847 • 255 • 1507 e-mail sales@kfco.com Internet www.kfco.com

MODEL ROPAS-D EMERGENCY DISPATCH

SYSTEM FEATURES:

- Two way communication system to control ROPAS-D equipment
- Software package allows for up to two (2) CCU-Ds
- Real time voice
- Five (5) distinct alarm tones
- Silent system test (automatic or manual)
- Status Monitoring: AC fail; AC normal; 24vdc low; 24vdc fail; RTU door open; No sound; Fault; Siren on; Siren off
- System Cancel activation
- VHF high band-narrow band radio with Antenna
- Pentium II 350 Mhz. Computer
- 32X Cd-ROM
- Mouse, Windows 98 or NT
- Printer
- Serial Port and RS32 Cable
- CCU-D Alarm screen touchpad and display
- Hand-held microphone set
- Antenna surge suppressor
- 7 Ahr. standby battery for CCU-D and Battery Charger

Independent alarm activation can be configured by:

- Tone type
- Tone duration
- Number of cycles
- Pre-recorded messages.

OPTIONS

- Standard group activation of a single unit
- Group or all units included for on demand grouping
- Remote LED Message Display unit
- Message Display Remote Controller with Interface to LED Message unit
- Trunked Radio, or Fiber Optics Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- UPS for the Computer and Printer
- Field Programmable Customized Tone or Real Time Voice message



Description

The CCU-D Central Control Unit (CCU-D) is used to activate a system via the push buttons on its front panel or through the system software running on a connected computer. The CCU-D communicates via radio frequency with all of the system's Remote Controllers (RCs). The RCs interface field devices to the Emergency Dispatch and Graphics Station (EDGS) and control outdoor speaker stations.

Two-way communication between the EDGS and RCs ensures that you are informed of any changes in status that occur between interrogation periods. The time interval for interrogation is defined by the user. For critical alarms such as a low battery, a warning is immediately reported back to the EDGS.

Message Security

Data communications between the CCU-D and RC is accomplished using a Frequency Shift Keying (FSK) encoding/decoding format transmitted over any two-

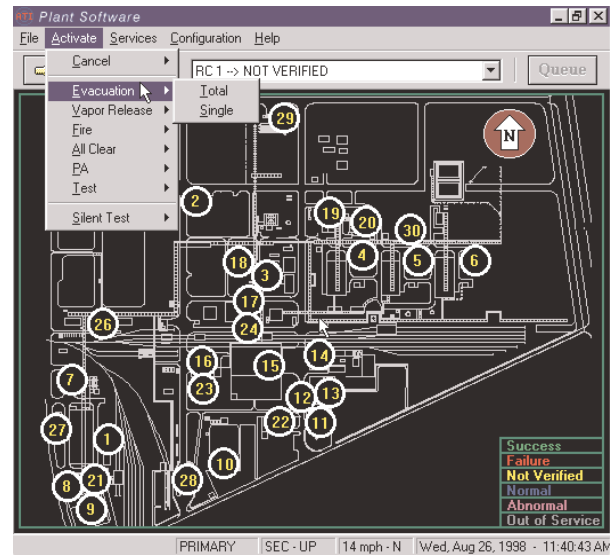
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way radio. For data error detection, an extended parity check and redundant messages are used. Each eight bit block of data in the message is transmitted along with an eight bit parity code. If the data does not match the parity code, the message is ignored. Each data packet consists of three copies of the message so at least one good message will be received.

Added security is obtained by use of a synchronization code. When the CCU-D is powered up, it sends a sync code to all RCs. This sync code is time dependent (it changes every second); but is unrelated to the time of day. RCs independently keep track of the sync code and only needs to be re-synched if they lose power.

A transmitted message contains the current sync code from the CCU-D which the RC compares to its current sync code. If the sync code does not match, the sirens will not activate. This prevents someone from recording a transmitted message and playing it back later with the intention of activating the sirens.



ROPAS-D 108-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 108-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 108dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 108-1 through 4

GENERAL

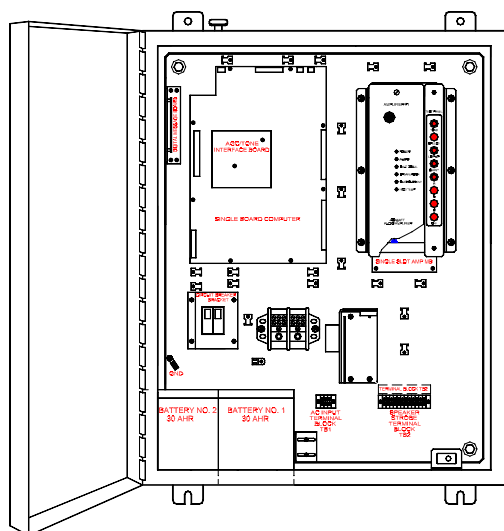
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (contoller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	290 lbs. (131.5 Kg.)
Speaker Dimensions one (1) head	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

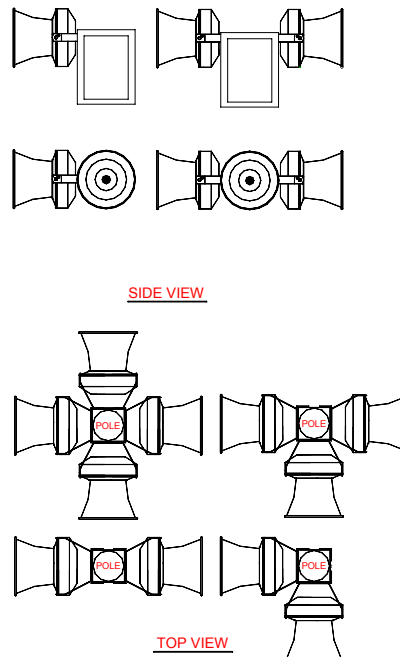
AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



Battery quantity and size determined by Speaker Head Configuration

1 through 4 Speaker Head Configurations



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ROPAS-D 111-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 111-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 111dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 111-1 through 4

GENERAL

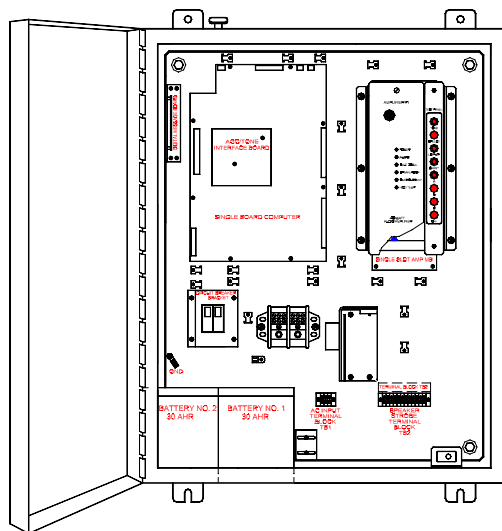
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (controller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	290 lbs. (131.5 Kg.)
Speaker Dimensions (one (1) head)	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

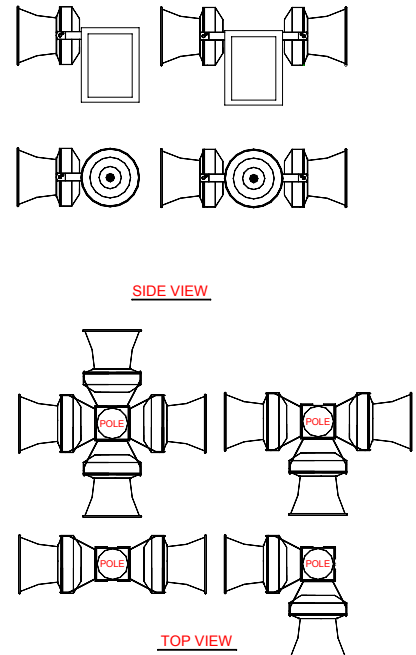
AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



Battery quantity and size determined by Speaker Head Configuration

1 through 4 Speaker Head Configurations



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ROPAS-D 114-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 114-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 114dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 114-1 through 4

GENERAL

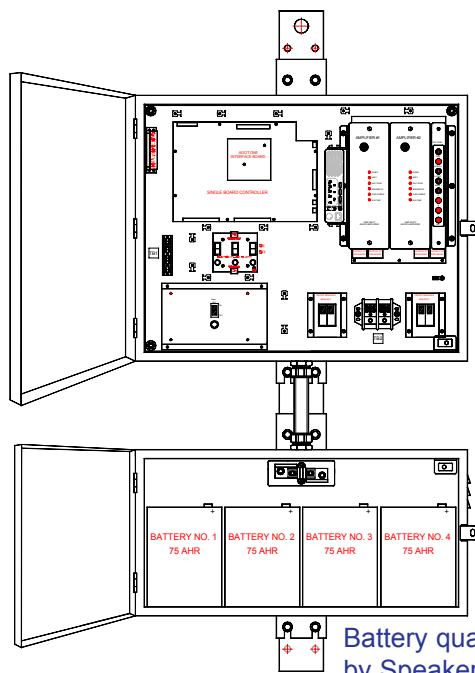
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (controller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	290 lbs. (131.5 Kg.)
Speaker Dimensions (one (1) head)	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

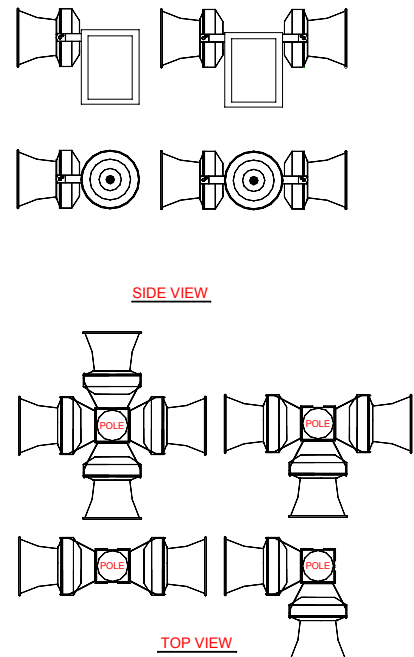
AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



Battery quantity and size determined by Speaker Head Configuration

1 through 4 Speaker Head Configurations



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ROPAS-D 117-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 117-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 117dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 117-1 through 4

GENERAL

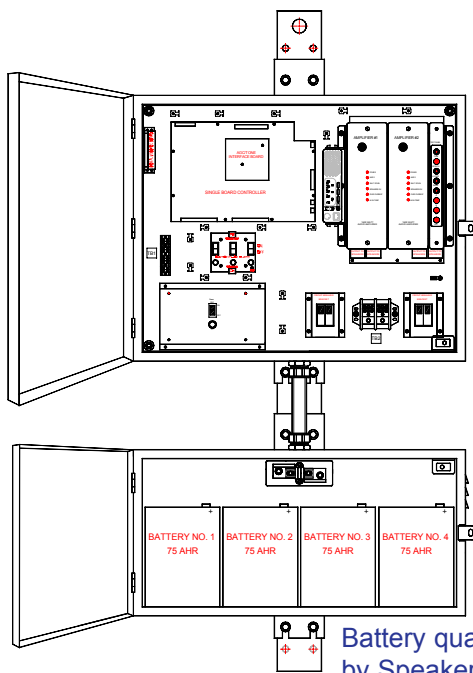
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (controller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	290 lbs. (131.5 Kg.)
Speaker Dimensions (one (1) head)	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

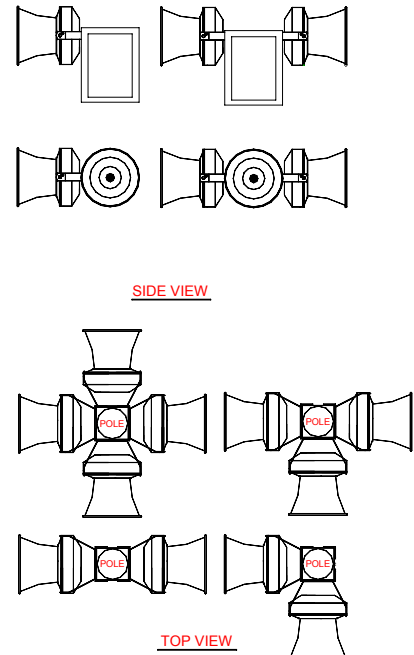
AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



Battery quantity and size determined by Speaker Head Configuration

1 through 4 Speaker Head Configurations



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ROPAS-D 120-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 120-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 120dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 120-1 through 4

GENERAL

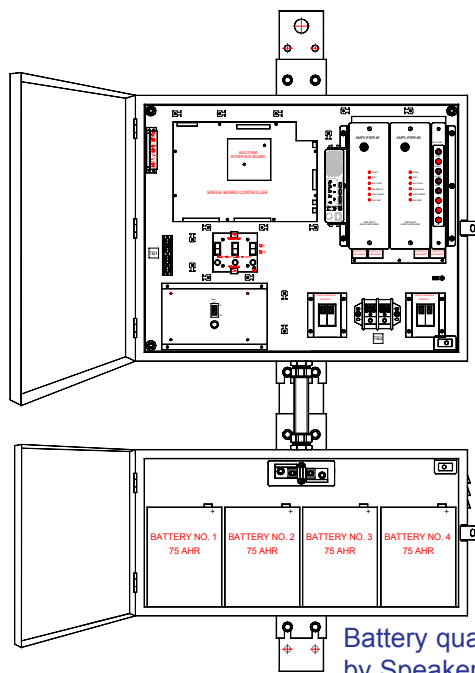
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (controller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	290 lbs. (131.5 Kg.)
Speaker Dimensions (one (1) head)	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

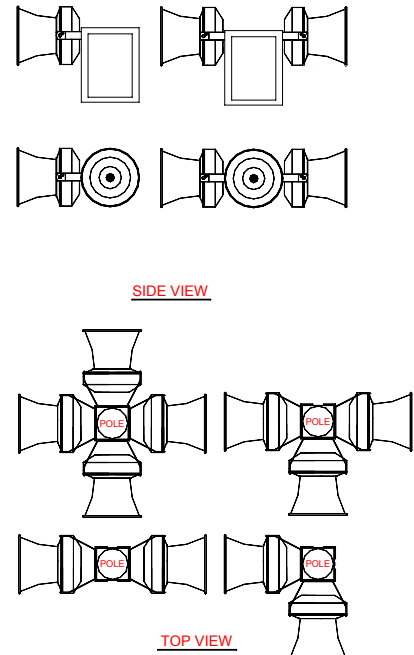
AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



Battery quantity and size determined by Speaker Head Configuration

1 through 4 Speaker Head Configurations



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ROPAS-D 123-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 123-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 123dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 123-1 through 4

GENERAL

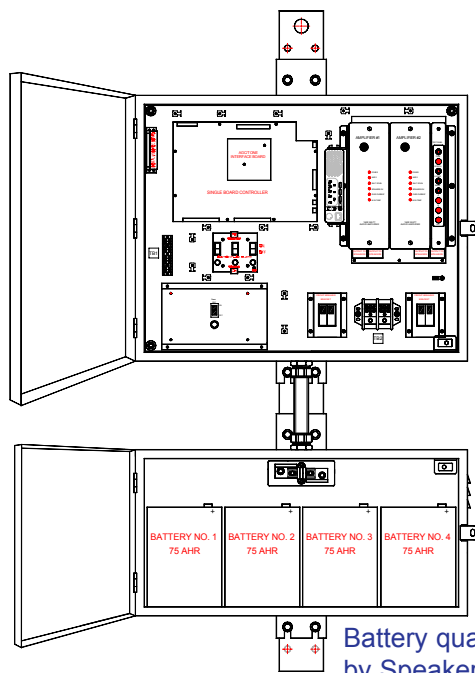
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (controller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	530 lbs. (240.4 Kg.)
Speaker Dimensions (one (1) head)	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

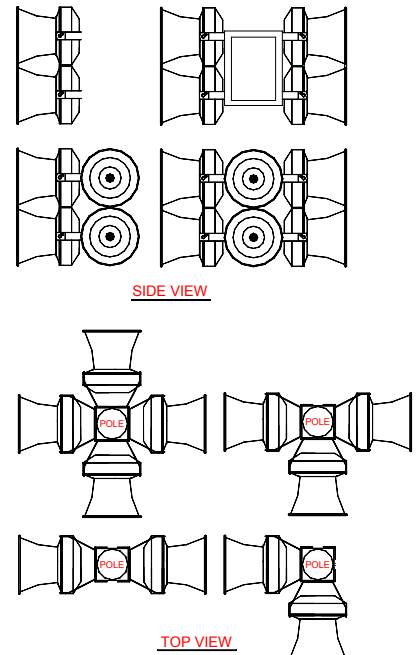
AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



Battery quantity and size determined by Speaker Head Configuration

2 through 8 Speaker Head Configurations



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ROPAS-D 126-1 through 4

REAL TIME VOICE AND SIREN SYSTEM

ROPAS-D SERIES DIRECTIONAL REAL TIME VOICE AND SIREN SYSTEMS DELIVER CLEAR VOICE AND EMERGENCY MESSAGES

SYSTEM FEATURES:

- Up to 3200 Watts of Speaker Power
- Custom Speaker Head Configuration
- 1600 Watt Audio Amplifier Assembly; Weather Resistant
- NEMA 4 Enclosures
- Local Diagnostics
- Single Board Remote Controller
- Intrusion Alarm
- Amplifier and Speaker Supervision
- Long Range Wireless Communication
- Stainless Steel Antenna
- Antenna Surge Suppression
- Local and Remote Alarm Activations
- Real Time Voice
- Up to 5 Tones
- 24VDC Battery Charger
- Short Circuit and Internal Fault Protection

OPTIONS

- Stainless Steel NEMA 4X Enclosures
- Battery Selection
- Solar Power Configuration
- Trunked Radio Communication
- Up to twenty (20) Pre Recorded Digitized Messages
- Wireless Push Button Interface
- Enclosure Heater
- Automatic Status Reporting
- Remote Diagnostics
- Field Programmable Customized Tone or Real Time Voice message

BASIC SYSTEM

Model ROPAS-D 126-1 through 4 is provided in speaker head configurations up to 360° coverage. and pre-packaged for 126dBc directional outdoor alerting service.

Consisting of Speaker Head assemblies, up to 360° coverage, real-time public address module, Nema 4 siren control cabinet, cabinet mounting bracket, controller, fifty (50) foot speaker cable, twenty (20) foot antenna cable, surge suppressor, tone generator, automatic gain control (for real time voice), built-in amplifiers, amplifier tray and battery charger (120/240vac). Battery fuse, and battery cables.

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ROPAS-D 126-1 through 4

GENERAL

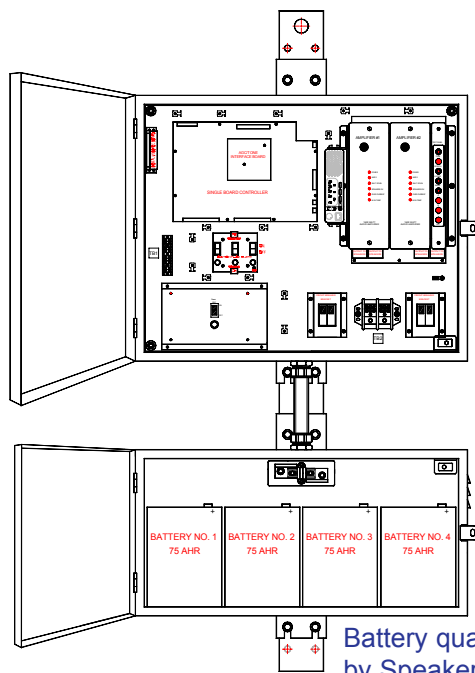
Operating Temperature (Note: Battery Heaters required for low temps)	-40 to +40 deg. C
Humidity	0% to 95% Non-Condensing
Standby Operation w/out AC	120 hour duration
Alarm Activation Operation w/out AC	30 minute duration (4 batteries)
Radio Communications	UHF, VHF, 800MHz & 900MHz Trunking
Gross Weight (controller & battery cabinet)	150 lbs. (68.04 Kg.) w/o batteries
Dimensions: Controller Cabinet	H 24" (61 cm). x W 30" (76.2 cm). x D 12" (30.5 cm)
Battery Cabinet	H 15" (38.1 cm). x W 30" (76.2 cm) x D 14" (35.6 cm)
Speaker Gross Weight (Maximum for 4 heads)	530 lbs. (240.4 Kg.)
Speaker Dimensions (one (1) head)	19" (48.3 cm) dia. x 24" (61.0 cm) long

ELECTRICAL

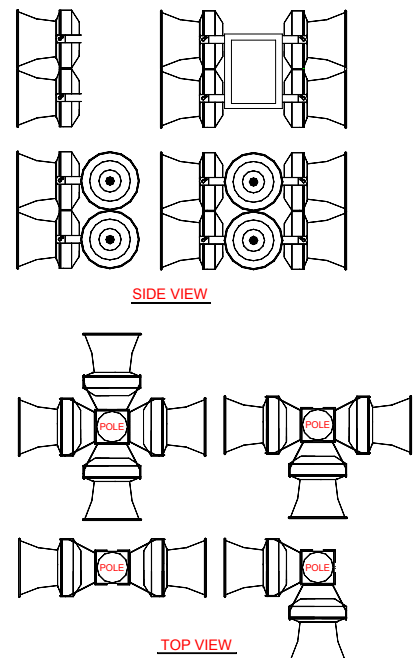
AC line Protection	MOV Protection for high transient surges
Antenna Surge Protection	50,000 Amps IEC 1000-4-5 8/20 use waveform surges
AC input Voltage	120Vac / 240Vac +/- 10% 50-60 Hz Single Phase
AC input Current	3.5 Amps for 120V and 2.0 Amps for 240V
Battery 12V, 75 Ahr.	Optional, call the Factory for Battery Selection

AMPLIFIER

Audio Output Power	1600 Or 3200 Watts (rms)
Frequency Operating Range	300 to 3.5KHz
Output Impedance	75V line
Total Harmonic Distortion	3%
Thermal Shut Down Protection	90 deg. C



2 through 8 Speaker Head Configurations



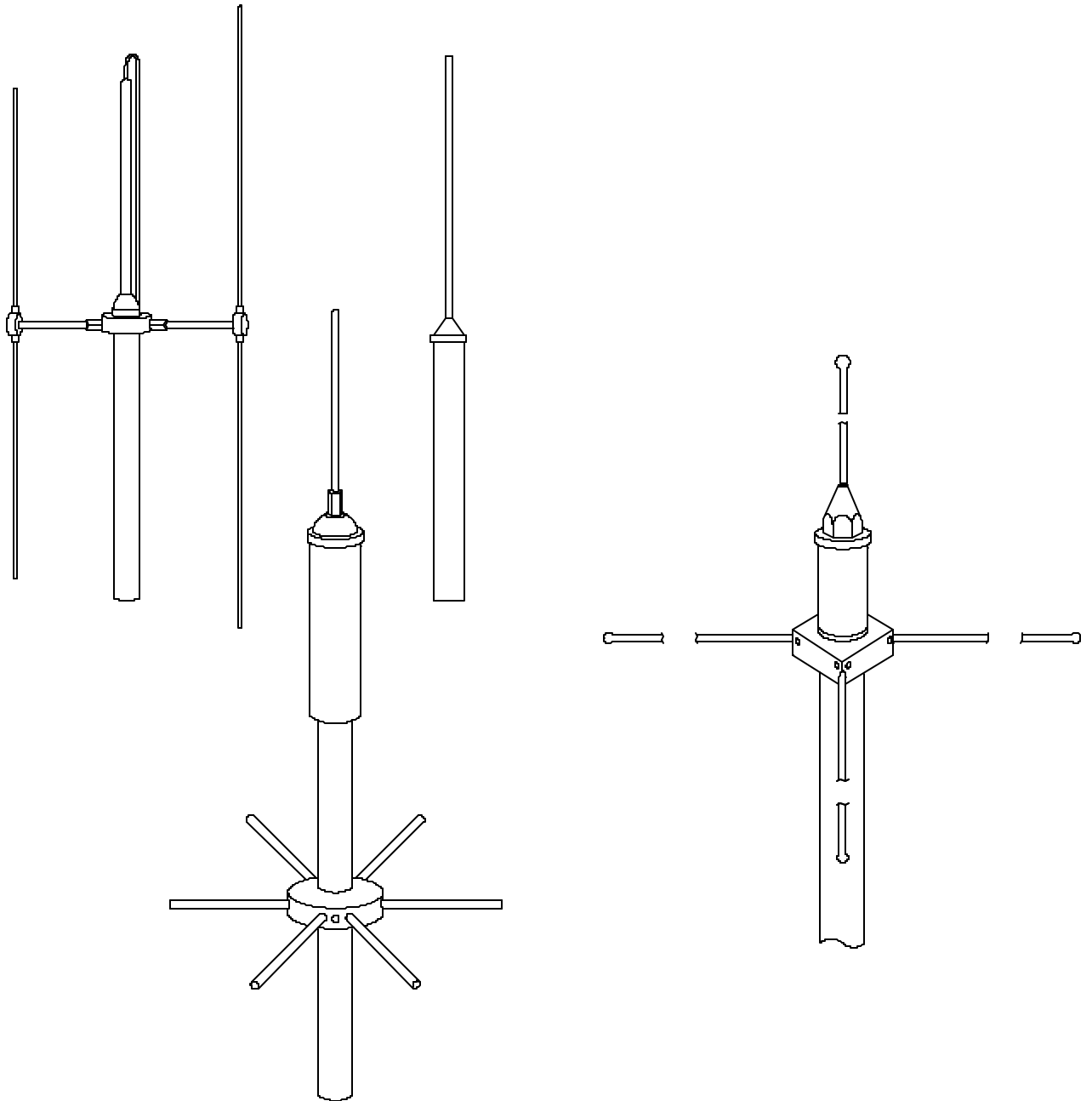
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ANTENNAS

TECHNICAL MANUAL



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

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QUESTION:

Is the Antenna an important component in a Radio System????

ANSWER:

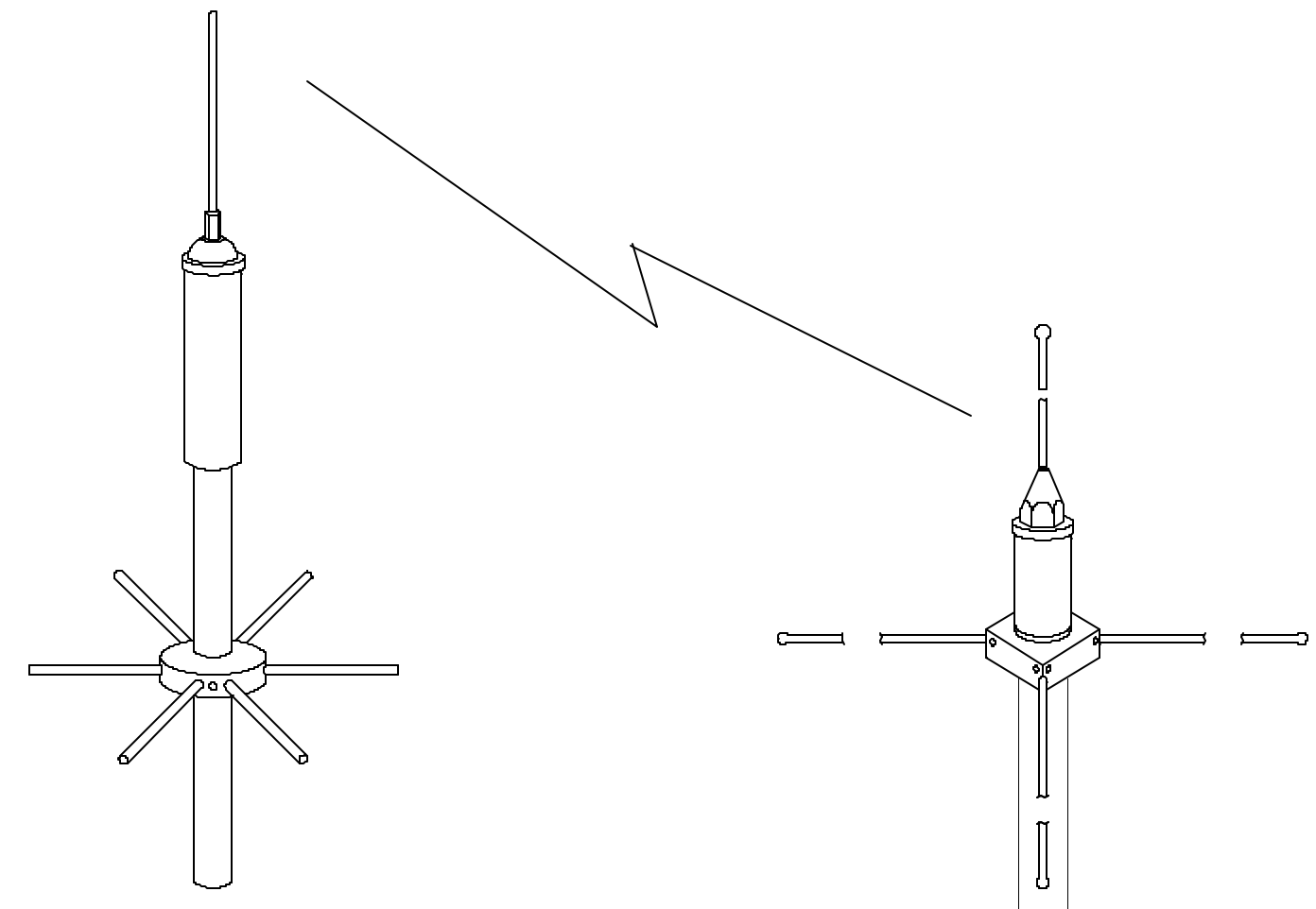
The Antenna is the single most important component in any Radio System!!!!!!

A great Antenna installation allows unbelievable range.

A poor installation won't transmit across the street!!!!!!!!!!

THE BEST PART IS:

You can do more to guarantee peak antenna performance - compared to time spent on other maintenance chores.

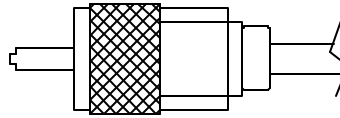
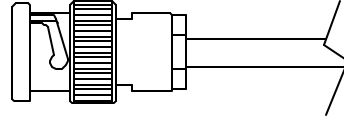


ANTENNA BASICS

ANTENNA SYSTEM

Consists of:

1. Antennna elements
2. Coax cable
 - RG 58u
 - RG 213
 - RG 8
3. Connectors
 - PL259
 - BNC
 - N
4. Ground



ANTENNA SYSTEM EFFICIENCY

1. Get Radio power from the Transmitter
2. Send most of it toward the Receiver

HOW CAN WE GET THE MOST POWER TO THE RECEIVER???

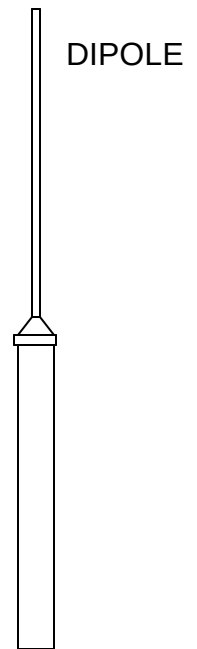
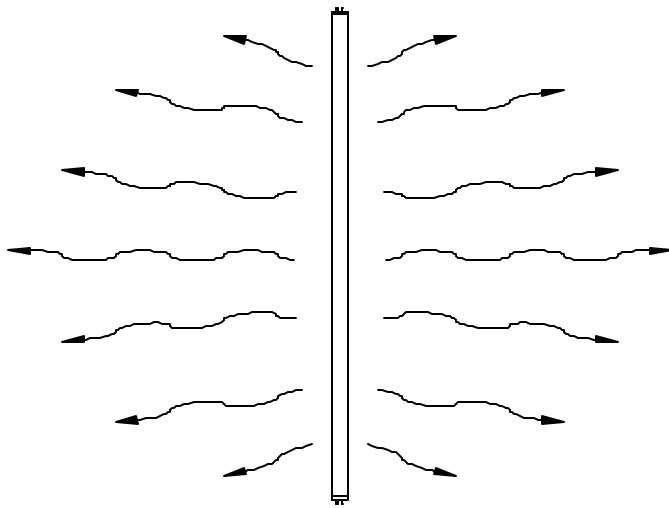
1. Make sure the power is not lost in the Coax cable!!
2. Make sure the antenna is tuned for the proper Frequency
3. Use the proper Antenna and Coax
4. Use the Restaurant Rule:
 - A. **LOCATION!!!**
 - B. **LOCATION!!!**
 - C. **LOCATION!!!**

ANTENNA BASICS

DIPOLE ANTENNA

Radio waves are similar to LIGHT
..... (with a few differences)

THINK OF A DIPOLE ANTENNA AS A LARGE FLUORESCENT LIGHT BULB



1. Earth blocks and bends (slightly) the Radio wave
2. Steel blocks and bounces the Radio wave
3. Concrete is like sunglasses
4. Wood is like tinted glasses
5. Glass is like glass

Consists of:

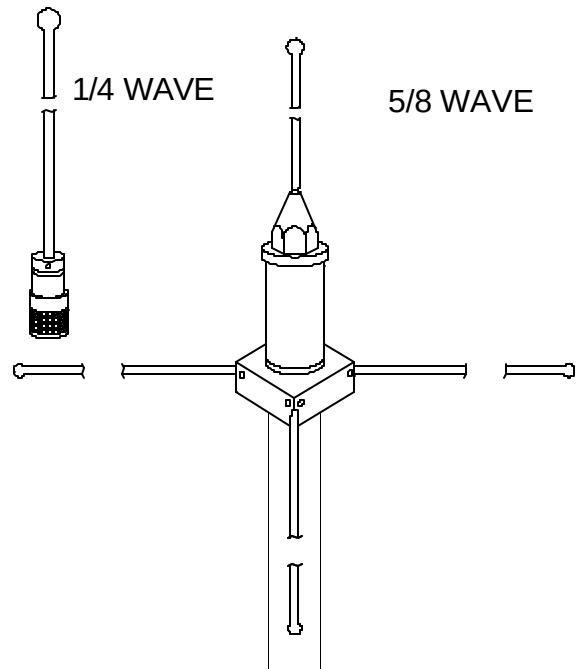
1. Two elements in a straight line
2. Vertical (or horizontal)
3. Rugged, high wind resistance
4. Non-critical tuning
5. Overall reliability and simplicity

ANTENNA BASICS

1/4 WAVE VERTICAL ANTENNA

Consists of:

1. One vertical element and 4 horizontal radials
2. Vertical polarization
3. Good wind resistance
4. Non-critical tuning
5. Overall reliability and simplicity; compact size



5/8 WAVE VERTICAL ANTENNA

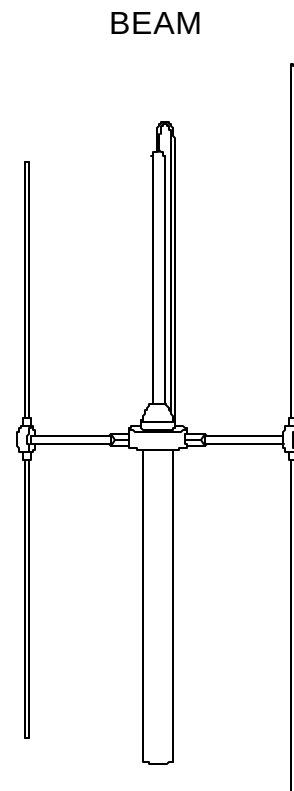
Consists of:

1. One vertical element with coil and 4 horizontal radials
2. Vertical polarization
3. Average wind resistance
4. Somewhat - critical tuning
5. Antenna "Gain" of about 3dB over a dipole or 1/4 wave antenna

BEAM - YAGI ANTENNA

Consists of:

1. One vertical element with coil and additional director(s)/reflector(s)
2. Vertical polarization
3. Below average wind resistance
4. Somewhat - critical tuning
5. Antenna "Gain" of about 8dB to 14dB over a dipole or 1/4 wave antenna
6. Short element pointed towards receiving antenna



ANTENNA BASICS

SWR METER ANTENNA TESTER

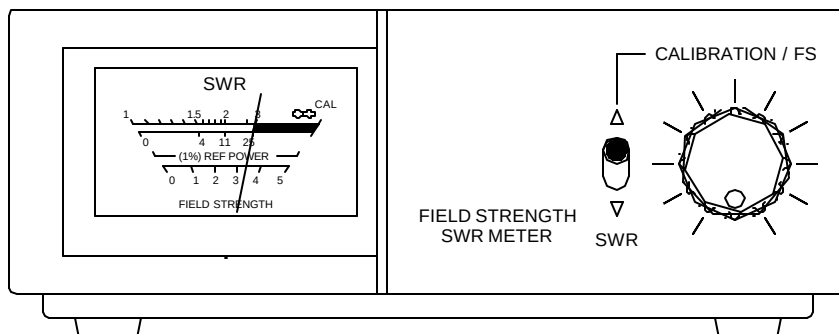
Forget everything else.....Remember this 3 - letter word **S W R**

This test tells us more about overall Antenna System Conditions than any other single test you can do.

The SWR test can uncover:

1. Defective or untuned antenna
2. Coax cable shorts
3. Coax cable opens/breaks
4. Defective Coax splices
5. Wrong type of Coax not 50 or 52 Ohm.
6. Defective Coax connector
7. Metal, Trees, Buildings too close to antenna
8. Missing radials or antenna connections
9. Defective transmitter

CALIBRATION MODE

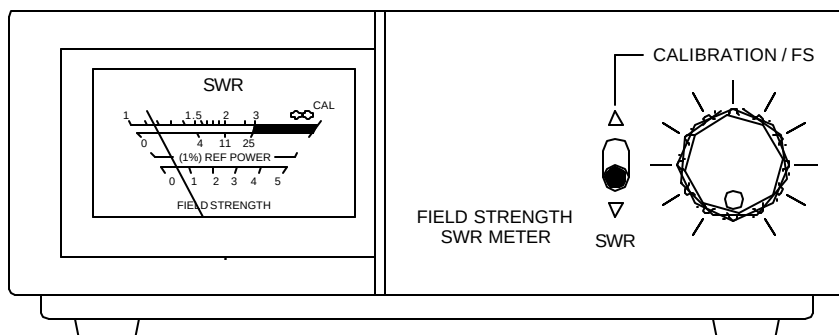


After meter is connected to the antenna and transmitter, it must be calibrated by turning the knob.

Turn on the transmitter and watch the needle swing, adjust needle to the calibration point on the meter scale.

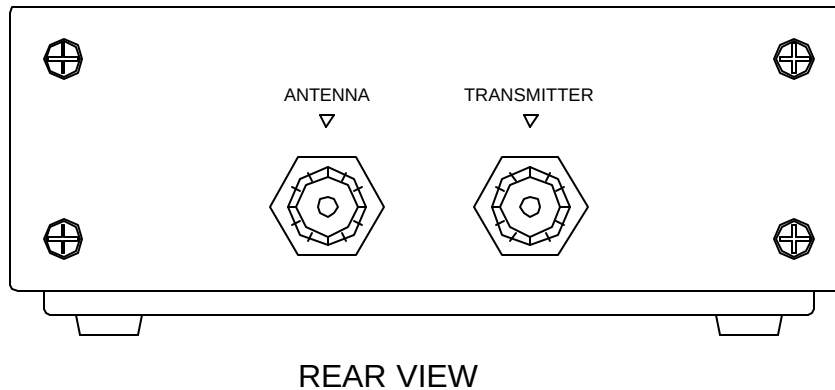
This procedure will also show RF being produced by the transmitter.

SWR MODE



Once the meter is calibrated and there is RF coming out of the transmitter, put the switch in the SWR mode and turn the transmitter on. (DO not move the KNOB or change the setting from the step above) Again watch the needle swing, it should not go past the 2 on the meter scale. The lower the reading the better the antenna will perform for long distances.

ANTENNA BASICS



BASIC ANTENNA CONCEPTS

ANTENNA

An antenna is a device that transmits and/or receives electromagnetic waves. Electromagnetic waves are often referred to as radio waves. Most antennas are resonant devices, which operate efficiently over a relatively narrow frequency band. An antenna must be tuned to the same frequency band that the radio system to which it is connected operates in, otherwise reception and/or transmission will be impaired.

WAVELENGTH

We often refer to antenna size relative to wavelength. For example: a half-wave dipole, which is approximately a half-wavelength long. Wavelength is the distance a radio wave will travel during one cycle.

Note: The length of a half-wave dipole is slightly less than a half-wavelength due to end effect. The speed of propagation in coaxial cable is slower than in air, so the wavelength in the cable is shorter.

The velocity of propagation of electromagnetic waves in coax is usually given as a percentage of free space velocity, and is different for different types of coax.

IMPEDANCE MATCHING

For efficient transfer of energy, the impedance of the radio, the antenna, and the transmission line connecting the radio to the antenna must be the same. Radios typically are designed for 50 ohms impedance and the coaxial cables (transmission lines) used with them also have a 50 ohm impedance.

VSWR AND REFLECTED POWER

The Voltage Standing Wave Ratio (VSWR) is an indication of how good the impedance match is. VSWR is often abbreviated as SWR. A high VSWR is an indication that the signal is reflected prior to being radiated by the antenna. VSWR and reflected power are different ways of measuring and expressing the same thing.

A VSWR of 2.0:1 or less is considered good. Most commercial antennas, however, are specified to be 1.5:1 or less over some bandwidth. Based on a 100 watt radio, a 1.5:1 VSWR equates to a forward power of 96 watts and a reflected power of 4 watts, or the reflected power is 4.2% of the forward power.

BANDWIDTH

Bandwidth can be defined in terms of radiation patterns or VSWR/reflected power. Bandwidth is often expressed in terms of percent bandwidth, because the percent bandwidth is constant relative to frequency. If bandwidth is expressed in absolute units of frequency, for example MHz, the bandwidth is then different depending upon whether the frequencies in question are near 150, 450, or 825 MHz.

DIRECTIVITY AND GAIN

Directivity is the ability of an antenna to focus energy in a particular direction when transmitting or to receive energy better from a particular direction when receiving. The relationship between gain and directivity: $\text{Gain} = \text{efficiency} / \text{Directivity}$ We see the phenomena of increased directivity when comparing a light bulb to a spotlight. A 100 watt spotlight will provide more light in a particular direction than a 100 watt light bulb, and less light in other directions. We could say the spotlight has more “directivity” than the light bulb. The spotlight is comparable to an antenna with increased directivity. An antenna with increased directivity is hopefully implemented efficiently, is low loss, and therefore exhibits both increased directivity and gain.

Gain is given in reference to a standard antenna. The two most common reference antennas are the isotropic antenna and the resonant half-wave dipole antenna. The isotropic antenna radiates equally well in “all” directions. Real isotropic antennas do not exist, but they provide useful and simple theoretical antenna patterns with which to compare real antennas. An antenna gain of 2 (3 dB) compared to an isotropic antenna would be written as 3 dBi. The resonant half-wave dipole can be a useful standard for comparing to other antennas at one frequency or over a very narrow band of frequencies. To compare the dipole to an antenna over a range of frequencies requires an adjustable dipole or a number of dipoles of different lengths. An antenna gain of 1 (0 dB) compared to a dipole antenna would be written as 0 dBd.

GAIN MEASUREMENT

One method of measuring gain is by comparing the antenna under test against a known standard antenna. This is technically known as a gain transfer technique. At lower frequencies, it is convenient to use a 1/2-wave dipole as the standard. At higher frequencies, it is common to use a calibrated gain horn as a gain standard, with gain typically expressed in dBi.

ANTENNA PLACEMENT

Correct antenna placement is critical to the performance of an antenna. An antenna mounted 50 feet in the air will function better than the same antenna installed 10 feet in the air.

RADIATION PATTERNS

The radiation or antenna pattern describes the relative strength of the radiated field in various directions from the antenna, at a fixed or constant distance. The radiation pattern is a “reception pattern” as well, since it also describes the receiving properties of the antenna. The radiation pattern is three-dimensional, but it is difficult to display the three-dimensional radiation pattern in a meaningful manner, it is also time consuming to measure a three-dimensional radiation pattern. Often radiation patterns are measured that are a slice of the three-dimensional pattern, which is of course a two-dimensional radiation pattern which can be displayed easily on a screen or piece of paper. These pattern measurements are presented in either a rectangular or a polar format.

ABSOLUTE AND RELATIVE PATTERNS

Absolute radiation patterns are presented in absolute units of field strength or power. Relative radiation patterns are referenced in relative units of field strength or power. Most radiation pattern measurements are relative pattern measurements, and then the gain transfer method is then used to establish the absolute gain of the antenna.

NEAR-FIELD AND FAR-FIELD PATTERNS

The radiation pattern in the region close to the antenna is not exactly the same as the pattern at large distances. The term near-field refers to the field pattern that exists close to the antenna; the term far-field refers to the field pattern at large distances. The far-field is also called the radiation field, and is what is most commonly of interest. The near-field is called the induction field (although it also has a radiation component).

Ordinarily, it is the radiated power that is of interest, and so antenna patterns are usually measured in the far-field region. For pattern measurement it is important to choose a distance sufficiently large to be in the far-field, well out of the near-field. The minimum permissible distance depends on the dimensions of the antenna in relation to the wavelength.

When extremely high power is being radiated (as from some modern radar antennas), the near-field pattern is needed to determine what regions near the antenna, if any, are hazardous to human beings.

BEAMWIDTH

Depending on the radio system in which an antenna is being employed there can be many definitions of beamwidth. A common definition is the half power beamwidth. The peak radiation intensity is found and then the points on either side of the peak represent half the power of the peak intensity are located. The angular distance between the half power points traveling through the peak is the beamwidth. Half the power is -3dB, so the half power beamwidth is sometimes referred to as the 3dB beamwidth.

ANTENNA PATTERN TYPES

Omnidirectional Antennas

For King-Fisher's applications the type of antenna needed has an omnidirectional radiation pattern. The omnidirectional antenna radiates and receives equally well in all horizontal directions. The gain of an omnidirectional antenna can be increased by narrowing the beamwidth in the vertical or elevation plane. The net effect is to focus the antenna's energy toward the horizon.

Selecting the right antenna gain for the application is the subject of much analysis and investigation. Gain is achieved at the expense of beamwidth: higher-gain antennas feature narrow beamwidths while the opposite is also true.

Omnidirectional antennas with different gains are used to improve reception and transmission in certain types of terrain. A 0 dBd gain antenna radiates more energy higher in the vertical plane to reach radio communication sites that are located in higher places. Therefore they are more useful in mountainous and metropolitan areas with tall buildings. A 3 dBd gain antenna is the compromise in suburban and general settings. A 5 dBd gain antenna radiates more energy toward the horizon compared to the 0 and 3 dBd antennas to reach radio communication sites that are further apart and less obstructed. Therefore they are best used in deserts, plains, flatlands, and open farm areas.

Directional Antennas

Directional antennas focus energy in a particular direction. Directional antennas are used in some base station and transmitter applications where coverage over a sector by separate antennas is desired. Point to point links also benefit from directional antennas. Yagi and panel antennas are directional antennas.

ANTENNA POLARIZATION

Polarization is defined as the orientation of the electric field of an electromagnetic wave. Polarization is in general described by an ellipse. Two often used special cases of elliptical polarization are linear polarization and circular polarization. The initial polarization of a radio wave is determined by the antenna that launches the waves into space. The environment through which the radio wave passes on its way from the transmit antenna to the receive antenna may cause a change in polarization.

With linear polarization the electric field vector stays in the same plane. In circular polarization the electric field vector appears to be rotating with circular motion about the direction of propagation, making one full turn for each RF cycle. The rotation may be right-hand or left-hand.

Choice of polarization is one of the design choices available to the RF system designer. For example, low frequency (< 1 MHz) vertically polarized radio waves propagate much more successfully near the earth than horizontally polarized radio waves, because horizontally polarized waves will be cancelled out by reflections from the earth. Mobile radio systems waves generally are vertically polarized. TV broadcasting has adopted horizontal polarization as a standard. This choice was made to maximize signal-to-noise ratios. At frequencies above 1 GHz, there is little basis for a choice of horizontal or vertical polarization, although in specific applications, there may be some possible advantage in one or the other. Circular polarization has also been found to be of advantage in some microwave radar applications to minimize the "clutter" echoes received from raindrops, in relation to the echoes from larger targets such as aircraft.

LIGHTNING PROTECTORS

INTRODUCTION

Lightning can generate high power surges causing extensive damage to electronic equipment and communications networks. Lightning protectors are used to protect sensitive equipment from these harmful surges.

Protecting devices should be physically located close to the equipment being protected - the closer, the better. Common locations in wireless infrastructures are at the top of the mast where the transmission line exits the antenna and the entrance to or inside the cabinet where the transmission line enters the base station electronics. Tower mount electronics require additional lightning protectors.

QUARTER WAVE STUB (QWS) PROTECTION

Quarter wave stub technology is based on a 3-port coaxial device. One port is a metallic short-circuit between the inner and the outer conductors, whose length is one quarter of the wavelength at the center frequency. Quarter wave stubs operate like a band pass filter. They operate within a specified frequency band.

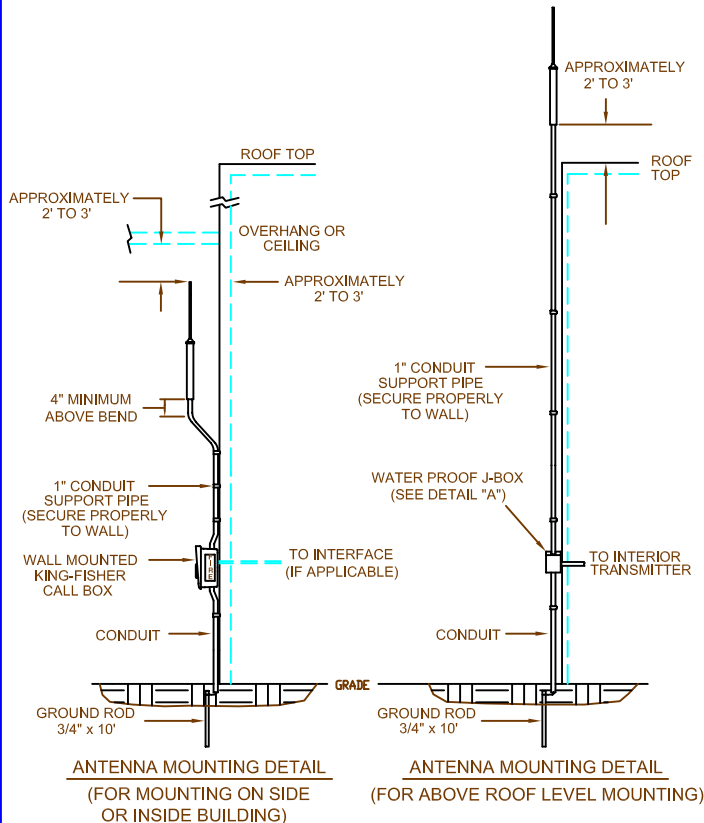
In normal use, the RF signal flows through the quarter wave lightning protector to the protected equipment. When lightning hits the infrastructure (antenna mast), current will flow through the feeder cable to the lightning protector installed at the entrance to the equipment being protected (Base Transceiver Station). As lightning strikes operate at low frequencies (i.e. outside the protector working frequency band), current will be instantaneously diverted through the short-circuit to the ground.

Since the quarter wave stub is a mechanical system, it can handle repeated surges. Any impulse at any time will be shunted to the ground. Only a low residual voltage, less than 15 volts, can pass through the equipment.

Quarter wave protectors do not require any maintenance. They achieve high passive intermodulation performance (-110 dBm/-153 dBc) and they pass on the lowest residual voltage.

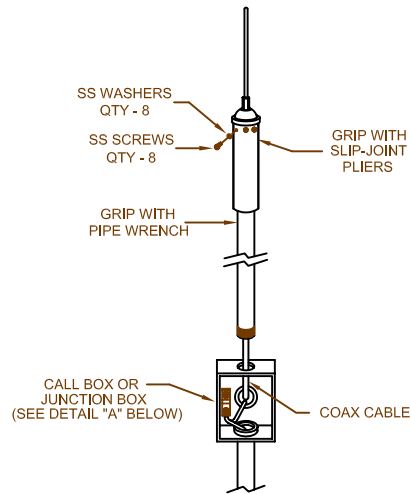
Quarter wave stubs can not pass DC signals and must incorporate a fairly long stub element.

ILLUSTRATION 3



- 3-1. COMPLETE CONDUIT RUN TO APPLICABLE TRANSMITTER OR INTERFACE PANEL.
- 3-2. DRILL A HOLE THROUGH THE WALL (IF NECESSARY) FOR CONDUIT CONNECTING TO WATER PROOF JUNCTION BOX OR CALL BOX.
- 3-3. STRAP THE CONDUIT SUPPORT PIPE WITH ANTENNA ATTACHED SECURELY TO THE BUILDING, TOWER, POLE, OR STRUCTURE. CHECK WITH LOCAL STANDARDS AND CODES FOR PROPER HOLDING STRENGTH OF ANTENNA STRAPS. ANTENNA STRUCTURE SHALL BE ABLE TO WITHSTAND ALL WIND LOADING CONDITIONS AND SAFETY FACTORS.
- 3-4. PULL COAXIAL CABLE THROUGH CONDUIT TO TRANSMITTER PANEL. PROVIDE A DRIP LOOP INSIDE WATER PROOF BOX. DO NOT KINK OR STRESS COAXIAL CABLE.
- 3-5. TRIM EXCESS CABLE AND ATTACH THE PROPER TYPE COAX CONNECTOR (PL-259 OR BNC) TO THE CABLE AT THE TRANSMITTER. (SEE SHEET 2 OF 2)
- 3-6. CONNECT CABLE TO TRANSMITTER INSIDE CABINET.
- 3-7. GROUND THE ANTENNA PIPE AT JUNCTION BOX OR TRANSMITTER (SEE DETAIL "A"). CONNECT GROUND CABLE TO 3/4" x 10' BURIED GROUND ROD AS SHOWN, OR TO WATER PIPE, OR OTHER APPROVED GROUNDING ELECTRODE IN ACCORDANCE WITH N.E.C.

ILLUSTRATION 2:



- 2-1. ASSEMBLE PARTS ON GROUND UNLESS OTHERWISE SPECIFIED.
- 2-2. SLIDE THE ANTENNA SKIRT UP TO THE ANTENNA WHIP ASSEMBLY AND ALIGN THE MOUNTING HOLES.
- 2-3. INSTALL THE EIGHT SCREWS AND WASHERS THROUGH HOLES IN ANTENNA SKIRT INTO ANTENNA WHIP ASSEMBLY. TIGHTEN SCREWS SECURELY.
- 2-4. SECURE ANTENNA WHIP TO CONDUIT SUPPORT PIPE. MAKE CERTAIN GOOD SEATING IS ACCOMPLISHED BY LOOSENING AND TIGHTENING 3 TO 4 TIMES. BE CAREFUL NOT TO TWIST OR DAMAGE COAX. TIGHTEN SECURELY BY USING A PIPE WRENCH AND LARGE SLIP JOINT PLIERS GRIP ANTENNA WITH PLIERS POSITIONED ON TOP OF STAINLESS STEEL SKIRT SCREWS. USE PIPE WRENCH ON CONDUIT SUPPORT PIPE. BE CAREFUL NOT TO DAMAGE PORCELAIN INSULATOR OR SKIRT. THIS CONNECTION MUST BE VERY TIGHT TO WITHSTAND VIBRATION AND HIGH WINDS. DO NOT TURN WHIP. ONLY PIPE SHOULD TURN.
- 2-5. SCREW CONDUIT SUPPORT PIPE INTO TOP HOLE OF WATER PROOF JUNCTION BOX OR CALL BOX. TIGHTEN THIS CONNECTION USING A PIPE WRENCH. OFFSET BEND, IF APPLICABLE, MUST BE ALIGNED AWAY FROM THE WALL.

DETAIL "A"

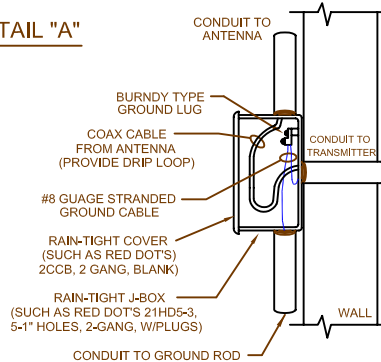
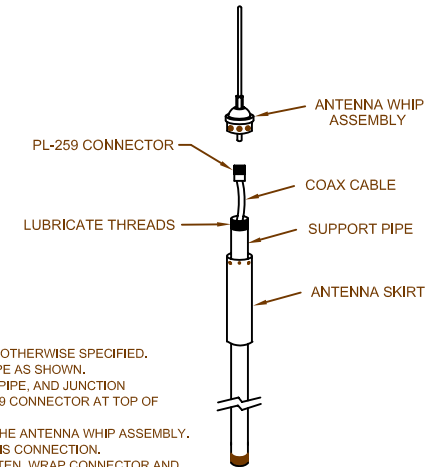


ILLUSTRATION 1:



- 1-1. ASSEMBLE PARTS ON GROUND UNLESS OTHERWISE SPECIFIED.
- 1-2. SLIP ANTENNA SKIRT OVER CONDUIT PIPE AS SHOWN.
- 1-3. PULL COAX CABLE THROUGH SUPPORT PIPE, AND JUNCTION BOX LEAVING THE END WITH THE PL-259 CONNECTOR AT TOP OF THE SUPPORT PIPE.
- 1-4. CONNECT THE PL-259 CONNECTOR TO THE ANTENNA WHIP ASSEMBLY. USE SLIP JOINT PLIERS TO TIGHTEN THIS CONNECTION. DO NOT HAND TIGHTEN OR OVER-TIGHTEN. WRAP CONNECTOR AND CABLE WITH 3 OR 4 LAPS OF QUALITY ELECTRICAL TAPE.
- 1-5. LUBRICATE SUPPORT PIPE THREADS WITH SILICON. DO NOT USE TEFLON TAPE. SCREW SUPPORT PIPE TWO OR THREE TURNS INTO ANTENNA WHIP ASSEMBLY. ONLY TURN CONDUIT SUPPORT PIPE. HOLD WHIP ASSEMBLY STATIONARY OR CABLE WILL TWIST AND KINK.

PRELIMINARY ANTENNA INSTALLATION INSTRUCTIONS

- P-1. LOCATE A SUITABLE POSITION ON A WALL TO MOUNT A WATER PROOF JUNCTION BOX, SUCH AS, (RED DOTS 2INDS-3 RAIN TIGHT J-BOX). IF THE TRANSMITTER MOUNTING IS BELOW THE ANTENNA THE JUNCTION BOX WILL NOT BE REQUIRED. (REFER TO ILLUSTRATION 3)
- P-2. MEASURE AND CUT THE APPROXIMATE LENGTH OF CABLE, FROM ANTENNA TO TRANSMITTER. USE RG-58U CABLE FOR LENGTHS UP TO 75 FEET LONG AND RG-8U FOR LENGTHS OF 75 TO 260 FEET LONG.
- P-3. ATTACH A PL-259 MALE COAX CONNECTOR TO ONE END OF THE CABLE. THIS CONNECTOR WILL REQUIRE SOLDERING. (SEE SHEET 2 OF 2)
- P-4. CUT CONDUIT SUPPORT PIPE TO THE REQUIRED LENGTH AND THREAD BOTH ENDS. (RIGID 1" GALVANIZED OR ALUMINUM PIPE IS RECOMMENDED).
- P-5. IF THE ANTENNA IS TO BE MOUNTED TO A WALL WITH THE ANTENNA BELOW THE ROOFTOP, OFFSET THE SUPPORT PIPE BY 2 FEET MINIMUM. (SEE ILLUSTRATION #3)
- P-6. FOLLOW ILLUSTRATIONS 1, 2 AND 3 FOR INSTALLATION INSTRUCTIONS.

SPECIAL INSTRUCTIONS

1. ANTENNA HEIGHT SHALL BE 20'-0" IN THE PUBLIC SERVICE BAND, AND A MINIMUM OF 20' 0" FOR THE NON-PUBLIC SERVICE BAND INSTALLATIONS.
2. ANTENNAS THAT ARE TO BE MOUNTED IN WEAK SIGNAL AREAS, SHOULD BE LOCATION TESTED BEFORE PERMANENT INSTALLATION. TRANSMIT SIGNALS TO DETERMINE IF RELIABLE AND PROPER SIGNALS ARE RECEIVED BY THE CONSOLE(S).
3. ON METAL EXTERIOR STRUCTURES, ANTENNAS SHOULD BE MOUNTED OUTSIDE TOWARDS RECEIVING ANTENNA.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCE ON: FRACT. DECIM. ANGL. ±1/64 ±.01 ±1° ±.005	DFT	DA	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
		CHK	DA	
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		DATE	7/7/98	
MATERIAL:		SCALE	NTS	DWG. NO. 76504-1
		SHT 1 OF 2		
				TITLE: ALUMINUM / ALODINE TRANSMITTER ANTENNA INSTALLATION

ILLUSTRATION 1:

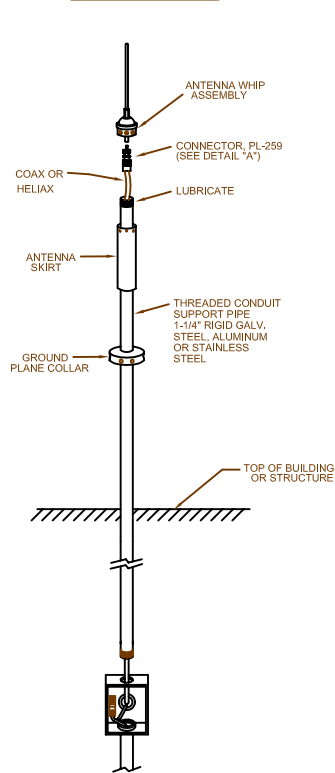
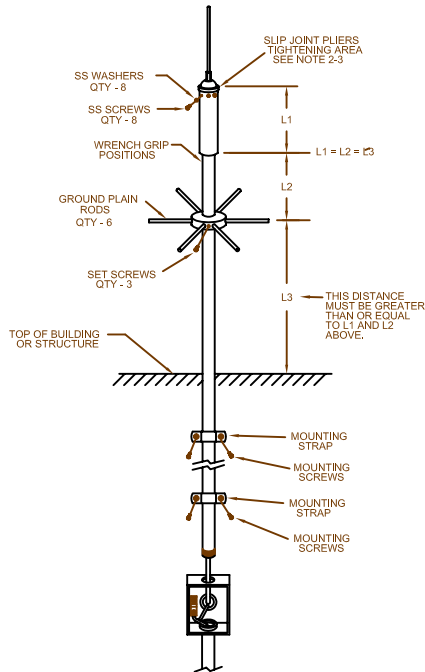


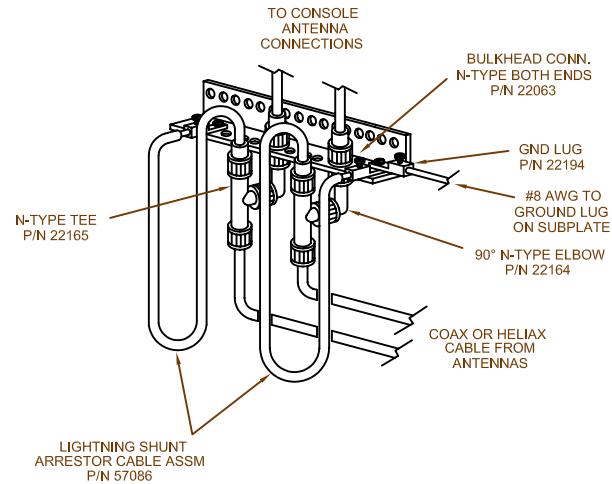
ILLUSTRATION 2:



- 2-1. SLIDE THE ANTENNA SKIRT UP TO THE ANTENNA WHIP ASSEMBLY AND ALIGN THE MOUNTING HOLES.
- 2-2. INSTALL THE EIGHT SCREWS AND WASHERS THROUGH THE HOLES IN THE ANTENNA SKIRT INTO THE ANTENNA WHIP ASSEMBLY. TIGHTEN SCREWS SECURELY. (DO NOT OVER TIGHTEN)
- 2-3. WRENCH TIGHTEN CONDUIT SUPPORT PIPE. MAKE CERTAIN GOOD SEATING IS ACCOMPLISHED BY LOOSENING AND TIGHTENING 3 TO 4 TIMES. BE CAREFUL NOT TO TWIST OR DAMAGE COAX. TIGHTEN SECURELY BY USING A PIPE WRENCH AND LARGE SLIP JOINT PLIERS. GRIP ANTENNA WITH PLIERS POSITIONED ON TOP OF STAINLESS STEEL SKIRT SCREWS. USE PIPE WRENCH ON CONDUIT SUPPORT PIPE. BE CAREFUL NOT TO DAMAGE PORCELAIN INSULATOR OR SKIRT. THIS CONNECTION MUST BE VERY TIGHT TO WITHSTAND VIBRATION AND HIGH WINDS. DO NOT TURN WHIP. ONLY PIPE SHOULD TURN.
- 2-4. INSERT THE BOTTOM END OF THE CONDUIT SUPPORT PIPE INTO THE JUNCTION BOX. BE CAREFUL NOT TO CRIMP CABLE.
- 2-5. TIGHTEN THE WATER TIGHT CONNECTORS (MEIERS HUB, GASKET, LOCK-NUT) SECURELY.
- 2-6. STRAP THE CONDUIT SUPPORT PIPE SECURELY TO THE BUILDING, POLE, TOWER, OR STRUCTURE. CHECK WITH LOCAL STANDARDS AND CODES FOR PROPER HOLDING STRENGTH OF THE ANTENNA STRAPS. ANTENNA STRUCTURE SHALL BE ABLE TO WITHSTAND ALL WIND LOADING CONDITIONS PLUS SAFETY FACTOR.
- 2-7. MEASURE THE LENGTH OF THE ANTENNA SKIRT. LOCATE THE GROUND PLANE COLLAR AN EQUAL LENGTH FROM THE BOTTOM EDGE OF THE ANTENNA SKIRT TO THE MIDDLE OF THE GROUND PLANE COLLAR AS SHOWN AND DIRECTED IN THE INSTRUCTIONS SUPPLIED IN THE ANTENNA BOX.
- 2-8. TIGHTEN ALL SET SCREWS SECURELY ONTO THE CONDUIT USING AN ALLEN (HEX) WRENCH.
- 2-9. SCREW THE SIX GROUND PLANE RODS INTO THE COLLAR AND TIGHTEN FIRMLY WITH AN ADJUSTABLE WRENCH. DO NOT OVER-TIGHTEN.

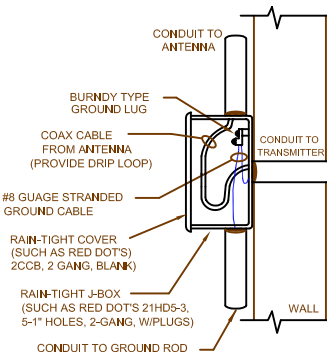
ILLUSTRATION 3

(REAR SIDE VIEW OF CONSOLE)



- 3-1. TRIM EXCESS CABLE AND ATTACH THE OTHER COAX OR HELIAS CONNECTOR AT THE BASE RECEIVING STATION. (SEE SHEET 2 OF 2)
- 3-2. CHECK FOR ANY ACCIDENTAL SHORTS BETWEEN THE GROUND BRAID AND THE CENTER CONDUCTOR OF THE CABLE. BY USING A DIGITAL VOLT-METER SET ON MEGA-OHM SCALE, THE METER SHOULD READ IN MEGA-OHMS (OPEN CIRCUIT).
- 3-3. ATTACH CONNECTOR TO THE "TEE" CONNECTOR AS SHOWN.
- 3-4. CONNECT OUTPUT OF CALL BOX TRANSMITTER TO AN APPROPRIATE VSWR METER. CONNECT THE OUTPUT OF THE METER TO THE BNC CONNECTOR WHICH IS NORMALLY CONNECTED TO THE RECEIVER INPUT.
- 3-5. CHECK AND RECORD THE VSWR READING FOR FUTURE REFERENCE. READING SHOULD BE LESS THAN 1.5:1.0 RECONNECT BNC CONNECTOR TO RECEIVER.

DETAIL "A"



PRELIMINARY ANTENNA INSTALLATION INSTRUCTIONS

- P-1. LOCATE A SUITABLE POSITION ON A WALL TO MOUNT A WATER PROOF JUNCTION BOX, SUCH AS, (RED DOT'S ZINDS-3 RAIN TIGHT J-BOX). (REFER TO ILLUSTRATION 1 AND 2)
- P-2. MEASURE AND CUT THE APPROXIMATE LENGTH OF CABLE. FROM ANTENNA TO CONSOLE. USE RG-213/U CABLE FOR LENGTHS UP TO 200 FT., 1/2 IN HELIAS UP TO 350 FT., & 7/8 IN. HELIAS UP TO 500 FT. LONG.
- P-3. ATTACH A PL-259 MALE COAX CONNECTOR TO ONE END OF THE CABLE. THIS CONNECTOR WILL REQUIRE SOLDERING. (SEE SHEET 2 OF 2)
- P-4. CUT CONDUIT SUPPORT PIPE TO THE REQUIRED LENGTH AND THREAD BOTH ENDS. (RIGID 1 1/4 " GALVANIZED OR STAINLESS STEEL PIPE IS RECOMMENDED).
- P-5. FOLLOW ILLUSTRATIONS 1, 2 AND 3 FOR INSTALLATION INSTRUCTIONS.

SPECIAL INSTRUCTIONS

1. ANTENNA HEIGHT SHALL BE 20'±0" IN THE PUBLIC SERVICE BAND, AND A MINIMUM OF 20' ±0" FOR THE NON-PUBLIC SERVICE BAND INSTALLATIONS.
2. ANTENNAS THAT ARE TO BE MOUNTED IN WEAK SIGNAL AREAS, SHOULD BE LOCATION TESTED BEFORE PERMANENT INSTALLATION, TRANSMIT SIGNALS TO DETERMINE IF RELIABLE AND PROPER SIGNALS ARE RECEIVED BY THE RECEIVER (S).
3. ON METAL EXTERIOR STRUCTURES, ANTENNAS SHOULD BE MOUNTED OUTSIDE TOWARDS RECEIVING ANTENNA.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE DWG.	(.01) ±.030	DFT.	DA	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
	(.000) ±.015	CHK.	DA	
	(.000) ±.005	APPD.	DA	
	ANG. ±1/2"	DATE	7/7/98	
		SCALE	NTS	
MATERIAL:		SHT	bf 2	TITLE KFRA-C ANTENNA INSTALLATION DWG. NO. 76597

ANTENNA INSTALLATION

PRELIMINARY:

- P-1. LOCATE A POSITION ON THE WALL TO MOUNT A WATER PROOF JUNCTION BOX (SUCH AS RED DOT'S 2INDS-3 RAIN TIGHT J-BOX). IF THE TRANSMITTER IS MOUNTED RIGHT BELOW THE ANTENNA, THE JUNCTION BOX WILL NOT BE NECESSARY. REFER TO ILLUSTRATION 3.
- P-2. MEASURE AND CUT THE APPROXIMATE LENGTH OF THE CABLE TO BE ROUTED TO THE TRANSMITTER. RG-58U TYPE CABLE IS RECOMMENDED FOR CABLE LENGTHS OF 75 FEET OR LESS AND RG-6U FOR LENGTHS OF 75 TO 260 FEET.
- P-3. ATTACH A PL-259 MALE COAX CONNECTOR TO ONE END OF THE CABLE. THIS CONNECTOR WILL REQUIRE SOLDERING. SEE DETAIL "B".
- P-4. CUT CONDUIT SUPPORT PIPE TO THE REQUIRED LENGTH AND THREAD BOTH ENDS. RIGID 1" GALVANIZED OR ALUMINUM PIPE IS RECOMMENDED.
- P-5. OFFSET THE SUPPORT PIPE IF THE ANTENNA IS TO BE MOUNTED TO THE SIDE OR INSIDE THE STRUCTURE. THE OFFSET SHOULD BE SMOOTHLY SHAPED AND APPROXIMATELY 2-1/2 TO 3 FEET FROM THE WALL AS SHOWN IN ILLUSTRATION 3.

ASSEMBLE ON THE GROUND (UNLESS OTHERWISE NOTED) ALL PARTS SHOWN IN ILLUSTRATIONS 1 AND 2 BY FOLLOWING THE INSTRUCTIONS BELOW.

ILLUSTRATION 1:

- 1-1. SLIP ANTENNA SKIRT OVER CONDUIT PIPE AS SHOWN.
- 1-2. PULL CABLE THROUGH SUPPORT PIPE, AND JUNCTION BOX LEAVING THE END WITH THE PL-259 CONNECTOR AT TOP OF SUPPORT PIPE.
- 1-3. CONNECT THE PL-259 CONNECTOR TO THE ANTENNA WHIP ASSEMBLY. USE SLIP JOINT PLIERS TO TIGHTEN THIS CONNECTION FIRMLY TOGETHER. DO NOT HAND TIGHTEN OR OVER-TIGHTEN. WRAP CONNECTOR AND CABLE WITH 3 OR 4 LAPS OF QUALITY ELECTRICAL TAPE.
- 1-4. LUBRICATE SUPPORT PIPE THREADS WITH SILICON (DO NOT USE TEFLON TAPE) AND SCREW SUPPORT PIPE TWO OR THREE TURNS INTO ANTENNA BASE ASSEMBLY. ONLY TURN CONDUIT SUPPORT PIPE. HOLD BASE ASSEMBLY STATIONARY OR CABLE WILL TWIST AND KINK.

ILLUSTRATION 2:

- 2-1. SLIDE THE ANTENNA SKIRT UP TO THE ANTENNA BASE ASSEMBLY AND ALIGN THE MOUNTING HOLES.
- 2-2. INSTALL THE EIGHT SCREWS AND WASHERS THROUGH HOLES IN ANTENNA SKIRT INTO ANTENNA BASE ASSEMBLY. TIGHTEN SCREWS SECURELY.
- 2-3. SECURE ANTENNA BASE TO CONDUIT SUPPORT PIPE. MAKE CERTAIN GOOD SEATING IS ACCOMPLISHED BY LOOSENING AND TIGHTENING 3 TO 4 TIMES. BE CAREFUL NOT TO TWIST OR DAMAGE COAX. TIGHTEN SECURELY BY USING A PIPE WRENCH AND LARGE SLIP JOINT PLIERS. GRIP ANTENNA WITH PLIERS POSITIONED ON TOP OF STAINLESS STEEL SKIRT SCREWS. USE PIPE WRENCH ON CONDUIT SUPPORT PIPE. BE CAREFUL NOT TO DAMAGE PORCELAIN INSULATOR OR SKIRT. THIS CONNECTION MUST BE VERY TIGHT TO WITH-STAND VIBRATION AND HIGH WINDS. DO NOT TURN WHIP. ONLY PIPE SHOULD TURN.
- 2-4. SECURE ANTENNA RADIAL ARMS TO ANTENNA BASE ASSEMBLY. MAKE CERTAIN GOOD SEATING IS ACCOMPLISHED BY LOOSENING AND TIGHTENING 3 TO 4 TIMES.
- 2-5. FASTEN THE TWO RADIAL RINGS AT THE END OF EACH RADIAL ARM. SPACE RINGS AS PRESCRIBED DISTANCE FROM THE RADIATOR.
- 2-6. SECURE ANTENNA ELEMENTS TO RADIAL RING. TWO SHORTER ELEMENTS ON THE OTHER. MAKE CERTAIN GOOD SEATING IS ACCOMPLISHED BY LOOSENING AND TIGHTENING 3 TO 4 TIMES.
- 2-7. ALIGN ALL ELEMENTS PARALLEL AND TIGHTEN ALL SET SCREWS.
- 2-8. SCREW CONDUIT SUPPORT PIPE INTO TOP HOLE OF WATER PROOF JUNCTION BOX OR TRANSMITTER. ALIGN ANTENNA WITH RECEIVER, WITH THE SHORTER ELEMENTS CLOSEST TO RECEIVER. TIGHTEN THIS CONNECTION USING A PIPE WRENCH. OFFSET BEND, IF APPLICABLE, MUST BE ALIGNED AWAY FROM THE WALL.

ILLUSTRATION 3:

- 3-1. COMPLETE CONDUIT RUN TO APPLICABLE TRANSMITTER OR INTERFACE PANEL.
- 3-2. DRILL A HOLE THROUGH THE WALL (IF NECESSARY FOR CONDUIT CONNECTING TO WATER PROOF JUNCTION BOX OR CALL BOX).
- 3-3. STRAP THE CONDUIT SUPPORT PIPE WITH ANTENNA ATTACHED SECURELY TO THE BUILDING, TOWER, POLE, OR STRUCTURE. CHECK WITH LOCAL STANDARDS AND CODES FOR PROPER HOLDING STRENGTH OF ANTENNA STRAPS. ANTENNA STRUCTURE SHALL BE ABLE TO WITH-STAND ALL WIND LOADING CONDITIONS AND SAFETY FACTORS.
- 3-4. PULL COAXIAL CABLE THROUGH CONDUIT TO TRANSMITTER PANEL. PROVIDE A DRIP LOOP INSIDE WATER PROOF BOX. DO NOT KINK OR STRESS COAXIAL CABLE.
- 3-5. TRIM EXCESS CABLE AND ATTACH THE PROPER TYPE COAX CONNECTOR (PL-259 OR BNC) TO THE CABLE AT THE TRANSMITTER.
- 3-6. CONNECT CABLE TO TRANSMITTER INSIDE CABINET.
- 3-7. GROUND THE ANTENNA PIPE AT JUNCTION BOX OR TRANSMITTER (SEE DETAIL "A"). CONNECT GROUND CABLE TO 3/4" x 10" BURIED GROUND ROD AS SHOWN, OR TO WATER PIPE, OR OTHER APPROVED GROUNDING ELECTRODE IN ACCORDANCE WITH N.E.C.

ILLUSTRATION 1:

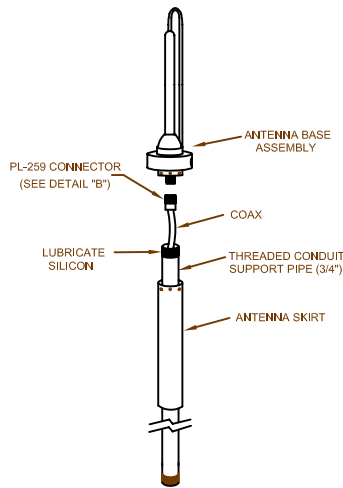
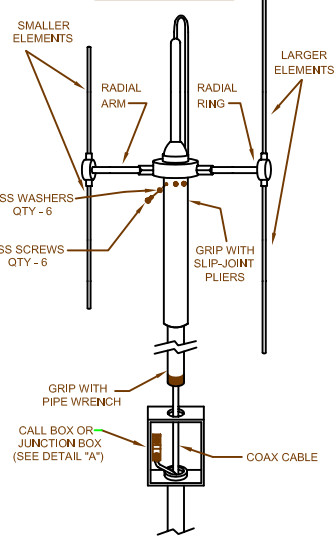
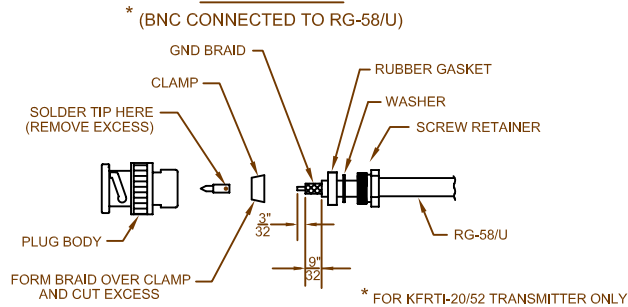


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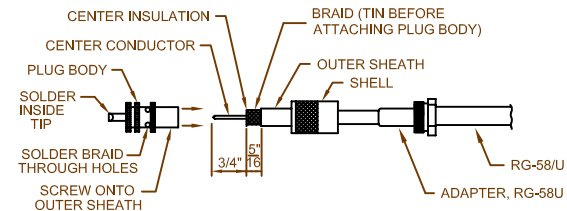


DETAIL "C"



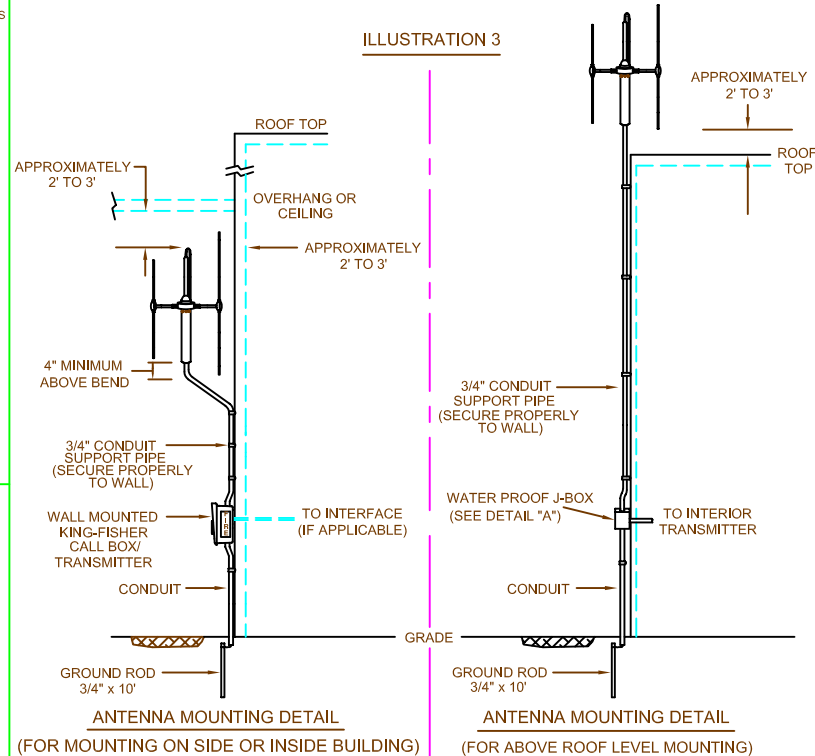
DETAIL "B"

(PL-259 CONNECTED TO RG-58/U)

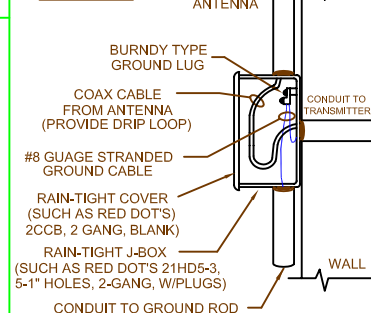


NOTE: 1) SOLDER CENTER LEAD OF COAX TO PL-259 TIP.

ILLUSTRATION 3



DETAIL "A"

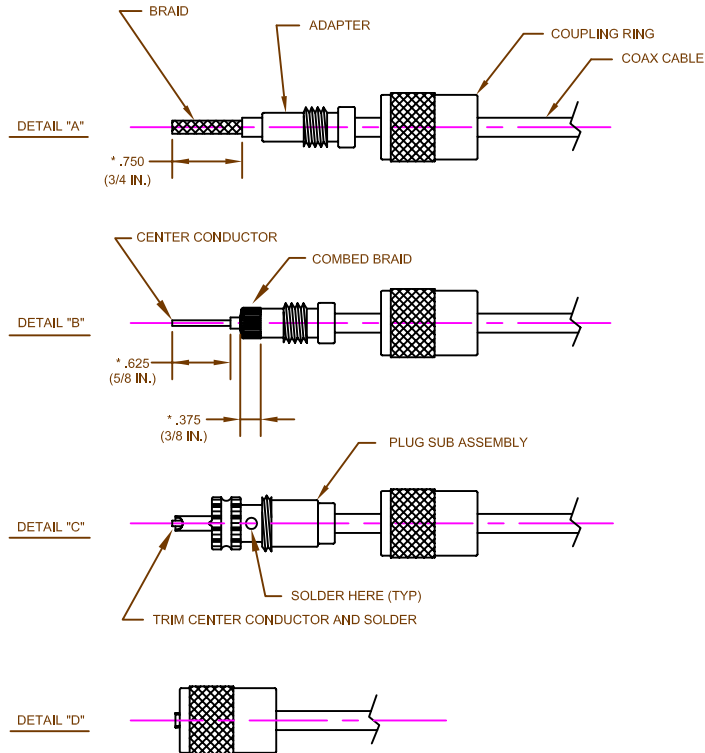


NOTES:

1. ANTENNA HEIGHT SHALL BE 20'-0" IN THE PUBLIC SERVICE BAND. ANTENNA HEIGHT SHOULD BE A MINIMUM OF 20'-0" FOR NON-PUBLIC SERVICE BAND INSTALLATIONS.
2. ANTENNAS THAT ARE TO BE MOUNTED IN WEAK SIGNAL AREAS, SHOULD BE LOCATION TESTED BEFORE PERMANENT INSTALLATION. TRANSMIT SIGNAL TO DETERMINE IF RELIABLE AND PROPER SIGNALS ARE RECEIVED BY THE CONSOLE(S).
3. ON METAL EXTERIOR STRUCTURES, ANTENNAS SHOULD BE MOUNTED OUTSIDE TOWARDS RECEIVING ANTENNA.

DFT.	JL	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
CHK	DP	
APPD	DP	
DATE	10/6/97	
SCALE	NONE	
SHT 1 OF 1		DWG. NO. 76507

PL-259 CONNECTED TO RG-58/U

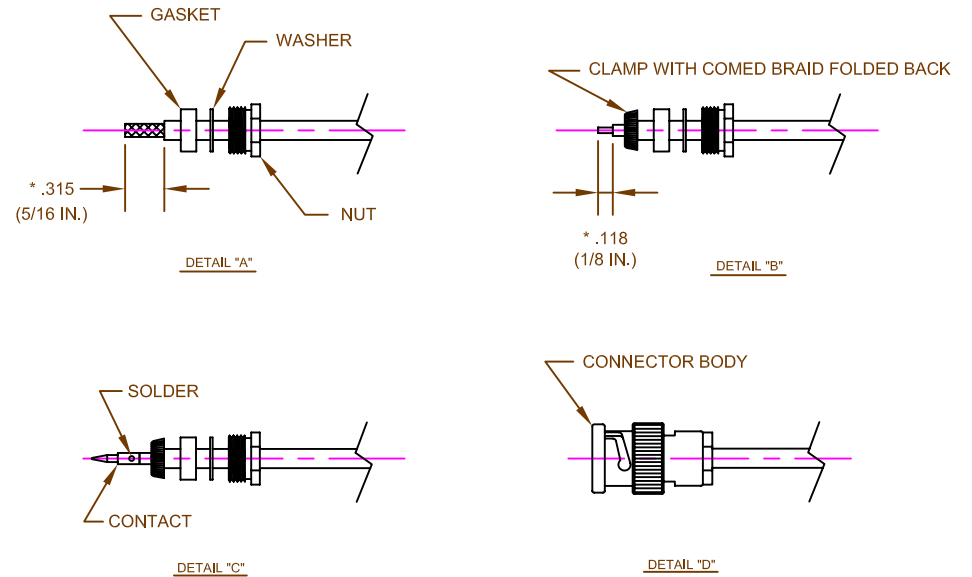


ASSEMBLY INSTRUCTIONS

(* DENOTES MANUFACTURES RECOMMENDED CUT LENGTH)

- 1) CUT END OF CABLE EVEN. REMOVE INSULATOR JACKET TO (.750) INCH DIMENSION. SLIDE COUPLING RING AND ADAPTER ON CABLE. (SEE DETAIL "A")
- 2) COMB OUT BRAID AND FOLD BACK. POSITION ADAPTER FLUSH WITH CABLE JACKET. PRESS BRAID DOWN OVER BODY OF ADAPTER AND TRIM TO (.375) INCH DIMENSION. BARE CONDUCTOR TO (.625) INCH DIMENSION. TIN EXPOSED CENTER CONDUCTOR. (SEE DETAIL "B")
- 3) SCREW PLUG SUB-ASSEMBLY ON ADAPTER. SOLDER BRAID THROUGH SOLDER HOLES. USE ENOUGH HEAT TO CREATE BOND OF BRAID TO SHELL OF PLUG SUB-ASSEMBLY. SOLDER CENTER CONDUCTOR TO SHELL OF PLUG SUB-ASSEMBLY. (SEE DETAIL "C")
- 4) SCREW COUPLING RING ON PLUG SUB-ASSEMBLY. (SEE DETAIL "D")

BNC CONNECTED TO RG-58/U



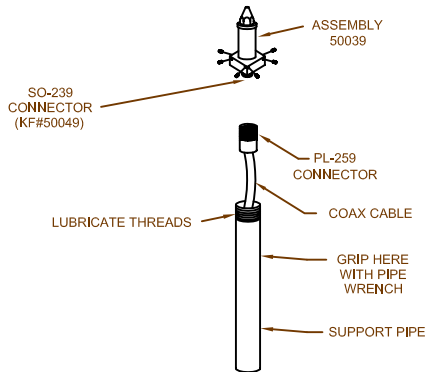
ASSEMBLY INSTRUCTIONS

(* DENOTES MANUFACTURES RECOMMENDED CUT LENGTH)

- 1) CUT END OF CABLE EVEN. REMOVE INSULATOR JACKET TO (.315) INCH DIMENSION. SLIDE NUT, WASHER AND GASKET ON CABLE. (SEE DETAIL "A")
- 2) PLACE CLAMP OVER BRAID AND PUSH BACK AGAINST CABLE JACKET. COMB OUT BRAID, FOLD BACK AND TRIM. TIN CENTER CONDUCTOR (SEE DETAIL "B")
- 3) SOLDER ON CONTACT THROUGH SOLDER HOLE. (SEE DETAIL "C")
- 4) INSERT CABLE AND PARTS INTO CONNECTOR BODY. TIGHTEN NUT. (SEE DETAIL "D")

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCE ON: FRACT. DECIM. ANGL. ±1/64 ±.01 ±1° ±.005	DFT	DA	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090 TITLE: 1/4 WAVE, 3db S.S. TRANSMITTER ANTENNA INSTALL. DWG. NO. 76506
		CHK	DA	
		APP	DA	
		DATE	7/7/98	
MATERIAL:		SCALE	NTS	
		SHT 2 OF 2		

ILLUSTRATION 1:



- 1-1. ASSEMBLE PARTS ON GROUND UNLESS OTHERWISE SPECIFIED.
1-2. PULL COAX CABLE THROUGH SUPPORT PIPE, AND JUNCTION BOX LEAVING THE END WITH THE PL-259 CONNECTOR AT TOP OF THE SUPPORT PIPE.
1-3. CONNECT THE PL-259 CONNECTOR TO THE SO-239 CONNECTOR ON ASSEMBLY #50039. USE SLIP JOINT PLIERS TO TIGHTEN THIS CONNECTION. DO NOT HAND TIGHTEN OR OVER TIGHTEN. WRAP CONNECTOR AND CABLE WITH 3 OR 4 LAPS OF QUALITY ELECTRICAL TAPE.
1-4. LUBRICATE SUPPORT PIPE THREADS WITH SILICON. DO NOT USE TEFLON TAPE. SCREW SUPPORT PIPE INTO ASSEMBLY #50039. GRIP ASSEMBLY WITH A 1 1/2 INCH OPEN END WRENCH. USE PIPE WRENCH ON CONDUIT SUPPORT PIPE. HOLD ASSEMBLY STATIONARY. ONLY TURN CONDUIT SUPPORT PIPE OR CABLE WILL TWIST AND KINK. MAKE CERTAIN GOOD SEATING IS ACCOMPLISHED BY LOOSENING AND TIGHTENING 3 TO 4 TIMES. THIS CONNECTION MUST BE VERY TIGHT TO WITHSTAND VIBRATION AND HIGH WINDS.

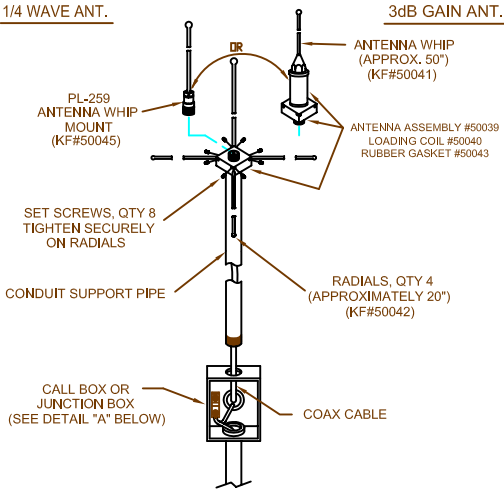
PRELIMINARY ANTENNA INSTALLATION INSTRUCTIONS

- P-1. LOCATE A SUITABLE POSITION ON A WALL TO MOUNT A WATER PROOF JUNCTION BOX, SUCH AS, (RED DOT'S 2INDS-3 RAIN TIGHT J-BOX), IF THE TRANSMITTER MOUNTING IS BELOW THE ANTENNA THE JUNCTION BOX WILL NOT BE REQUIRED. (REFER TO ILLUSTRATION 3)
P-2. MEASURE AND CUT THE APPROXIMATE LENGTH OF CABLE. FROM ANTENNA TO TRANSMITTER. USE RG-58U CABLE FOR LENGTHS UP TO 75 FEET LONG AND RG-8U FOR LENGTHS OF 75 TO 280 FEET LONG.
P-3. ATTACH A PL-259 MALE COAX CONNECTOR TO ONE END OF THE CABLE. THIS CONNECTOR WILL REQUIRE SOLDERING. (SEE SHEET 2 OF 2)
P-4. CUT CONDUIT SUPPORT PIPE TO THE REQUIRED LENGTH AND THREAD BOTH ENDS. (RIGID 1" GALVANIZED OR ALUMINUM PIPE IS RECOMMENDED).
P-5. IF THE ANTENNA IS TO BE MOUNTED TO A WALL WITH THE ANTENNA BELOW THE ROOFTOP, OFFSET THE SUPPORT PIPE AS SHOWN IN ILLUSTRATION #3.
P-6. FOLLOW ILLUSTRATIONS 1, 2 AND 3 FOR INSTALLATION INSTRUCTIONS.

SPECIAL INSTRUCTIONS

1. ANTENNA HEIGHT SHALL BE 20'-0" IN THE PUBLIC SERVICE BAND, AND A MINIMUM OF 20' 0" FOR THE NON-PUBLIC SERVICE BAND INSTALLATIONS.
2. ANTENNAS THAT ARE TO BE MOUNTED IN WEAK SIGNAL AREAS, SHOULD BE LOCATION TESTED BEFORE PERMANENT INSTALLATION. TRANSMIT SIGNALS TO DETERMINE IF RELIABLE AND PROPER SIGNALS ARE RECEIVED BY THE RECEIVER (S).
3. ON METAL EXTERIOR STRUCTURES, ANTENNAS SHOULD BE MOUNTED OUTSIDE TOWARDS RECEIVING ANTENNA.

ILLUSTRATION 2:



- 2-1. ASSEMBLE PARTS ON GROUND UNLESS OTHERWISE SPECIFIED.
2-2. SCREW CONDUIT SUPPORT PIPE INTO TOP HOLE OF WATER PROOF JUNCTION BOX OR CALL BOX. TIGHTEN THIS CONNECTION USING A PIPE WRENCH. OFFSET BEND, IF APPLICABLE, MUST BE ALIGNED AWAY FROM THE WALL.
2-3. INSERT FOUR (4) RADIALS INTO THE CORNERS OF ASSEMBLY #50039 AND SECURE WITH EIGHT (8) ALLEN (HEX) SCREWS.
2-4. ATTACH ANTENNA WHIP MOUNT TO ASSEMBLY #50039 IF APPLICABLE.
2-5. INSERT ANTENNA WHIP INTO 50039, IF APPLICABLE, AND SECURE WITH ALLEN (HEX) WRENCH. CHECK TIGHTNESS OF ANTENNA WHIP HOLDER.

DETAIL "A"

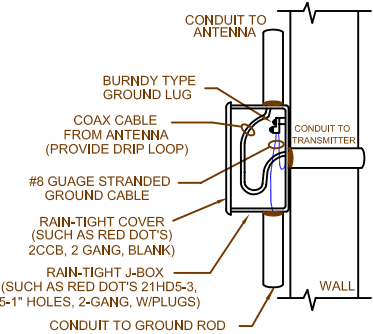
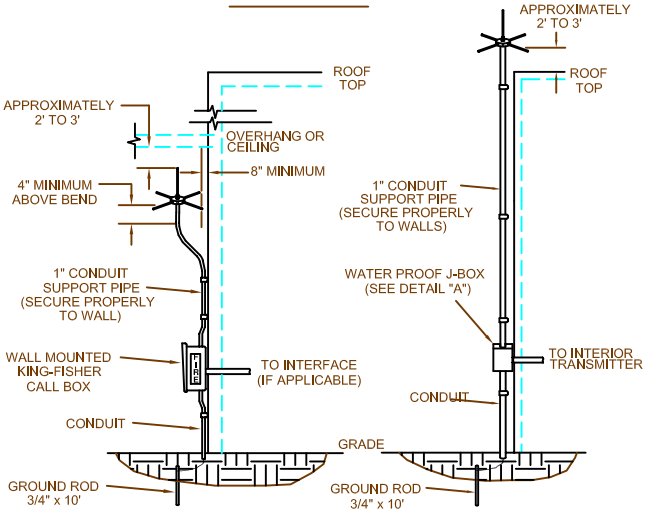


ILLUSTRATION 3



ANTENNA MOUNTING DETAIL

(FOR MOUNTING ON SIDE OR INSIDE BUILDING)

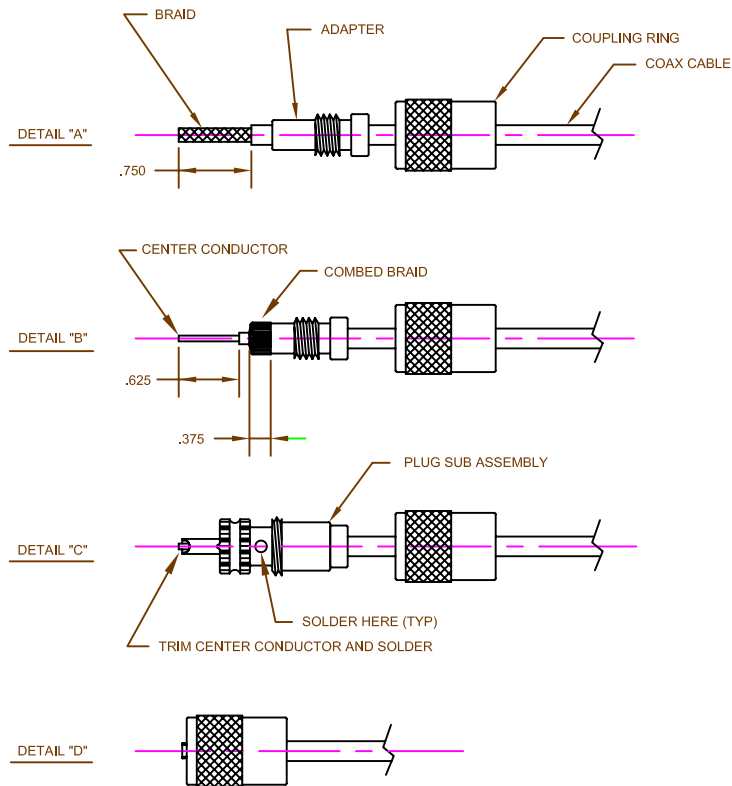
ANTENNA MOUNTING DETAIL

(FOR ABOVE ROOF LEVEL MOUNTING)

- 3-1. COMPLETE CONDUIT RUN TO APPLICABLE TRANSMITTER OR INTERFACE PANEL.
3-2. DRILL A HOLE THROUGH THE WALL (IF NECESSARY) FOR CONDUIT CONNECTING TO WATER PROOF JUNCTION BOX OR CALL BOX.
3-3. STRAP THE CONDUIT SUPPORT PIPE WITH ANTENNA ATTACHED SECURELY TO THE BUILDING, TOWER, POLE, OR STRUCTURE. CHECK WITH LOCAL STANDARDS AND CODES FOR PROPER HOLDING STRENGTH OF ANTENNA STRAPS. ANTENNA STRUCTURE SHALL BE ABLE TO WITHSTAND ALL WIND LOADING CONDITIONS AND SAFETY FACTORS.
3-4. PULL COAXIAL CABLE THROUGH CONDUIT TO TRANSMITTER PANEL. PROVIDE A DRIP LOOP INSIDE WATERPROOF BOX. DO NOT KINK OR STRESS COAXIAL CABLE.
3-5. TRIM EXCESS CABLE AND ATTACH THE PROPER TYPE COAX CONNECTOR (PL259) OR BNC TO THE CABLE AT THE TRANSMITTER. (SEE SHEET 2 OF 2)
3-6. CHECK FOR ANY ACCIDENTAL SHORTS BETWEEN THE GROUND BRAID AND THE CENTER CONDUCTOR OF THE CABLE, BY USING A DIGITAL VOLT-METER SET ON MEGA-OHM SCALE. THE METER SHOULD READ IN MEGA-OHMS, (OPEN CIRCUIT)
3-7. CONNECT CABLE TO TRANSMITTER INSIDE CABINET.
3-8. GROUND THE ANTENNA PIPE AT JUNCTION BOX OR TRANSMITTER (SEE DETAIL "A"). CONNECT GROUND CABLE TO 3/4" X 10" BURIED GROUND ROD AS SHOWN, OR TO WATER PIPE, OR OTHER APPROVED GROUNDING ELECTRODE IN ACCORDANCE WITH N.E.C.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCE ON: FRACT, DECIM, ANGL. ±1/64 ±.01 ±1° ±.005	DFT	DA	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090
		CHK	DA	
		APP	DA	
		DATE	7/7/98	
MATERIAL:		SCALE	NTS	TITLE: 1/4 WAVE, 3db GAIN S.S. TRANSMITTER ANTENNA INSTALLATION DWG. NO. 76506
			SHT 1 OF 2	

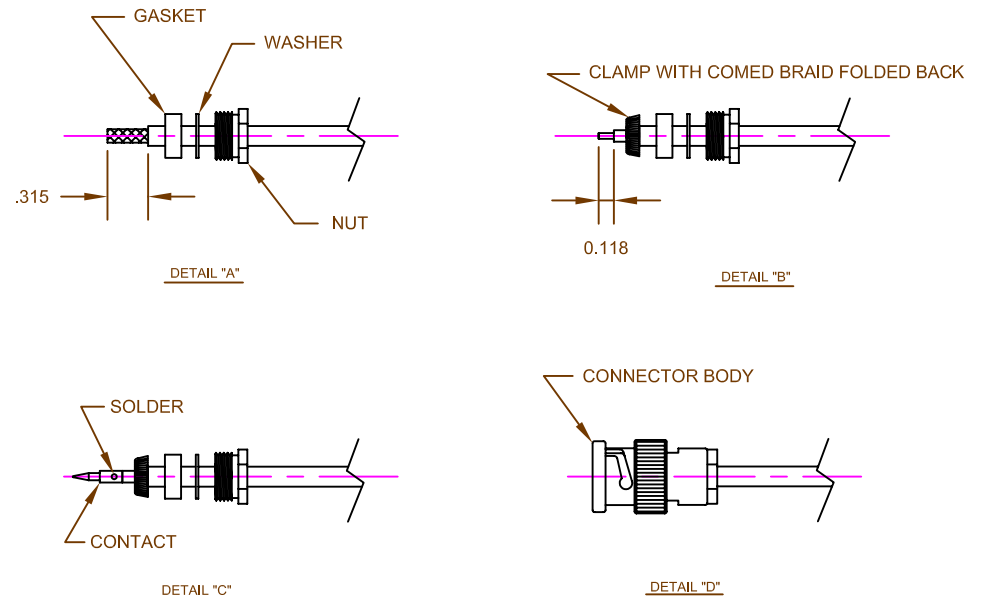
PL-259 CONNECTED TO RG-58/U



ASSEMBLY INSTRUCTIONS

- 1) CUT END OF CABLE EVEN. REMOVE INSULATOR JACKET TO (.750) INCH DIMENSION. SLIDE COUPLING RING AND ADAPTER ON CABLE. (SEE DETAIL "A")
- 2) COMB OUT BRAID AND FOLD BACK. POSITION ADAPTER FLUSH WITH CABLE JACKET. PRESS BRAID DOWN OVER BODY OF ADAPTER AND TRIM TO (.375) INCH DIMENSION. BARE CONDUCTOR TO (.625) INCH DIMENSION. TIN EXPOSED CENTER CONDUCTOR. (SEE DETAIL "B")
- 3) SCREW PLUG SUB-ASSEMBLY ON ADAPTER. SOLDER BRAID THROUGH SOLDER HOLES. USE ENOUGH HEAT TO CREATE BOND OF BRAID TO SHELL OF PLUG SUB-ASSEMBLY. SOLDER CENTER CONDUCTOR TO SHELL OF PLUG SUB-ASSEMBLY. (SEE DETAIL "C")
- 4) SCREW COUPLING RING ON PLUG SUB-ASSEMBLY. (SEE DETAIL "D")

BNC CONNECTED TO RG-58/U

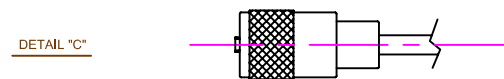
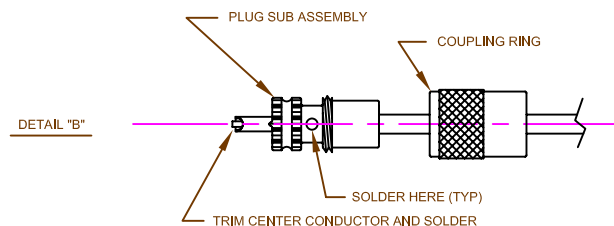
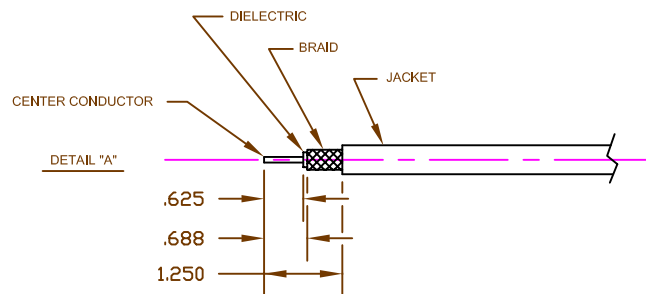


ASSEMBLY INSTRUCTIONS

- 1) CUT END OF CABLE EVEN. REMOVE INSULATOR JACKET TO (.315) INCH DIMENSION. SLIDE NUT, WASHER AND GASKET ON CABLE. (SEE DETAIL "A")
- 2) PLACE CLAMP OVER BRAID AND PUSH BACK AGAINST CABLE JACKET. COMB OUT BRAID, FOLD BACK AND TRIM. TIN CENTER CONDUCTOR (SEE DETAIL "B")
- 3) SOLDER ON CONTACT THROUGH SOLDER HOLE. (SEE DETAIL "C")
- 4) INSERT CABLE AND PARTS INTO CONNECTOR BODY. TIGHTEN NUT. (SEE DETAIL "D")

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCE ON: FRAC, DECIM, ANGL. ±1/64 ±.01 ±1°	DFT	DA	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090 TITLE: ALUMINUM / ALADYNED TRANSMITTER ANTENNA INSTALL. DWG. NO. 76504-1
		CHK	DA	
		APP	DA	
		DATE	7/7/98	
MATERIAL:		SCALE	NTS	
		SHT 2 OF 2		

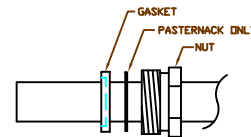
PL-259 CONNECTED TO RG-213/U



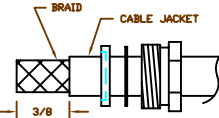
ASSEMBLY INSTRUCTIONS

- 1) CUT END OF CABLE EVEN AND STRIP JACKET, BRAID AND DIELECTRIC TO DIMENSIONS SHOWN IN DETAIL "A". ALL CUTS ARE TO BE SHARP AND SQUARE. DO NOT NICK BRAID, DIELECTRIC OR CENTER CONDUCTOR. TIN EXPOSED CENTER CONDUCTOR AND BRAID, AVOIDING EXCESSIVE HEAT.
- 2) SLIDE COUPLING RING ON CABLE. SCREW THE PLUG SUB ASSEMBLY ON CABLE, SEE DETAIL "B". SOLDER ASSEMBLY TO BRAID THROUGH SOLDER HOLES, MAKING A GOOD BOND BETWEEN BRAID AND SHELL. SOLDER CENTER CONDUCTOR. DO NOT USE EXCESSIVE HEAT.
- 3) MOVE COUPLING RING FORWARD AND SCREW IN PLACE ON PLUG SUB ASSEMBLY, SEE DETAIL "C".

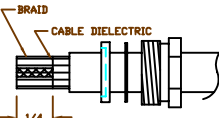
DETAIL "A"



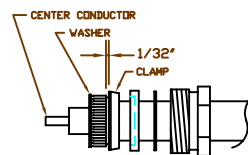
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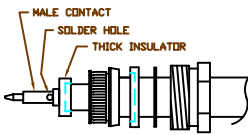
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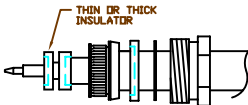
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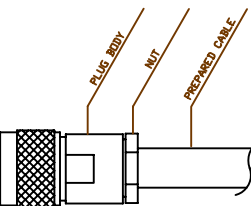
DETAIL "E"



DETAIL "F"

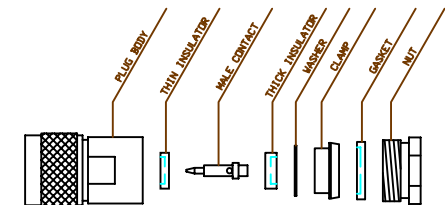


DETAIL "G"

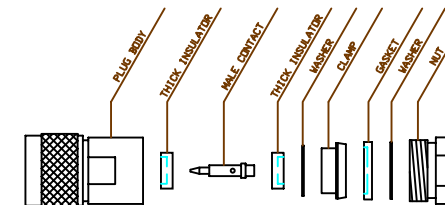


NOTE: ALWAYS CHECK SWR BEFORE PLACING COMPLETED CABLE ASSEMBLIES INTO SERVICE.

N TYPE CONNECTED TO RG-213/U



AMPHENOL DETAIL



PASTERNAK DETAIL

ASSEMBLY INSTRUCTIONS

NOTE: IDENTIFY WHAT PARTS PACKAGE YOU HAVE BY LOOKING AT THE PACKAGE FOR THE MANUFACTURERS NAME; AMPHENOL OR PASTERNAK. LAYOUT AND IDENTIFY THE VARIOUS PARTS. (SEE ABOVE)

- DETAIL "A" CUT END OF CABLE EVEN. PLACE NUT AND GASKET WITH "V" GROOVE TOWARD THE CLAMP. PLACE WASHER OVER CABLE END FOR PASTERNAK PART ONLY.
- DETAIL "B" REMOVE CABLE JACKET 3/8 INCH FROM END.
- DETAIL "C" COMB OUT BRAID AND FOLD OUT. CUT OFF CABLE DIELECTRIC TO 1/4 INCH FROM END.
- DETAIL "D" PULL BRAID WIRES FORWARD AND TAPER TOWARD CENTER CONDUCTOR. PLACE CLAMP OVER BRAID AND PUSH BACK AGAINST CABLE JACKET. FOLD BACK BRAID WIRES AND TRIM TO PROPER LENGTH AS SHOWN. PLACE WASHER OVER CABLE DIELECTRIC AND PUSH BACK AGAINST BRAID WIRES.
- DETAIL "E" SLIDE THICK INSULATOR ON MALE CONTACT AND SLIDE MALE CONTACT ONTO CENTER CONDUCTOR. PARTS MUST BUTT TOGETHER WITH CABLE DIELECTRIC. SOLDER CONTACT TO CENTER CONDUCTOR. DO NOT PRE-TIN CENTER CONDUCTOR.
- DETAIL "F" SLIDE FRONT INSULATOR OVER CONTACT. BE SURE TO PLACE COUNTER BORE END OF INSULATOR TOWARD MATING END OF CONTACT, AS SHOWN.
- DETAIL "G" INSERT PREPARED CABLE TERMINATION INTO CONNECTOR PLUG BODY. MAKE SURE SHARP EDGE OF CLAMP SEATS PROPERLY IN GASKET. TIGHTEN NUT HOLDING BODY AND PREPARED CABLE STATIONARY.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOLERANCE ON: FRACT, DECIM, ANGL. ±1/64 ±.01 ±1" ±.005	DFT	DA	 KING-FISHER COMPANY 2350 FOSTER AVE., WHEELING, IL 60090 TITLE: KFR-C ANTENNA INSTALLATION DWG. NO. 76597
		CHK	DA	
		APP	DA	
		DATE	7/7/98	
		SCALE	NTS	
		MATERIAL:		



CAD 2000

RESPONSE PREPLAN AND EMERGENCY DISPATCH SYSTEM



KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847•398•7100 f 847•255•1507 e-mail sales@kfco.com Internet www.kfco.com

AN OVERVIEW OF THE KING-FISHER COMPANY WINDOWS ⁹⁸ – BASED RESPONSE PREPLAN AND EMERGENCY DISPATCH SYSTEM

King-Fisher Company's dispatch software has been rewritten to take advantage of the "multi-threading" capabilities which first became available with the Windows ⁹⁵ operating system, WIN32. CAD 2000. Our Win 32-based product, is now capable of responding to an automatic alarm signal even if the dispatcher is running a different program at the time that the signal arrives! This added reliability justified our investment to build the CAD 2000 program. **NOTE: When CAD 2000 is used for Primary Dispatching it will be operating 24 hours -7 days a week, therefore, CAD 2000 should be the only software running on this Computer.**

CAD 2000 may be installed on any PC running Windows ⁹⁵, Windows ⁹⁸, or Windows NT (version 4.0 or later). An SVGA monitor (800 x 600), or one of greater resolution, is required. The demo version of CAD 2000 includes a full set of test data, and should not be installed onto a computer currently used to run PC-CAD (in a DOS window) as the production version installs side-by-side with PC-CAD. In the production version, the first attempt to run CAD 2000 builds a parallel database in CAD 2000 format. At that point, either the DOS-based PC-CAD or WIN32-based CAD 2000 may be run – with neither affecting the other.

THE PRIMARY DATA

The CAD 2000 dispatch system is constructed upon a database of **VEHICLES, RUNNING ASSIGNMENTS, RESPONSE SUGGESTIONS** and **GEOGRAPHICAL PREPLAN RECORDS**.

VEHICLES are identified with a four-character label, the first two of which are identical for vehicles of the same type – that is, which may be substituted when another of the same type is unavailable for dispatch. Provision is also made for crew-sharing among vehicles. The vehicles available in the test data are

Assistant Chief Vehicles – **AC02, AC03, AC04, AC05, AC06, AC07**

Ambulances – **AM01, AM02, AM03, AM04, AM05, AM06**

Battalion Chief's Vehicle – **BC06**

Chiefs' Vehicles – **CH03, CH04, CH05, CH07**

...etc.

RUNNING ASSIGNMENTS are lists of vehicles available for response to incidents. Although a small response area may have only one Running Assignment (especially if all emergency vehicles are housed at the same location) the normal installation will have several such records. Because vehicles are listed in the preferred order of dispatch (within each type) and some locations are closer to one engine house than another, different running assignments would be created. Thus, those locations closest to where **AMB2** is stored could use a running assignment listing that ambulance before any other, while those closest to where **AMB3** is housed could use one reflecting the nearness of that ambulance.

RESPONSE RECOMMENDATIONS remind the dispatcher of the normal equipment to be sent for a given incident type. These are defined by example – that is, one appropriate response is listed, and the dispatch logic uses those types of vehicles to suggest (using the running assignment record) the specific appropriate vehicles for the incident location.

Among the call types linked to response recommendations in the test data are

FIRE1 FIRE2...FIRE7 (progressive severities of fire incidents)
SEC (request for security)

GEOGRAPHIC RECORDS contain preplanned response information for specific locations or areas. They are of four types:

Street Segment Records, which are brought up by specifying the name of the street

Specific Address Records, which are brought up by full number-and street specifications

Common Place Name Records, which are brought up by building name

Building Number Records, which are brought up by building number (as on military posts)

Specific Address Records may also be entered in a form which covers a full block, or one side of a block, of numbers on a street. Geographic Records may be retrieved from streets specified as

“AARDVARK” and “ELM”, while names such as “DOCTORS HOSPITAL”, “ELM STREET ELEMENTARY” and “ACME CHEMICAL” will also retrieve test records.

ESTABLISHING A DISPATCH STATION



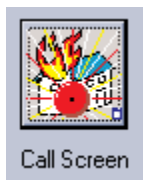
In the process of installing **CAD 2000** on your computer, a shortcut icon was added to your desktop. Double-click on that icon to enter the program. The test data includes a number of ID's and passwords... you may use the ID “**TOP**”, with the password “**PCCAD**”. NOTE: On the login dialog, there is a button labeled, “**HELP**”. This is a direct entry into the **CAD 2000** help system. Once you have successfully logged in, the last item on the main menu provides the same capability.



You are now ready to set up your dispatch desktop. In a “live” installation, in which a King-Fisher radio receiver(s) (KFRA or KFRA-C) is being monitored by this particular computer, you must bring up the Automatic monitoring element. You may specify COM PORT 1, COM PORT 2, or BOTH, to which the radio receiver is connected, and which type it is. Were you to be monitoring two receivers, you would simply launch Automatic monitoring element twice.

Having launched the monitor (or monitors), you may start any other programs running, without disturbing the automatic initiation of an incident situation should an alarm come in. Until the monitor is turned off (by clicking on the “COM 1” or “COM 2” button displayed by it), the dispatcher is in exactly the same situation as he would be were he at the Call Screen on PC-CAD, with “AUTO” showing in the call-type field.

You may wish to reduce the monitor routine(s) to a base-line tag by clicking the reduction icon at the left of the top right-hand corner of the monitor dialog. This will not affect the performance of the monitoring function.



The second item you may wish to include on your dispatch desktop is the Call Screen dialog. This provides for beginning incidents in response to a telephone call, walk-in report, or other non-automatic situation. Although the dispatcher could wait to bring this up until it is actually necessary to begin an incident, having the “gun cocked” will take that task off the list of things which have to be done “in the heat of battle”.



The third item you will certainly wish to include is the Incident dialog. From the Incident dialog, the operator can quickly recall an incident for further dispatching, or add comments to an incident. Although the dialog displays only the latest seven incidents, clicking the **Dispatch/Recall** or **Add Notes** button will bring up a scrollable window enabling the dispatcher to select from any of the latest 50 incidents. If it is necessary to go back further, perhaps to add a comment to an incident several weeks old, the computer may use the Adjust Scope capability to extend that 50-incident limit up to 4000.



Finally, you may wish to include the **Equipment Status** dialog on your dispatch desktop. This presents all vehicles in the database (if more than 36, the remainder are viewable by scrolling the equipment status screen) and the status of each vehicle. This dialog has three functions: (1) to display the current status of all vehicles under control of the dispatch enter; (2) to change the status of any vehicle in response to its reported activity; and (3) to tell the program of “move up” situations, in which one vehicle is standing in for another...typically, because the latter is under repair.

DISPATCHING A NEW INCIDENT

On the Call Screen, enter Call Type “**FIRE1**” change the priority to “4” and set the location as “**DOCTORS HOSPITAL**”. If you wish, you may continue, entering information on a hypothetical caller (feel free to use information on yourself).

When you have entered those first three items and whatever portion of the rest you choose, click on **OK** to begin the incident process. The main dispatch dialog will appear for Doctors Hospital. This location has, among other things, a series of floor plans, stored as Fire Graphics.

Call Screen

Call Type

Priority: (low) ☒ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 (high)

Location

Caller Information

Name

Address

City/ST/Zip -

Telephone -

If there were more than one record matching the location “**DOCTORS HOSPITAL**”, you would have been offered the opportunity to select from among them. You may observe this by entering the location “**ELM**”. Not only will you be presented with all of the street segment records for Elm Street, but the four alarm-linked records for Elm Street Elementary School will be offered. Elm street Elementary is an interesting record to bring up, as it contains an extended preplan text, with many categories of information. It also has a graphic, but only one: the floor plan for the first floor. But back to the Doctors Hospital record....

Priority (1-5)

4

CAD-2000

DISPATCH

(NONE)

Call Type

FIRE1

Location

DOCTORS HOSPITAL

Map Grid:

MD02

DOCTORS HOSPITAL / S SOUTH MEMORI

Call Summary

Comments

More Detail

Text Preplan

SEE GRAPHICS SCREENS FOR FLOOR PLANS FOR THIS BUILDING.
INCLUDE LADDER UNIT IN ALL RESPONSES.

Vehicle Selection

☐ AC04	☒ AMB4	☐ CHF4	☒ ENG4	☐ LAD4	☐ RES4	☒ SQD4	☒ TRK4
☐ AC05	☐ AMB5	☐ CHF5	☐ ENG5	☐ LAD5	☐ RES5	☐ SQD5	☐ TRK5
☐ AC06	☐ AMB6	☐ BC06	☐ ENG6	☐ LAD6	☐ RES6	☐ TRK6	☐
☐ AC07	☐ CHF7	☐ ENG7	☐ TRK7	☐	☐	☐	☐
☐ AC05	☐ AMB5	☐ CHF5	☐ ENG5	☐ LAD5	☐ RES5	☐ SQD5	☐ TRK5
☐ AC06	☐ AMB6	☐ BC06	☐ ENG6	☐ LAD6	☐ RES6	☐ TRK6	☐
☐ AC07	☐ CHF7	☐ ENG7	☐ TRK7	☐	☐	☐	☐
☐ AMB1	☐ ENG1	☐ SQD1	☐ TRK1	☐	☐	☐	☐
☐ AC06	☐ AMB6	☐ BC06	☐ ENG6	☐ LAD6	☐ RES6	☐ TRK6	☐
☐ AC07	☐ CHF7	☐ ENG7	☐ TRK7	☐	☐	☐	☐
☐ AMB1	☐ ENG1	☐ SQD1	☐ TRK1	☐	☐	☐	☐
☐ AC02	☐ AMB2	☐ ENG2	☐ TRK2	☐	☐	☐	☐

Move-Ups

Out of service:

Replaced by:

DISCARD CALL

DISPATCH

Notice that the Call Type “FIRE1” has triggered the suggestion of vehicles **AMB4**, **ENG4**, **SQD4** and **TRK4** for dispatch. If you have the Equipment Status dialog displayed as part of your dispatch desktop, you will note that these vehicles are shown with the status “(On Hold)”. This tells other potential dispatchers that you have tentatively selected these vehicles for dispatch.

Clicking “DISPATCH” at the point would start a new incident (the “(NONE)” at the top right of the dialog box indicates this is not yet

a registered incident.

Prior to dispatching, you may wish to enter a very brief comment on the incident, below the location, in the field labeled “Call Summary.” You may also alter the equipment to be dispatched by clicking on or off the appropriate check boxes. For example, if you click on the check box for **AMB4** then the box for **AMB5**, the former is deselected, while the latter is selected.

Prior to dispatch, or after recall, **Comments** and **More Detail** may be entered or viewed by clicking the appropriate buttons. The incident information, with any comments or selected vehicles, may be printed by clicking the PRINT icon at the bottom left of the main dispatch dialog...usually to prepare information for the responding crews. Printout may be automatic, if desired (see **CONFIGURE**).

The labels on the two larger buttons at the bottom of this page will change to reflect the status of the incident. The current two labels reflect the fact that this is, potentially, the start of a new incident, and some vehicles have been selected for dispatch (you cannot dispatch without sending vehicles). Deselect each checked vehicle. Note that the **DISPATCH** button is now labeled “**HOLD FOR LATER DISPATCH**”. Clicking that button will now add the incident to the incident list, without a number, as a “pending” incident. It may be recalled for that list for dispatch later... a good policy if the incident is trivial and a critical one currently requires your attention.

Suppose you had dispatched the four vehicles originally selected, and, after they are at the scene, you receive a request for an additional engine/pumper to protect an adjacent building. Your recall of the incident would produce this dialog, but the buttons would be labeled “**CANCEL CHANGES**” and “**PROCESS ANY CHANGES**”. For now, just dispatch the incident.

MANAGING VEHICLE STATUS

Vehicle Status

☐ Update by Group

☐ AC02	☐ AMB6	☐ ENG7
☐ AC03	☐ BC06	☐ LAD1
☐ AC04	☐ CHF3	☐ LAD4
☐ AC05	☐ CHF4	☐ LAD5
☐ AC06	☐ CHF5	☐ LAD6
☐ AC07	☐ CHF7	☐ LAD7
☐ ACO2	☐ ENG1	☐ P-15
☐ AMB1 Out of Service	☐ ENG2 Out of Service	☐ RES4
☐ AMB2	☐ ENG3	☐ RES5
☐ AMB3	☐ ENG4	☐ RES6
☐ AMB4	☐ ENG5	☐ SNK3
☐ AMB5	☐ ENG6	☐ SQD1

← Update Selected Vehicles Move-Ups Close →

The Vehicle Status dialog has automatically adjusted itself to reflect the dispatch of the four vehicles you dispatched. The test data has more than 36 vehicles; the remainder may be viewed by clicking on the arrow to the bottom right of the dialog.

This dialog not only presents the current status of each vehicle, but also provides the means for informing the system of changes in the status of vehicles.

As a vehicle is reported as responding to an incident, you change the status on this dialog. At the same time, the computer uses your action to time-stamp the activity for later reports. The “Incident Status” activity presents the resulting information, vehicle by vehicle.

The actual process of updating the status of a vehicle is performed simply by clicking on the checkbox associated with that vehicle (scrolling the window first, if necessary). The status selection menu will appear, with only the acceptable new status options enabled. Click on the new status, then click **OK**.

It is also possible to save some time by changing the status of several vehicles (to the same new status) at the same time. Just click the Update By Group checkbox on before beginning to select the vehicles to have the new status. As soon as the first one is selected, the Update Selected Vehicles button will be activated. When you have completed selecting the vehicles to have the new status, click the Update Selected Vehicles button to get the status menu. Only those new status options which are appropriate for all of the selected vehicles will be enabled. Again, click on the new status, then click OK. Note: it is perfectly permissible to scroll through vehicles when selecting for group update .. the computer knows of all of them at all times, even those which may not be visible when you finally press the Update Selected Vehicles button.

AMB4

- ☐ Responding to Incident
- ☐ On Site of Incident
- ☐ Enroute Hospital, still assigned
- ☐ At Hospital, still assigned
- ☐ Returning to Quarters
- ☐ In Quarters
- ☐ Out of Quarters, Available
- ☐ Out of Service

Try placing one of the vehicles out of service, then designating another of the same type to handle its normal activities, using the Move-Ups button and the dialog which it produces. Try setting TRK5 to “out of Service”, then move-up TRK1 to cover it. If you now recall the Doctors Hospital incident, you will note that TRK1 appears at the end of the second line of vehicles, where TRK5 was.

INCIDENT COMMENTS

Incident Maintenance

Status	Type	Alarm	Location	
— PRIORITY 1 —	ALARM	05/18/99 11:26:13	ELM STREET	
— PRIORITY 1 —	ALARM	05/18/99 07:48:43	BUFFALO BOULEVARD	
2001-00004	ACTIVE	FIRE1	03/05/01 08:39:13	DOCTORS HOSPITAL
2001-00003	ACTIVE	FIRE1	03/05/01 08:26:36	DOCTORS HOSPITAL
2001-00002	ACTIVE	FIRE1	03/05/01 08:22:19	DOCTORS HOSPITAL
2001-00001	ACTIVE	FIRE1	03/05/01 08:16:09	DOCTORS HOSPITAL
1999-00011	CLOSED	ALARM	05/16/99 10:33:15	2350 FOSTER AVENUE

Adjust Scope **Dispatch/Recall** Add Notes Close

Let's add a comment to the most recent incident. On the "Incident Recall and Commentary" dialog box, click on that incident to highlight it, then click the **Add Notes** button.

Incident # 199900008 Status: CLOSED
Call Type: ALARM Map Grid: ES00
Location: ELM STREET ELM STREET ELEMENTARY / 26 E ELM ST
Call Summary:

Existing Commentary

New Comments

Cancel Print Save Updates

This differs from the **Dispatch/Recall** function in that it reopens the incident information process at the incident notepad screen. This screen reminds the user of the incident involved, with a summary of the location heading.

Any existing comments, with time-stamps, will be presented within the scrollable **Existing Commentary** box.

Within the **New Comments** box, begin typing your

note...perhaps something about finding, upon arrival at the hospital, that it had been a mistaken alarm, with smoke from a nearby leaf fire being mistaken for indication of a fire within the building. Your typing will automatically roll to the next line when the current one is full, so the {ENTER} key will be needed only when you wish to double space to indicate a new paragraph. When you have completed your comment, click the Save Updates button to time-stamp and lock in your new information.

You may also use the Add Notes incident recall to print out the commentary on a specific incident, without including other incident information. To get full information on an incident, including vehicles dispatched (with follow-up time-stamped information on arrival at the scene, etc.), use the incident Status function.

INCIDENT STATUS



The **Status** function brings up an incident list, much like the **Incident Recall** screen. As in the latter, the most recent 50 incidents are available from the scrollable list. If you wish to review an older incident, use the **Include Older Incidents** button to extend the look-back depth to as much as 4,000 incidents.

Incident Type: FIRE1
 Location: DOCTORS HOSPITAL
 Description:
 Status: ☒ Active ☐ Closed ☐ Pending
 Re-dispatches: 1
 Client's Classification:
 Caller Information:
 Name:
 Address:
 City/ST/Zip:
 Telephone:
 Incident Chronology:
 Fire Started 03/05/01 08:39:13
 Fire Detected 03/05/01 08:39:13
 Alarm Received 03/05/01 08:39:13
 Dispatched 03/05/01 08:39:26
 On Site 03/05/01 08:39:50
 Fire Put Out 00/00/00 00:00:00
 EQUIPMENT DISPATCHED ON INCIDENT

Equip	Seq	Dispatched	Responded	At Scene	To Hospital	At Hospital	Secured	In Quarters
AMB4	00	08:39:26	08:39:50	08:39:50	10:17:57	10:18:23	10:18:46	10:18:46
ENG4	00	08:39:26	08:40:00	08:40:00	00:00:00	00:00:00	00:00:00	00:00:00
TRK7	00	08:39:26	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
SQD1	00	08:39:26	08:40:08	08:40:08	00:00:00	00:00:00	00:00:00	00:00:00
AMB4	01	10:20:27	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00

 Incident Commentary:
 Print Incident Cancel OK

Click on the incident to be reviewed, highlighting it, then click the OK button to bring up the status dialog.

This dialog presents the overall information on the incident, a scrollable transcription of the time-stamped comments which have been entered on this incident, and both general and vehicle-specific time information.

Note that the **Incident Chronology** box may be updated within this dialog. You may also use the **Print Incident** button to get a printout of the general incident

information, all comments, and a full listing of all vehicles dispatched on the incident. Note that, in this example, **ENG7** is listed with sequence "01", whereas the others are "00". Those given the "00" sequence were dispatched in the initial incident dispatch. The "01" indicates **ENG7** was dispatched subsequently, to the same incident.

EDIT THE DATABASE



A user with "full" access, can edit any and all database information (which is one reason why such access should be given out to only a few). The **Edit Files** button on the main menu line brings up the record-type selection buttons. **Cad2000** contains Operator Records, Vehicle Records, Running Assignment Records, Suggested Response Records and Geographic Records. These were described in the "Primary Data" paragraphs on the

Users Equipment Running Assignments Suggested Response Geographic Records

first page. Select among the five to proceed into the edit process.

If you are using a demonstration version of **CAD 2000**, you will not be able to edit any Geographic Records. Enter into some of these edit modules, listing,

adding to, or reporting the records stored in the database.

OPERATIONAL REPORTS



As the CAD 2000 system is used, it generates records beyond the primary data. These maintain information on incidents and vehicle usage. Any user with access greater than simple dispatcher may generate any of these reports.

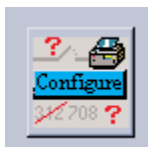
When reporting incidents, you may limit the range by incident number or dispatch date.

Comments will be included if the Include all detail box is checked.

When reporting vehicle usage, which accumulates the time various

vehicles spend out on calls, enter the first and last vehicle ID's to be reported, e.g. "AC03" and "BC06" values would include AC03, AC04, AC05, AC06, AC07, AMB1, AMB2, AMB3, AMB4, AMB5, AMB6 and BC06.

CONFIGURATION

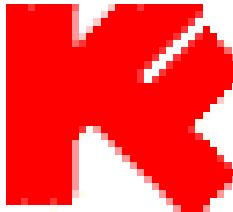


Finally, you should call-up the Configure function. Each station is configured uniquely, based upon the file "C:\KFCD\PC04SE.DAT". Note that this file is on the C: drive. Even if the CAD 2000 is on a LAN server, a "local" copy of that file is required on each computer

accessing the program. One station may be connected to an automatic monitor; another, to an E911 computer; another used only to begin incidents based upon non-E911 telephone and other incident reports; and another, just for entering vehicle status changes. For this reason, a local configuration for each station is needed.

Several items are open for specification by anyone with "full" access authorization. For immediate print-outs of "proto-incidents" when the dispatch screen is brought up (and before any vehicles are actually dis-

patched) click on the automatic print box at the top. The normal status of each COM port may also be specified. The remainder is restricted for use by King-Fisher personnel, or specially authorized local agents.



PREPLAN SOFTWARE

VERSION 4

TECHNICAL MANUAL

King-Fisher PrePlan

View Edit Settings Help

Call Screen Incidents Categories Records Settings Help

Last 100 Incidents

Date	Time	Location Information	City	Alarm Number
5/20/2004	10:16 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/20/2004	10:16 AM	S, 2350 Foster Ave	Wheeling	0019950004
5/20/2004	10:14 AM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/20/2004	8:39 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/20/2004	8:38 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/20/2004	8:38 AM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/20/2004	8:37 AM	S, 2350 Foster Ave	Wheeling	0019950004
5/20/2004	8:20 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/20/2004	8:20 AM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/20/2004	8:19 AM	S, 2350 Foster Ave	Wheeling	0019950004
5/20/2004	6:24 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/20/2004	6:24 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/20/2004	6:23 AM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/20/2004	6:23 AM	S, 2350 Foster Ave	Wheeling	0019950004
5/19/2004	1:43 PM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/19/2004	1:26 PM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950002
5/19/2004	1:24 PM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/19/2004	1:23 PM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/19/2004	1:18 PM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/19/2004	1:17 PM	100-200, S, S. Foster Ave	Wheeling	0019950003
5/19/2004	12:59 PM	100-200, S, S. Foster Ave	Wheeling	0019950003
4/7/2004	8:53 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
4/7/2004	8:40 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
4/7/2004	8:35 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001

Edit Incident

COM 1 Listener

Message	Box	Date	Time	Special
FIRE ZN 00	01995	5/20/2004	8:55 AM	
TROUBLE 0	01995	5/20/2004	8:54 AM	
FIRE ZN 60	01995	5/20/2004	8:52 AM	
FIRE ZN 50	01995	5/20/2004	8:51 AM	
FIRE ZN 40	01995	5/20/2004	8:49 AM	
FIRE ZN 30	01995	5/20/2004	8:48 AM	
FIRE ZN 20	01995	5/20/2004	8:47 AM	
FIRE ZN 10	01995	5/20/2004	8:45 AM	
FIRE ZN 01	01995	5/20/2004	8:39 AM	
FIRE ZN 02	01995	5/20/2004	8:38 AM	
FIRE ZN 03	01995	5/20/2004	8:38 AM	
FIRE ZN 04	01995	5/20/2004	8:37 AM	
TROUBLE 1	01995	5/20/2004	8:37 AM	
FIRE ZN 02	01995	5/20/2004	8:20 AM	
FIRE ZN 03	01995	5/20/2004	8:20 AM	
FIRE ZN 04	01995	5/20/2004	8:19 AM	
TROUBLE 1	01995	5/20/2004	8:19 AM	
FIRE ZN 00	01995	5/20/2004	7:37 AM	
TROUBLE 0	01995	5/20/2004	7:36 AM	

COM 2 Listener

Message	Box	Date	Time	Special

Thursday, May 20, 2004 1:15:30 PM COM 1 Listener - ON COM 2 Listener - ON Automatic Monitoring - ON

KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847•398•7100 f 847•255•1507 e-mail sales@kfco.com Internet www.kfco.com

PREPLAN

PrePlan has been designed for the small fire department, or the “satellite” department which is dispatched from a central source. This program reinforces and complements the efforts of the members of the response team. It assures that they approach a site with the information necessary to safely and efficiently attack the situation, rescue the occupants, and sidestep or neutralize special risks.

This manual has been designed for the user to read. To meet this design, it is **SHORT** and **COMPREHENSIVE**. Each responder, dispatcher or preplanner should take the one hour or less needed to read it through.

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PREPLAN

INTRODUCTION

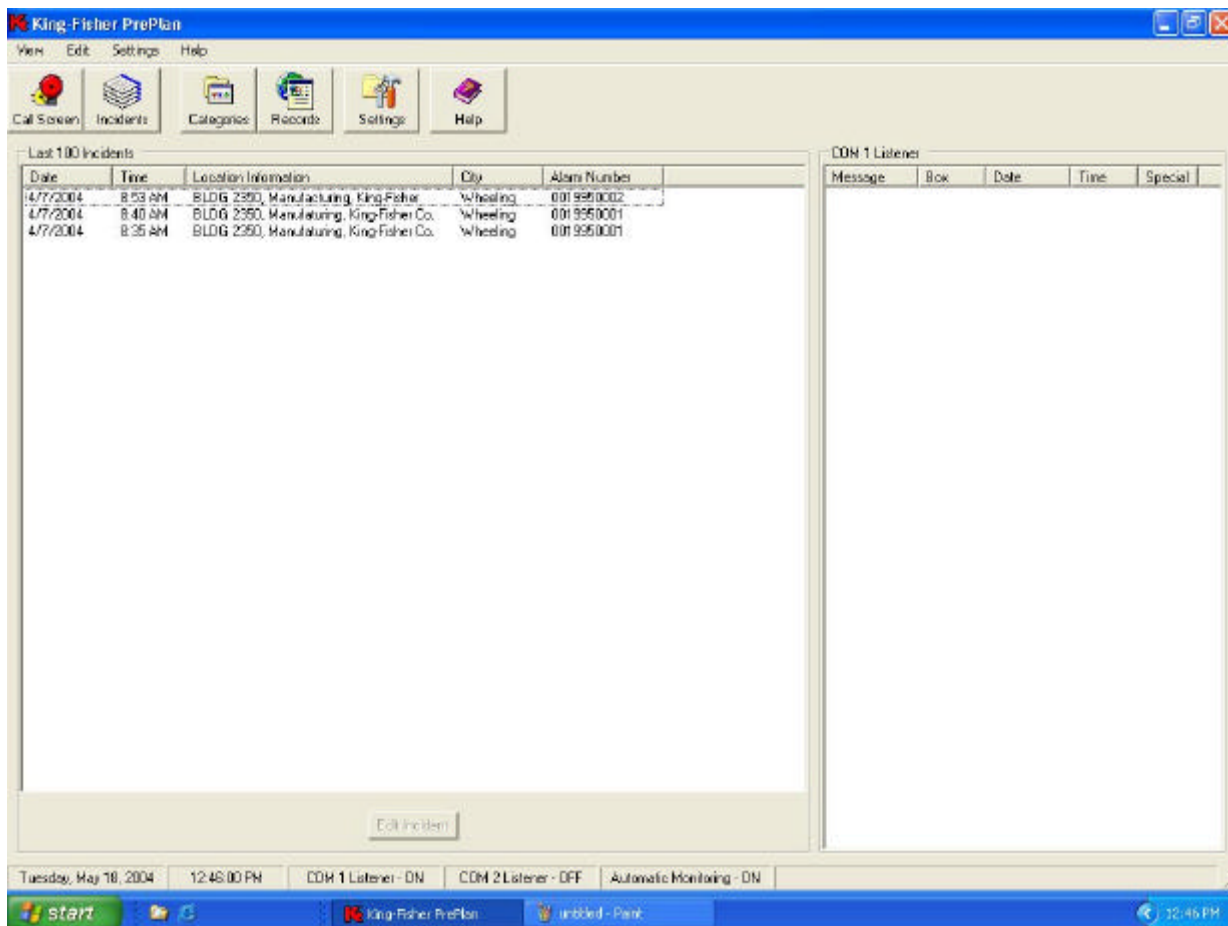
PrePlan by KING-FISHER COMPANY is designed to fulfill the needs of the smaller emergency response organization, volunteer fire departments, private emergency response entities and those which are dispatched by an oversight organization. It enables the user to store up to as many categories of information important to those responding to a given location, then quickly (or automatically) retrieving that information when the need arises.

INSTALLATION

Installation media for PrePlan consist of one CD-ROM.

Place the **PrePlan** installation CD-ROM into the CD-ROM drive, then type, "SETUP" from the Windows RUN command. During the installation procedure, **PrePlan** software, **Acrobat Reader** and **Volo Express Viewer** will be loaded to your C: Drive in Program Files, under the name of King-Fisher

THE MENU SCREEN



King-Fisher Company

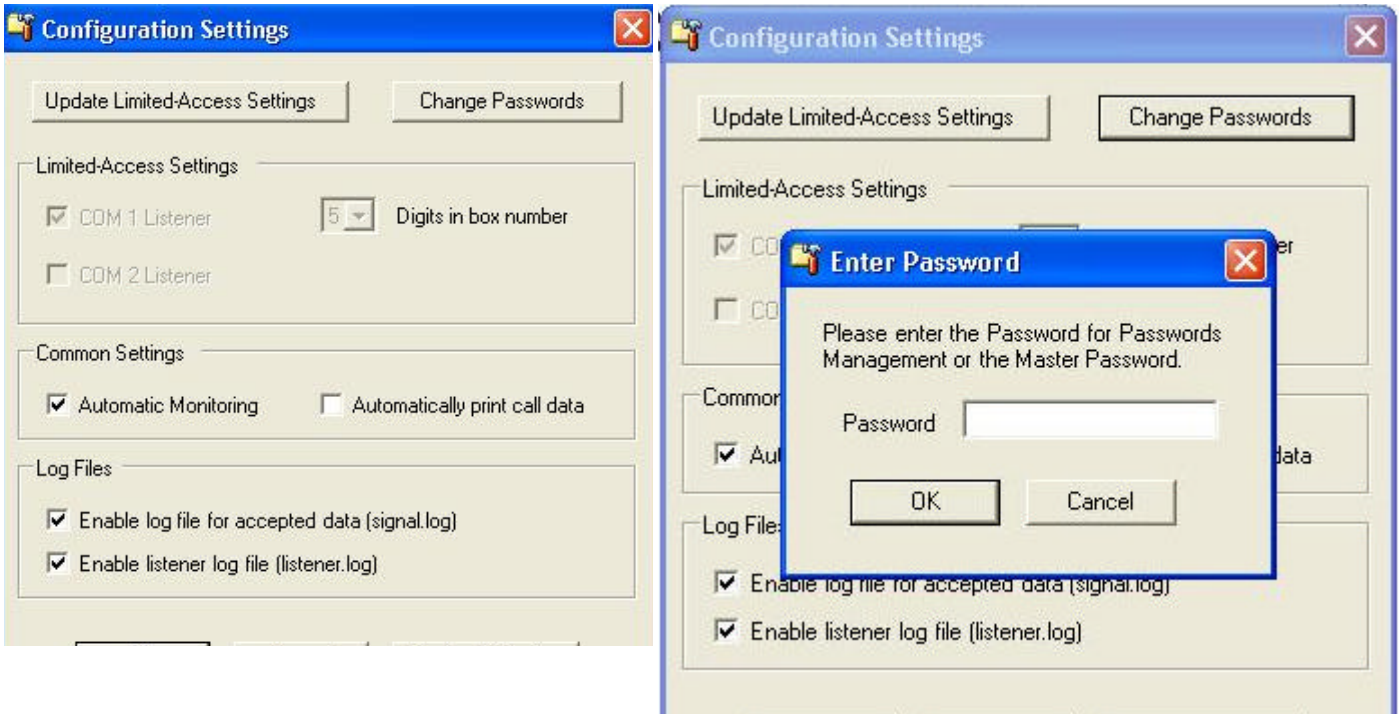
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The MAIN MENU appears at the start of **PrePlan**.

You may select an activity from this menu by clicking on the Icon of your preference.

Notice at the bottom left corner of the window the Date and Time is displayed. When setting up the program, first go to SETTINGS. If you plan to have a password-protected operation, click on the Change Password BUTTON. the “Enter Password Window” will open.



If for some reason you do not want to use password protection, then just click on the “OK” button whenever this window appears.

As the master user, you should be prepared with three passwords which you either commit to memory or (better yet) write down and place in a secure, easily remembered location. To proceed with entering your passwords, just click on the “OK” button a new window will open.

Now enter a password for “Modify Access” Password for “Configuration” and finally a password for “Management”. These three (3) passwords can be the same word or different if you desire.

Now click on the “Limited Access Settings” button. For **PrePlan** to work with King-Fisher Radio Receiving Consoles (KFRA-C) the following information has to match. Enter the appropriate number for “Digits in box number” (this will be from 1 to 6). Then click on the Box for COM 1 Listener or COM 2 Listener or both if monitoring two (2) KFRA-C Receivers.

Under “Common Settings” select Automatic Monitoring and if you want your run cards printed automatically, select Automatically print call data.

Under “Log Files” Enable listener log file must be checked for the received signals to be shown in the right hand pane of the main window.

These passwords are required as follows:

1. Ultimate password, which is used to set or change other passwords;
2. Modify password, needed to maintain geographical data.
3. Modify the configuration file.

PrePlan comes equipped with a three (3) level security system based upon those three passwords.

Access levels are as follows:

- Level 3 - (no password required) dispatch functions, viewing and look-up of information are permitted.
- Level 2 - access is granted to change, add or delete response information of all types (knows password #3.)
- Level 1 - access to password maintenance for all three levels (knows password #1.)



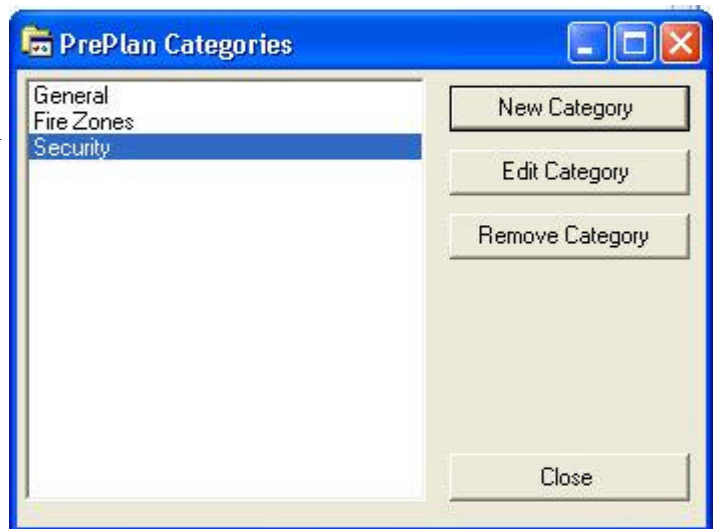
PREPLAN CATEGORIES

A special customization feature of **PrePlan** is that each installation may make its own decision as to how to compartmentalize location information. Your configuration is not limited to any set number of categories, the only limitation is that the first category can only contain 4 (four) lines of text, any other categories can have unlimited text.

For example, a category WATER; could contain water cutoff location, closest water source, and stand pipe/hydrant access. BUILDING; construction characteristics such as dropped ceilings, roof type, fire resistance. EXPOSURE; whether there were easily ignited or dangerous (if ignited) structures adjacent to the location.

Common Categories

Categories should be carefully planned out before geographic records are entered. List some commonly used categories, but feel free to add your own. Obviously, some of these are effectively duplicates, while others overlap. Choice of scope and terminology are up to you.



In all but the most extraordinary of circumstances, a category is never deleted after the entry of geographic records has begun. In several cases, users have, at a later date, added a category as a need for it became apparent during preplan entry. In those cases, however, the new category must be added to the end of the existing categories. Preplan information groups are linked sequentially to category labels; removing or adding a category in the middle of the list would shift the preplanned information of those categories after that added or dropped label.

That being said, it is perfectly proper to change the name of a category, as long as the new name describes the information which had been stored under the old. For example, an existing label “GAS/ELEC” which was used to store the location of gas and electrical cutoffs might be replaced by the more generic “CUT-OFFS”, including all cutoffs. The new label would appear on both existing and any new geographic records immediately.

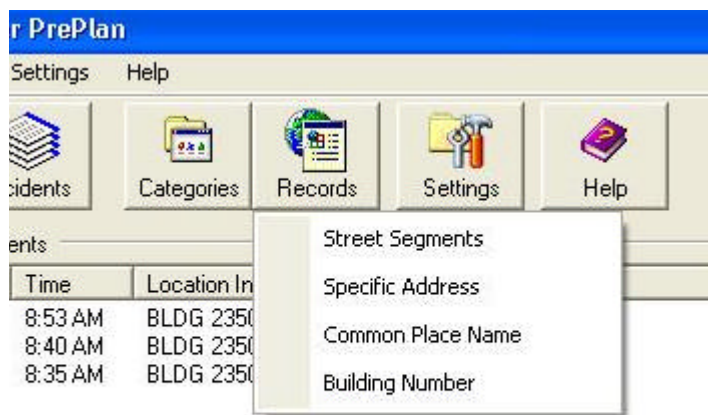
Entering Categories

Remember: Do NOT delete categories, or insert categories other than at the end of the list, after the entry of geographic run cards has begun!

GEOGRAPHIC RECORD (RUN CARD) ENTRY

PrePlan stores response information on a geographical basis. Four kinds of run cards may be used; a single type or a mixture of types as desired. Street Segment records (retrieved by street name), Specific Address records (one-step retrieval by street address), Common Place Name records (in which non-address identification is used for retrieval) and Building Number records (used mainly on military bases).

Selecting Record Type



Street Segment records can be used to “sketch in” a response area with fewer records than any other type. Each record can cover several blocks. To get information, the dispatcher specifies the street name, then selects the appropriate segment from that street’s records.

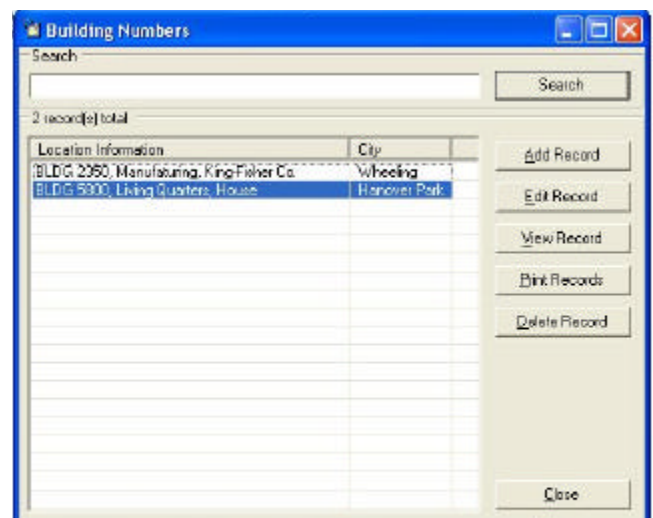
Specific Address records key on exact address, so each normally instructs the response for one site. The special BLOCK form of this record responds to requests for an address within the street block it covers, if an exact match for the address is not found among the geographic

records.

Common Place Name records key on the name of a location. Such a record is not needed for a location which is also covered by a specific address or building number record. It is excellent for non-structure areas; e.g. “MacArthur Park.”

Building Number records key on the number (alphnumeric) assigned to a building on the military base or campus within the installation’s response area.

EDIT RECORD recalls selected records, opening them for alterations of general and **PrePlan** data. Procedures are precisely as for ADD RECORD.



Street Segment

Specific Address

Common Place Name

Building Number

DELETE RECORD displays each selected record, verifies the user's intent to delete, then performs the deletion.

PRINT RECORDS prints records by location or by alarm number, at the user's option.

These are as follows:

Alarm Number - (optional) always searchable, is the composite transmitter-and function code from an integrated King-Fisher Company KFRA-C Radio receiver.

Also Known As - (optional) always searchable, this is the name by which the building or area covered by the record is commonly known. This, the Building Name and the Common Place Name field are, in reality, the same field. Leave blank if no such name is in common use.

Apt/Suite - (optional) on a Specific Address record is seldom used. It may be used to indicate the specific location of an alarm-triggered response, where multiple alarms are wired within a single building.

Block Range - this is the range of street addresses numbers for which the Street Segment record applies. Enter in the form 200 - 499.

Building Name - (optional) always searchable, this is the same as Common Place Name and Also Known As. On a Building Number record, it is the name by which a building is known.

Building Number- always searchable, this is the prime key of a Building Number record. It is the number (with character(s) prefix permitted) of the building on a campus, military base, or other installation where buildings are numbered.

City - (optional) this is the name of the municipality in which this record falls. It is often left blank for installations covering a military base or single municipality.

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Cross Street(s) - (optional) always searchable, this is the name of the closest cross street to the location. If in the middle of the block, both cross streets may be entered; however, only the first will be searchable. This field may also be used to store rural fire-stop numbers. In many installations, Cross Street is left blank unless a location is at or very near an intersection.

FireGraphics - (optional) any AutoCad drawings (.DWF format) applicable to this location. It is available as an aid to the dispatch

Map Grid - (optional) in those locations in which there exists a master reference map, this is where the letter/number cross-reference code is entered.

Number on Street - (optional) is the number on the street at which the Common Place Name record location is situated.

Responsible Person - (optional) is the person to be contacted in the event of an incident at this location.

Station - this is the nearest fire station or engine house to this location. One or two characters may be employed.

Street Address - (optional) always searchable, this gives an additional way to locate a Building Number record, and is available to help responders locate a less well-known building.

Street Direction - (optional) when a street extends on both sides of a north-south or east-west municipal midline, it commonly is labeled with a direction (e.g. "W Main Street" and "SE Webster Blvd.") Enter the one- or two-letter compass direction from that address in this field. Note that city quadrant (normally expressed as a trailing "NW", "NE", "SE" or "SW") does not belong in this field.

Street Name - always searchable, this is the name of the street, including street type (ST, BLVD, AV etc.) and any trailing direction (e.g. ELM ST NW), but not including leading directions (e.g. "120 S. Oak Street" and "420 N. Oak Street" would both have OAK ST in this field). It is very important that street types be standardized. A dispatcher seeking "OAK AVE" will not match to "OAK AV" on a geographic record.

Telephone Number - (optional) is the telephone number of the person to be contacted in the event of an incident at this location.

(a) Access Filter

Accessing Geographic Location Maintenance is possible at two levels - with and without update authorization. When that activity is selected, the very first request the program makes of the user is whether he wishes view-only access. View-only access requires no password, but offers a limited menu of activities: looking at individual records or generating a printout of records.

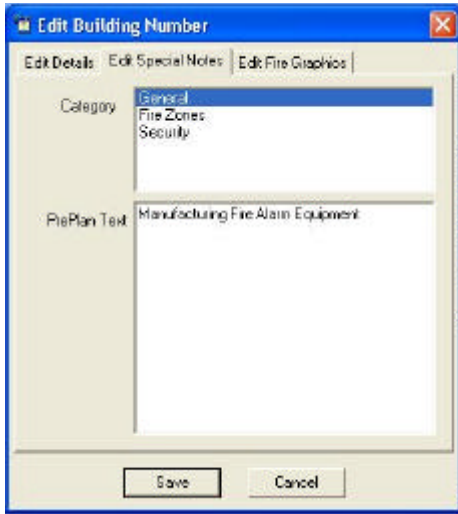
Geographic Access

If the user responds "NO" to the filter, he will be required to enter the password. He then, however, is offered the full set of edit activities, as well as view activities

LOOK-UP RECORD displays selected records, but does not permit any changes to be made. The access includes any categorized preplan notes or Fire Graphics.

ADD NEW RECORD (not available on “View Only” access) sets up for entry of a new record. The primary location data screen will be presented for the user to complete with data appropriate for this geographic location.

Note that several optional fields have been left blank. If a field is inappropriate for a given location (e.g. there is no one responsible for the 100-block of S. Foster Ave.), leave it blank. If the information is not readily at hand, but can be gotten later, leave it blank for now; it can be completed during a later EDIT RECORD session. When all available information has been entered, click on the save button.



At that point, the EDIT SPECIAL NOTE and EDIT FIRE GRAPHICS menu, containing this installation’s categories, will be activated. Click on the category you want to enter information for.

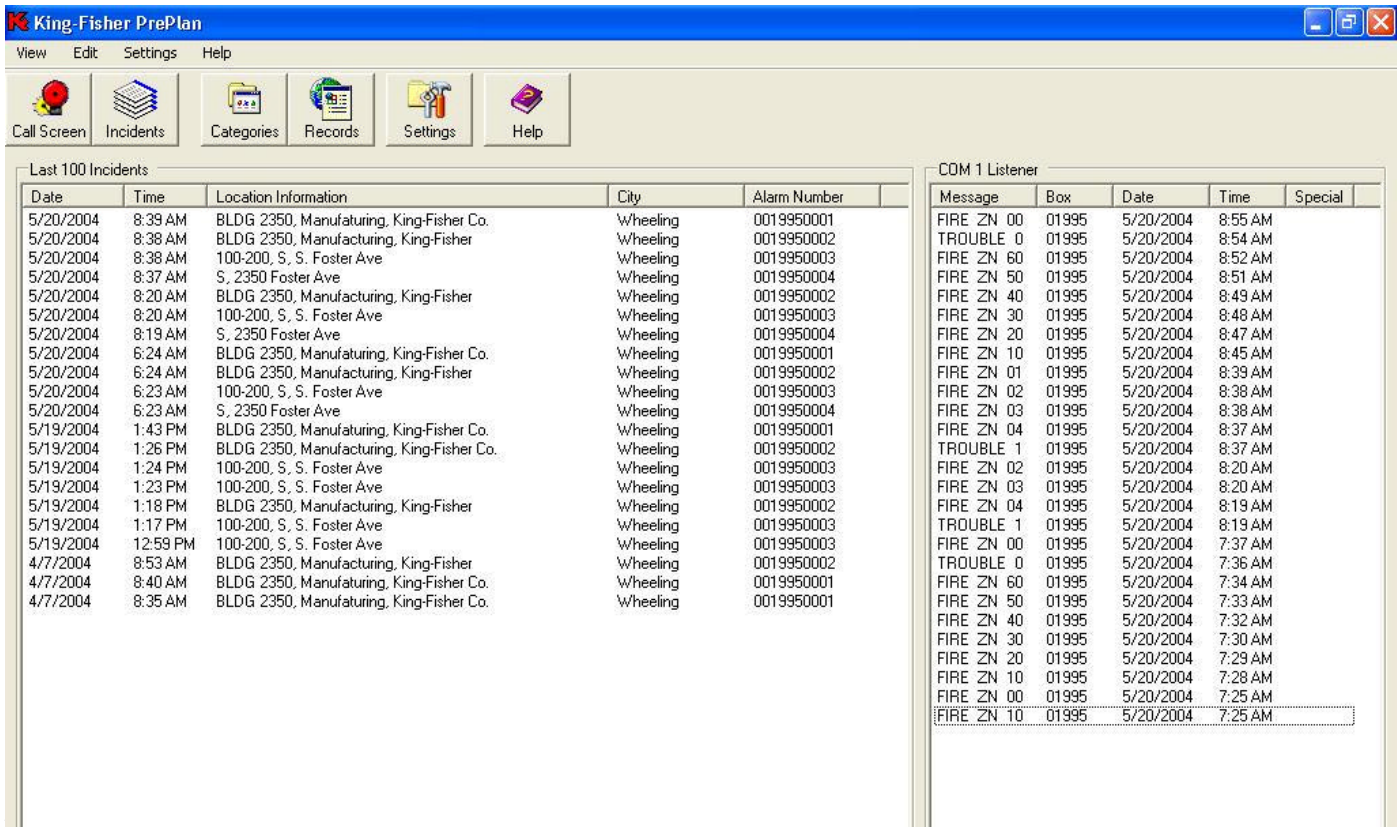
Entering PrePlan Text:

Enter information for as many or few categories as appropriate for the location. It is recommended that, if any categories have information, the GENERAL category (always visible when run card is brought up during dispatch) have information as well ... and, ideally, reminds the dispatcher to check other categories of notes. Keep in mind that the first category will only except four (4) lines of text, the other categories can have unlimited text. When done click on the save button

INCIDENT HANDLING

Incident Screen, with history

When automatic monitoring of either King-Fisher Company radio receivers is configured, the right-hand window pane will indicate “Automatic Monitoring”. It is listening for any alarm which needs to be responded to. If program is shut down this list will be maintained for 24 hrs, after that it will be erased.



King-Fisher PrePlan

View Edit Settings Help

Call Screen Incidents Categories Records Settings Help

Last 100 Incidents

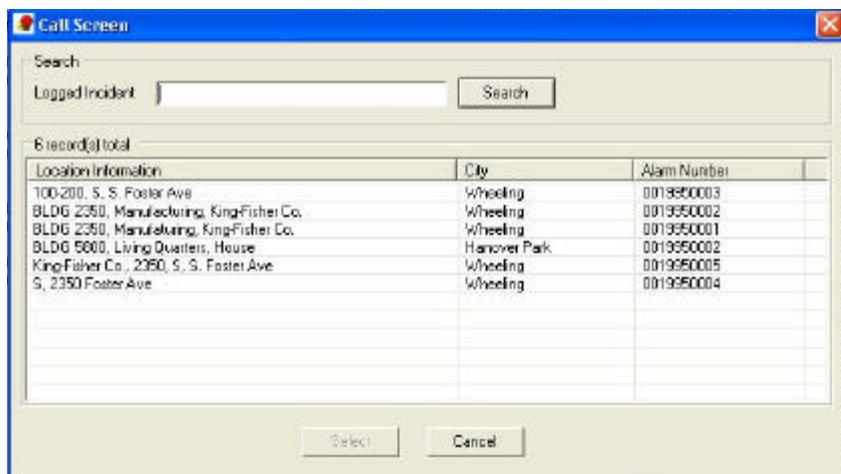
Date	Time	Location Information	City	Alarm Number
5/20/2004	8:39 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/20/2004	8:38 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/20/2004	8:38 AM	100-200, S. S. Foster Ave	Wheeling	0019950003
5/20/2004	8:37 AM	S. 2350 Foster Ave	Wheeling	0019950004
5/20/2004	8:20 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/20/2004	8:20 AM	100-200, S. S. Foster Ave	Wheeling	0019950003
5/20/2004	8:19 AM	S. 2350 Foster Ave	Wheeling	0019950004
5/20/2004	6:24 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/20/2004	6:24 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/20/2004	6:23 AM	100-200, S. S. Foster Ave	Wheeling	0019950003
5/20/2004	6:23 AM	S. 2350 Foster Ave	Wheeling	0019950004
5/19/2004	1:43 PM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
5/19/2004	1:26 PM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950002
5/19/2004	1:24 PM	100-200, S. S. Foster Ave	Wheeling	0019950003
5/19/2004	1:23 PM	100-200, S. S. Foster Ave	Wheeling	0019950003
5/19/2004	1:18 PM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
5/19/2004	1:17 PM	100-200, S. S. Foster Ave	Wheeling	0019950003
5/19/2004	12:59 PM	100-200, S. S. Foster Ave	Wheeling	0019950003
4/7/2004	8:53 AM	BLDG 2350, Manufacturing, King-Fisher	Wheeling	0019950002
4/7/2004	8:40 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001
4/7/2004	8:35 AM	BLDG 2350, Manufacturing, King-Fisher Co.	Wheeling	0019950001

COM 1 Listener

Message	Box	Date	Time	Special
FIRE ZN 00	01995	5/20/2004	8:55 AM	
TROUBLE 0	01995	5/20/2004	8:54 AM	
FIRE ZN 60	01995	5/20/2004	8:52 AM	
FIRE ZN 50	01995	5/20/2004	8:51 AM	
FIRE ZN 40	01995	5/20/2004	8:49 AM	
FIRE ZN 30	01995	5/20/2004	8:48 AM	
FIRE ZN 20	01995	5/20/2004	8:47 AM	
FIRE ZN 10	01995	5/20/2004	8:45 AM	
FIRE ZN 01	01995	5/20/2004	8:39 AM	
FIRE ZN 02	01995	5/20/2004	8:38 AM	
FIRE ZN 03	01995	5/20/2004	8:38 AM	
FIRE ZN 04	01995	5/20/2004	8:37 AM	
TROUBLE 1	01995	5/20/2004	8:37 AM	
FIRE ZN 02	01995	5/20/2004	8:20 AM	
FIRE ZN 03	01995	5/20/2004	8:20 AM	
FIRE ZN 04	01995	5/20/2004	8:19 AM	
TROUBLE 1	01995	5/20/2004	8:19 AM	
FIRE ZN 00	01995	5/20/2004	7:37 AM	
TROUBLE 0	01995	5/20/2004	7:36 AM	
FIRE ZN 60	01995	5/20/2004	7:34 AM	
FIRE ZN 50	01995	5/20/2004	7:33 AM	
FIRE ZN 40	01995	5/20/2004	7:32 AM	
FIRE ZN 30	01995	5/20/2004	7:30 AM	
FIRE ZN 20	01995	5/20/2004	7:29 AM	
FIRE ZN 10	01995	5/20/2004	7:28 AM	
FIRE ZN 00	01995	5/20/2004	7:25 AM	
FIRE ZN 10	01995	5/20/2004	7:25 AM	

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Call Screen

When the dispatcher enters a “location”, the program will seek for all geographic records matching that value, either by the primary key of each or by any of several other key able fields.)

The primary data fields differ by the type of record; however, the meaning of any given data request is the same across all records using it.

When a dispatcher types in a location, one of three things will happen.

1. No match is found. The most common reason for this is over-specifying the location. The dispatcher enters “FOREMANS FOUNDRY”, but the stored record is “FOREMANS IRON FOUNDRY”; or “120 ELM STREET”, but the record is stored as “120 ELM ST”. In either case, shortening the specification (to “FORMANS” or “120 ELM”, respectively) would take care of the problem, as the program checks only through the number of characters typed by the dispatcher. If there is no specific-address record for “120 ELM ST”, the system will look for a “100 BLOCK ELM ST” block record, reporting a match if one is found.
2. If no match is reported for “120 ELM”, the dispatcher should try just “ELM”, retrieving records with “ELM” in the cross-street field, or in the location field of street segment records.

A single match is found. The matching geographical record (run card) is used to display the preplanned incident information screen.

3. Multiple matches are found. A table of matching records will be presented from which the dispatcher may make his final selection of geographic record. The ease of this process is why it is normally better to use short descriptions, then make the final selection from a Multiple Match table.

Multiple Match

When either a single match is found, or a final selection is made, and a LOGGED INCIDENT is underway, the program will

- Register the event for future access.
- Print out the incident data sheet (unless configured otherwise).
- Display the preplanned incident information screen.

The left-hand window pane displays the current incident based upon the location the dispatcher enters, which recalls a geographic record for examination, without recording a new incident.

INCIDENT DATA SHEET. The printout generated either automatically or on demand contains the information concerning this incident (date, time and reported location), the contents of the applicable geographical record, and the categorized notes.

The “Location:” block contains both the search text and a composite of the location information from the geographical record ultimately used. This is very useful when the system has defaulted to a generic BLOCK record; the “Re-reported:” line would then contain the exact address, while the “Selected:” line would point to the record from which the preplan is being drawn.

Finally, the “DETAILED PREPLAN INFORMATION” portion contains all notes made under the categories in use at this installation. The category appears as the paragraph heading to the left, with the notes under that heading printed indented from that heading. A heading/text block will appear only for those categories for which a commentary was entered on this geographical record.

If automatic printout is suppressed, or if an incident is being displayed by having been recalled, a printout may be generated from the incident information screen by clicking on the print button.

Installations configured to interface with King-Fisher Company radio receivers will, when this screen comes up, begin a 60-second countdown towards an automatic registration of the incident. This is to handle volunteer fire departments in which a dispatcher may not be at

Note that the GENERAL category of PREPLAN INFORMATION is immediately on display. For this reason, that category should either contain all immediately critical information, or note which categories do contain such critical response information.

In the Incident Memo Screen, the dispatcher may simply scroll through existing data, or add a new memo by clicking on ADD MEMO. This will bring up a new window that will let the dispatcher type in a new memo. Memos become “locked in,” leaving a valuable reference in case of a liability situation. Note that a time-stamp is provided by the system for each memo entered.

APPENDIX A

“BLOCK”Format

In communities and installations where emergency situations are commonly referenced directly by specific street address, it is impossibly cumbersome to enter run cards for all addresses. Worse, these would have to be constantly updated to reflect new construction. The Street Segment record type can be used to “sketch in” responses for groups of addresses, but require secondary selection to bring up the appropriate segment from all the segments available for a given street.

The Specific Address BLOCK record addresses this situation. Consider a situation in which the following addresses exist on Elm Street:

100 Elm Street	
105 Elm Street	
110 Elm Street	
115 Elm street	(handicapped child in the house)
120 Elm Street	
125 Elm Street	
130 Elm Street	
135 Elm Street	
140 Elm Street	
145 Elm Street	
150 Elm Street	
155 Elm Street	(Propane tank in back yard)
160 Elm Street	
165 Elm Street	
170 Elm Street	
175 Elm Street	
180 Elm Street	
185 Elm Street	
190 Elm Street	
195 Elm Street	

The records for 115 Elm Street and 155 Elm Street, which have special, specific information necessary for an effective, safe response, must be entered individually. The other 18, however, will have basically the same response guide. These can be replaced with a single Specific Address record: “100 BLOCK ELM STREET”. When an address is entered, **PrePlan** will first seek an exact match. If none is found, it will replace the last two digits of the number with “00” (addresses numbered less than 100 become “000”), insert the word “BLOCK”, and try again.

Therefore entered address will retrieve the Specific Address record

105	ELM	ST	100	BLOCK ELM STREET
115	ELM	ST	115	ELM STREET
145	ELM	ST	100	BLOCK ELM STREET
155	ELM	ST	155	ELM STREET
175	ELM	ST	100	BLOCK ELM STREET

With this tool, therefore, it is a very rapid job to “sketch in” an entire response area, then insert the specific addresses at which there are special dispatching considerations.

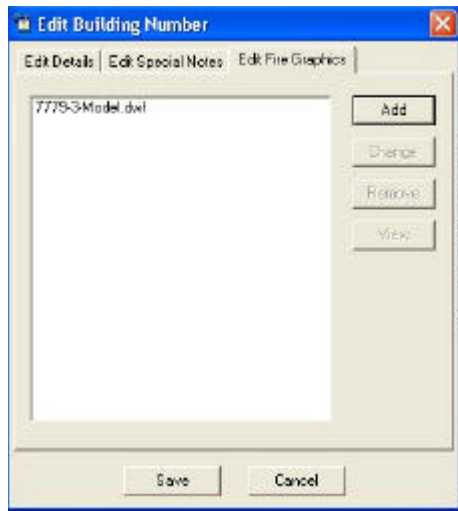
APPENDIX B

FireGraphics

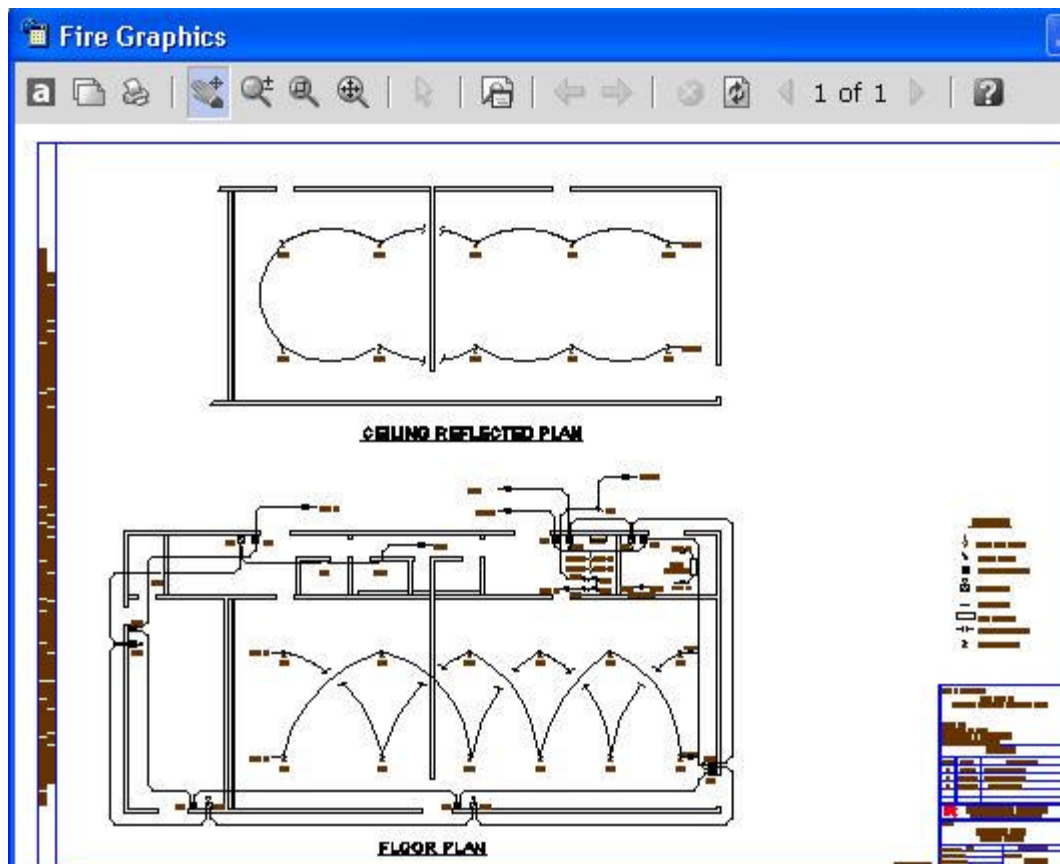
Some response organizations have elected to enhance their preplanning by the inclusion of routing maps, floor plans, etc. To fulfill this need, KingFisher Company provides FireGraphics to **PrePlan**. This product is composed of latent capabilities within **PrePlan** which are activated to enable the direct display and/or printing of FireGraphics graphic preplans .

King-Fisher's FireGraphics package uses AutoCad (.DWF) format images with relatively small storage requirements.

To create a .DWF file have your Fire Protection Engineer print the floor plan as a DWF ePlot or as an eView file.



Save all your drawing files in one folder on the computer hard drive. Each geographic record can have as many drawing files as desired.



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2350 Foster Ave., Wheeling, IL. 60090-6574

☎ 847.208.7100 ☎ 847.255.1507 ✉ service@kfcg.com 🌐 www.kfcg.com

SYSTEMS ANALYSIS & INTEGRITY LOGGER (SAIL)

TECHNICAL MANUAL

[illegible]

KING-FISHER Company

2350 Foster Avenue, Wheeling, IL 60090-6574

t 847 • 398 • 7100 **f** 847 • 255 • 1507 **e-mail** sales@kfco.com **Internet** www.kfco.com

SYSTEMS ANALYSIS & INTEGRITY LOGGER (SAIL)

DESCRIPTION

The (SAIL) Software program is a two (2) part program, consisting of the monitoring (logger file) and the analysis portion, which allows the user to arrange the logger file data in various information modules.

A separate computer to run (SAIL) is required, and is connected to a single or dual KFRA-C Radio Fire Alarm Receiver(s). The monitoring portion (logger file) of the (SAIL) program continuously monitors the messages processed by the KFRA-C receiver(s).

The analysis portion of (SAIL) allows the user to view or arrange the logger file data into several configurations.

Once the records are properly collected in the logger file the user may then load the records onto a floppy disk for reloading into the analysis portion of the software program. Both the monitoring and analysis programs may be stored on the hard drive of, either the same computer, or a second computer away from the dispatch area.

Once the floppy disk containing the logger file data is loaded into the analysis portion of (SAIL), the user can then view on the monitor screen; the report program and the chronological transmission record.

Report Screen

The report screen displays the transmitters that had a low battery during a selected time frame, missing transmitters, missing rounds, and run away transmitters. Printing of reports on the above four (4) categories is also available to the user.

Chronological Transmitter Record

The chronological transmission record allows the user to view 1 to 9999 days of KFRA-C Receiver data.

Transmitter messages for all transmitter box numbers, or a single transmitter box number within a selected number of days may be viewed.

Note: The address number is limited to 6 digits.

Scratch Pad

A scratch pad feature allows a record to be copied for further analysis.

Notes

A note feature is available (up to 32 characters) allowing the user to insert pertinent information for a specific transmitter box number, or condition.

SYSTEMS ANALYSIS & INTEGRITY LOGGER (SAIL) SOFTWARE

INSTALLATION INSTRUCTIONS

STEP 1

Copy the entire program from the King-Fisher CD-ROM to the computer that is to be used for analyzing the Logger file from the monitor software program.

Problems? call the factory, 847-398-7100 or e-mail us at service@kfco.com

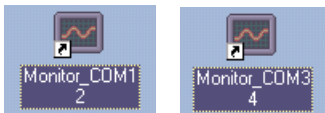
The Sail program has two (2) parts; the monitor (logger file) and the analysis file.

Click on the “Start Button” on the desktop of your computer. Go to RUN, Find and Select the “SAIL.EXE file. (Double clicking on the SAIL.EXE file will do the same function) the analysis program will install itself and also create an Icon on your desktop showing the “KF” logo and the word “KF SAIL”.



STEP 2

While the CD-ROM is still in the drive, double click on the monitor.exe file which will install the monitor (logger file) in the same manner as above. Two (2) Icons will automatically be created on the desktop; Com port 1&2, and Com port 3&4.



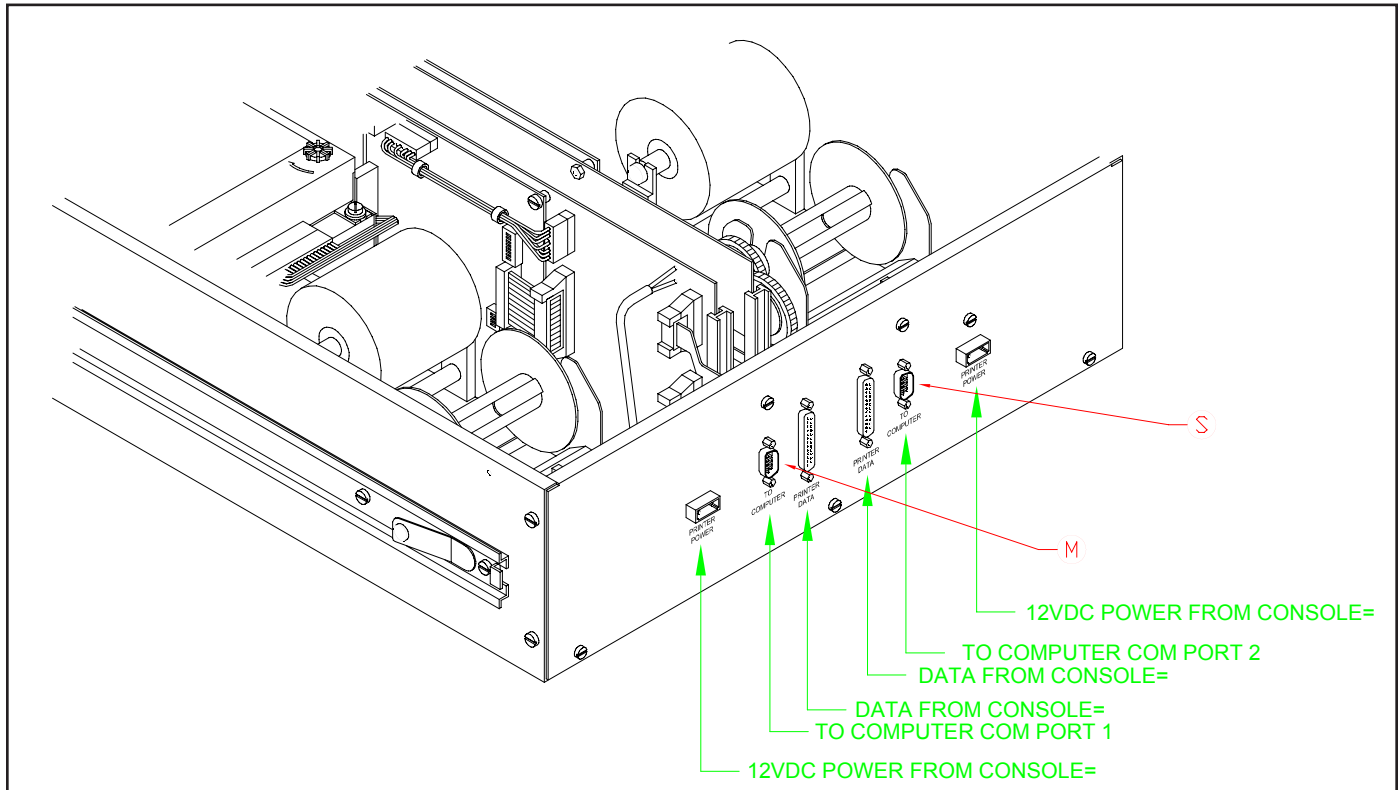
Problems? call the factory, 847-398-7100 or e-mail us at service@kfco.com

STEP 3

The following cable configuration illustrates a dual KFRA-C Radio Receiver connection. For a Single configuration simply use one cable connected to the master computer port labeled “M” in the illustration.

Connect one (1) end of the nine (9) pin cable to the nine (9) pin Com port on the back of the dual KFRA-C printer (labeled “M”). The other end of the cable to Com 1 on the monitoring computer.

Connect the other cable’s nine (9) pin connector to the second nine (9) pin Com port on the back of the dual KFRA-C printer (labeled “S”). The other end of the cable to Com 2 on the monitoring computer.



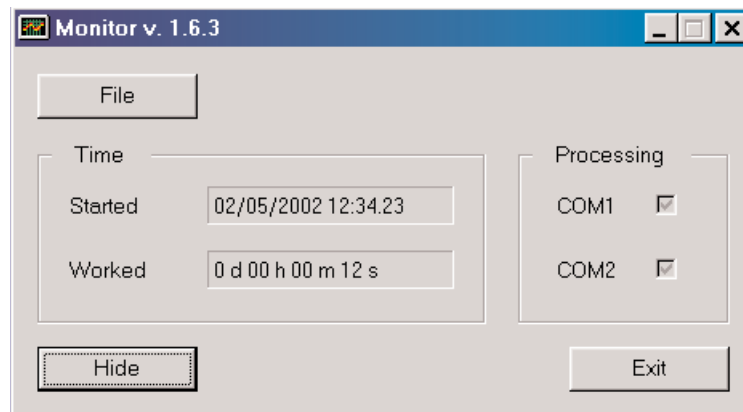
Once the cables are connected, turn the computer on and load Windows. Double click on the Monitor Icon representing Com 1 and Com 2. A window will appear on the desktop, this window can be left open or selecting hide will close the window, and place an Icon in the Task Bar. The program is now running in the background. The computer can be used with other software as long as the program does not interfere with the Com Port activity.

As long as the computer remains on the Monitor software will record all activity from the Master and Slave KFRA-C Receivers.

Note: Before any data is shown on the System Analysis and Integrity report screen, or the chronological transmission record screen, the monitoring program needs to create a data base of reporting transmitters, which normally will take a few days of reporting from the KFRA-C Receivers.

Problems? call the factory, 847-398-7100 or e-mail us at service@kfco.com

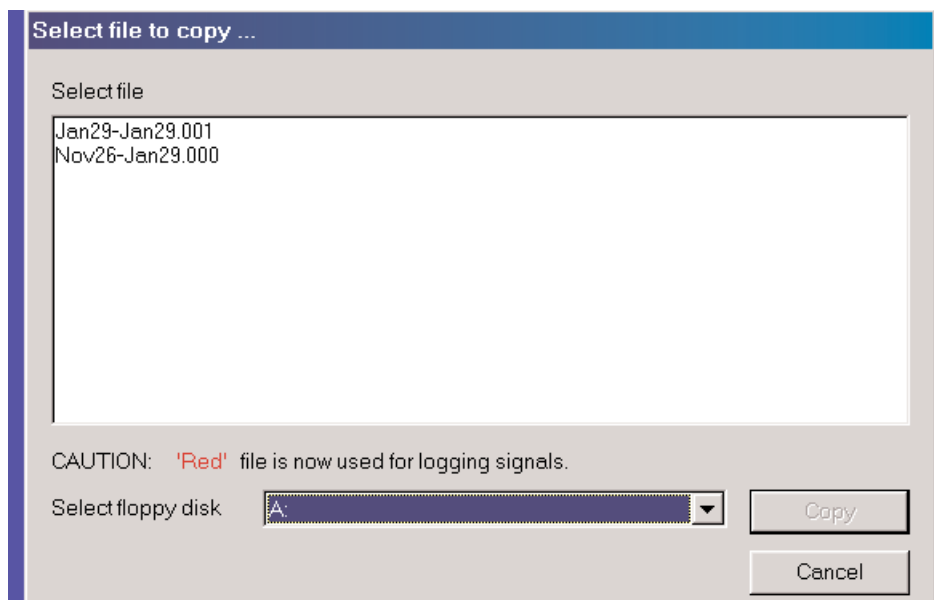
After letting the program run for a week or more, the next step is to right click on the Icon in the Task Bar.



The above window will open again, click on Exit.

Now double click on the Monitor Icon for Com1 and 2, the same window as above will appear again, this time click on File.

A new window will appear as shown below



Place an empty floppy disk in drive A:, then select the latest file and click on copy. This file will be copied to the floppy disk in drive A:. When the drive light goes out, remove the floppy disk.

Double clicking on the KF Logo Icon on the desktop will put this window on the screen

[illegible]

Step 4.

Loading records into the program for analysis is done by putting the floppy disk from the Monitor program into drive A:. Click the DATA BUTTON, select drive A, then select the latest file and click OPEN. When the window comes up saying "All records are successfully transferred to database" click OK. Now click the DO IT BUTTON and the records will appear in the Chronological Transmission Record area.

There are two (2) parts to this program, Report Screen and Chronological Transmission Record. Under Report Screen there are four (4) categories:

Low Battery Indications - clicking on this item will show all transmitters that had a low battery during the date frame. Under the appropriate date the [number of rounds] processed by the KFRA-C Receiver(s) will be shown.

Missing Transmitters - clicking on this item will show that the KFRA-C Receiver(s) did not process any messages from the transmitters listed in a 24hr. time period. Under the appropriate date an ["M"] will be shown.

Missing Rounds - clicking on this item will show that the KFRA-C Receiver(s) did not process all three (3) rounds of the same message from the transmitters listed. Under the appropriate date the [number of rounds] missed will be shown.

Runaway Transmitters - clicking on this item will show that the KFRA-C Receiver(s) processed more than three (3) rounds of the same message from the transmitters listed. Under the appropriate date the [number of rounds] processed will be shown.

Whenever, one of these items is selected clicking the PRINT BUTTON can generate a report, also, previous dates can be viewed by changing the END DATE. Whenever, the END DATE is changed click the DO IT BUTTON so the program can recalculate the records. One (1) of the categories must be reselected so the information will update itself.

Double clicking on a transmitter address will cause the transmitter to be listed in the Chronological Transmission Record area for each day that at least one (1) message was processed

Clicking on the IDENTIFY BOXES BUTTON will bring up the window shown below. This window will accept information pertaining to a location for each transmitter address number in the system. The program automatically inserts transmitter address numbers. Click on the address #, then in the window under location, type in the information for that address, and then click UPDATE.

Box Location Editor

BOX

LOCATION

Address #	LOCATION
000004	Bldg. 4
000009	Bldg. 9
000338	Bldg. 338
000345	
000950	
009000	Central Dispatch Building
000240	
012345	Security Building

Update

Exit

The Chronological Transmission Record is the bottom section of the window. This window represents all transmitter(s) message(s) processed by the KFRA-C receiver(s) in chronological order by date. Each line

CHRONOLOGICAL TRANSMISSION RECORD

SCRATCH PAD

Address #	Message	Con	Date	Round1	Round2	Round3	Rounds	Batt

View 1 days

Transmission Selection
☒ All boxes
☐ Single box

 ADD

Delete line

Clear

Notes

 Print

Exit

across (record) shows the transmitter address number; message processed by the KFRA-C receiver(s); which receiver, 1 or 2 (if all 3 rounds are processed by both receivers, then a 1 is inserted, this is the default); the transmission date; the time each round was processed; total rounds processed by both receivers (this count continues until another transmitter message is processed); and if the transmitter had a low battery.

A record can be copied to the Scratch Pad. Select a record, then click the ADD BUTTON this copies the record to the Scratch Pad area for further analysis, also, a note can be attached (double clicking will copy it to the Scratch Pad also). To add a note to a record, select the record in the Scratch Pad then click on the NOTES BUTTON, the following window will appear. Type any pertinent information into the window, and click on the OK BUTTON (32 characters maximum). The Scratch Pad can be printed, by clicking the PRINT BUTTON.

[illegible]

DELETE LINE BUTTON – deletes the selected record in the Scratch Pad.

CLEAR BUTTON – deletes everything in the Scratch Pad.

EXIT BUTTON – closes the program.

All columns can be resized to different widths and the program window can be resized as well.

NOTE:

FOR THE MONITOR PROGRAM TO RECORD ALL ACTIVITY FROM THE KFRA-C RECEIVERS, THEY BOTH MUST BE PUT IN PRINT ALL MESSAGE MODE.... [To put the KFRA-C into print all message mode, follow the procedure (refer to the KFRA-C manual) for Memory Read except go to menu 6, push alarm button, then go again to menu 6, push alarm button again]. The Printer will now print all 3 rounds of TEST.

A UPS unit is recommended for the computer (connected to the KFRA-C Receivers) containing the Monitor program. This will assure uninterrupted monitoring of the KFRA-C receivers during short periods of power outages.