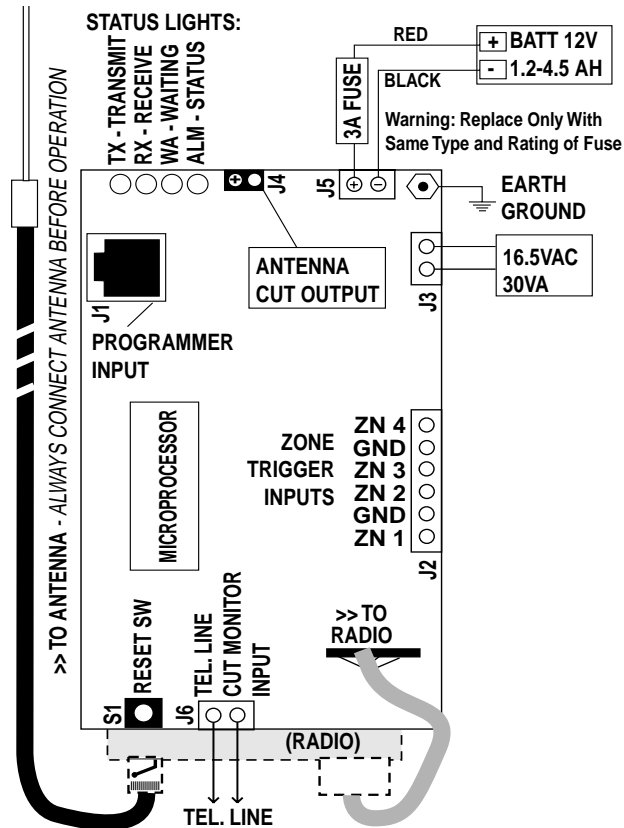


AES 7450 RF Subscriber Unit Installation Manual



7450 Subscriber Unit Specifications

- SIZE:** 11.5"h x 5.0"w x 5.6"d / 29 cm x 12.5 cm x 14 cm
- WEIGHT:** 5 pounds / 2.2 kilograms (approx, exc battery)
- RADIO:** Standard Frequency Ranges (others available) 450-470 MHz.
Standard Radio Output Power: 2 Watts (others available)
All radio systems require FCC licensing;
- POWER INPUT:** 16-18VAC, 30-40VA / 18-20VDC, 2A
- VOLTAGE:** 12VDC nominal
- | CURRENT: | Standby | Transmit |
|----------------------|---------|----------|
| Subscriber Unit Only | 150ma | 1.1A |
- OPERATING TEMPERATURE RANGE:** 0° to 50° C (32° to 122°F)
- STORAGE TEMPERATURE RANGE:** -10° to 60° C (14° to 140°F)
- RELATIVE HUMIDITY RANGE:** 0 to 85% RHC, Non Condensing
- BACK-UP BATTERY:** 12V, 1.2 AH min - 4.5AH max, lead acid gel type
- LOW BATTERY REPORTING:** 22.5 Minute Test Cycle (approx)
- AC STATUS REPORTING:** Reports AC fail to central station after approx 4 minutes without AC; reports restoral after approx 4 minutes of restored AC.
- ANTENNA CUT / LOCAL REPORTING:** 12V open collector output at J4, ground on activation; 200ma max load;
- TEL LINE CUT MONITOR:** Reports tel. line cut to central station as Zn 5 Trouble.

WARNING:

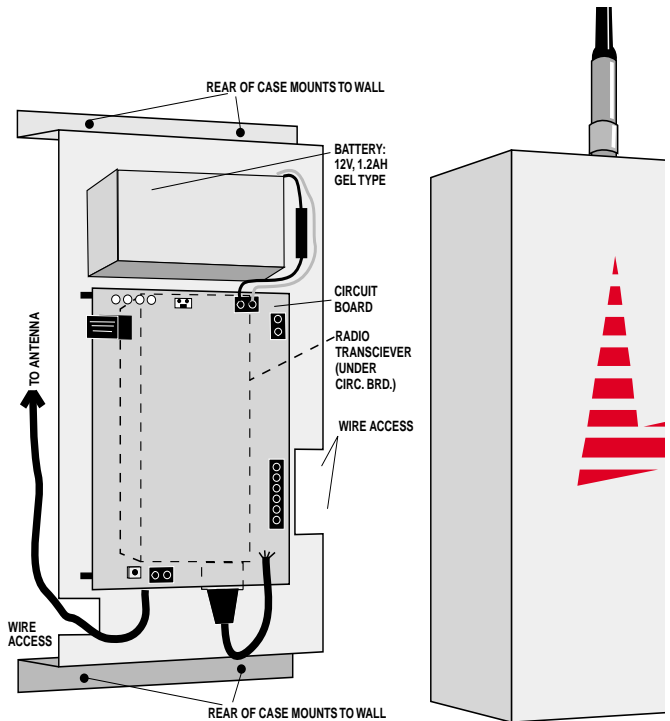
- It is unlawful to operate this equipment without a valid FCC radio station license.
- If the antenna or cables connected to this equipment come in contact with electrical power lines, DEATH or SERIOUS INJURY may result.
- Never install the antenna where people may come in contact with it as SERIOUS INJURY may result.
- Test this system periodically for proper operation. AES assumes no responsibility for this equipment's failure to operate. AES's sole responsibility is to repair or replace any AES device found to be defective during the warranty period.

AES IntelliNet

AES Corporation

① PHYSICAL INSTALLATION

- Subscriber Unit should be mounted inside the protected premises. Avoid extremes of heat, cold, humidity, dust.
- Mount unit to wall using 4 suitable screws/anchors.
- Antenna -Flexible 2.5db antenna can be mounted on case as shown. When needed, use higher gain antenna with rated cable and connectors. Mount antenna as high as possible - attics are ideal. (See antenna and cable options listed below.)



ANTENNA OPTIONS (460-470 MHz)

- 2.5 db Antenna & Cable - mounts on Subscriber, order p/n 7210-3-UR/C
 - 3 db Stealth Antenna & Cable - mounts in attics, vents, walls, behind drapes order p/n 7211
 - 5 db Antenna* - steel mast, in/outdoor, 3 ft, p/n 7210-5-UM
 - 6 db High Gain* - fiberglass mast, in/outdoor, 4.5 ft, p/n 7210-6-UC
 - 7 db High Gain* - fiberglass mast, in/outdoor, 6 ft, p/n 7210-7-US
 - 9 db High Gain* - fiberglass mast, in/outdoor, 8 ft, p/n 7210-9-UC
- * requires cable, see below:

CABLES w/CONNECTORS, BNC<->N, for all AES Subscriber Units, hi Performance, low loss for -UM, -UC and -US antennas.

- 10 Ft Cable, p/n 7220-10-N
- 25 Ft Cable, p/n 7220-25-N

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② POWER UP

NOTE: During installation, the subscriber unit enrolls itself on the network, generating signals to the central station. Central station operators must be forewarned to avoid a false alarm.

Connect programmer to the controller board (see diagram, page 1).

Connect battery to battery terminals. Then, with the transformer NOT plugged in, connect the output of a 16-18VAC, 30-40 VA class II transformer to the power input terminals. Plug in power to the power input. Be certain that the transformer is connected to an outlet that is NOT controlled by a switch.

After power is connected, **push Reset Button for a fresh reset.**

The controller runs a "self test". After a few seconds, a message will appear on the handheld programmer:

```
SELFTEST-PASS (or FAIL ###)
SUB [rev#] 7450
ID#: [4 digit ID number] (C)YYYY AES
```

If the message reads SELFTEST - PASS, you may proceed with programming the unit. Note that the current ID# for this unit is displayed, as well as the software version and date.

If the messages reads SELFTEST - FAIL [Error Code], retry the procedure by pushing the controller RESET button (see diagram).

If the Fail message persists, see the list of error messages below.

SELF-TEST/ STATUS ERROR CODES: An [Error Code] is listed when the unit fails the self test. Check that the microprocessor IC is seated properly in its socket. Push the reset switch to see if the problem clears. If not, check these procedures.

Message: **01 Battery power is low**

Procedure: Check battery; Push RESET button,

Message: **02 RAM Checksum failure**

Procedure: Push RESET button. If unit passes, it must now be reprogrammed (see next section). If unit fails service is required.

Message: **03 Problems 01 and 02 above.**

Message: **04 or 06, EEPROM Failure**

Procedure: Push RESET button. If unit passes, it must now be reprogrammed (see next section). If unit fails service is required.

Message: **08, Analog Digital Converter / ADC Failure**

Procedure: Same as 04 / 06 failure, see above

Message: **80 Loopback Test Failure**

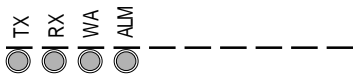
Procedure: Push RESET button, unit will likely pass self test; If the unit consistently reports the same message service is required

Message: **100 AC Not Present**

Procedure: Check AC power input, transformer

Other Messages: Multiple errors are added. For example a Fail message of 101 indicates AC not present and low battery (100+01)
Other Messages: Unit requires AES authorized servicing. Report error code to AES service rep.

STATUS INDICATORS: LED's on upper left edge of the board



TX - indicates radio transmit

RX - indicates radio receive (includes any radio activity on this frequency)

WA - Steady On = Waiting for acknowledgment of last transmission;
- Steady Blinking = Not on Network; Off = Normal

ALM - Status / troubleshooting indicator, "blink" codes as follows:

·	·	·	steady blink - system OK;
··	··	··	short-short blink - low battery;
·-	·-	·-	short-long blink - an input zone is in alarm or trouble;
··-	··-	··-	short-short-long blink, low batt & zone in alarm/trouble;
··	··	··	short-pause-short-short, AC Fault
··	··	··	short-short-pause-short-short, AC fault & low batt
··	··	··	steady / no blink - Self-test failure (excl low batt)

③ LOAD ID# AND SYS. CIPHER- CTRL+F1

The unit ID# and the system cipher can only be entered with a handheld programmer.

NOTE: Entering new data overwrites (erases) any previously stored ID# and the Cipher Code. Pushing the ENTER key without entering new data saves the previously stored information. The programmer should be connected and the power should be on.

Push programmer keys **(CTRL)+F1**.

The following message appears:

```
SETUP UNIT -OLD: NEW Previously stored "old" data;
ENTER ID#- 1234: ____ Enter new data here
```

To keep previously stored ID#, simply push ENTER. To change the ID#, enter the 4 digit identification number for this unit using any of the 16 hex numerals, and then push ENTER. **The ID number must be unique, different from all other ID numbers in your system.**

After entering the ID number, the following message appears

```
CPHR CODE-- XXXX: ____ Stored data is not shown
```

Enter the 4 digit cipher as assigned by the system administrator, then push enter. The code must match that of the central station - If the wrong code is used, the unit cannot log on and will not work.

After entering the cipher code, the following message appears:

```
OK
```

④ Set CHECK-IN TIME* and REPORTING DELAY PERIOD* - CTRL+F2

The Check-In Time is the interval at which the subscriber unit sends it's "Check-in" messages to the central station. The default is 24 hours (recommended). The range for this feature is 5 minutes to 24 hours.

Important Note: short check-in times (less than 6 hours) can impede system performance by creating heavy radio traffic. The standard setting is between 12 and 24 hours. Use shorter check-in times for highest security applications only. DO NOT enter a time of 00 hours, 00 minutes.

The Reporting Delay sets the rate at which signals are transmitted. The default value is 10 seconds; transmissions are sent at least 10 seconds apart (this helps to meter traffic on the system). The range is 0 (no delay, *not* recommended) to 330 seconds.

To start, push Programmer keys (CTRL)+(F2)

Press programmer keys CTRL + F2 (hold down the Control and the F2 keys at the same time). The following message appears:

```
CHKIN TIME--OLD: NEW
ENTER HRS---HH: ____ [0-24] (HH = Prev. programmed)
```

Enter a number between 0 and 24 (default = 24) and push ENTER.

```
ENTER MINS---MM: ____ [0-59] (MM = Prev. programmed)
```

Enter the number of minutes, 0 and 59, and push ENTER.

```
NTR RPT DLY-NNN: ____ [0-330] [seconds]
```

(Report Delay, NNN= Prev. programmed)

Enter a number of seconds to allow between transmissions; the range is 0 to 330; the default is 10 seconds.

If data has been entered correctly, the following message appears:

```
OK
```

* Can be programmed remotely using Net* Software for the AES central receiver. Refer to Zone Programming/7050E in the manual.

⑤ ZONE PROGRAMMING - CTRL+F3

Use Handheld Programmer:

Press programmer keys CTRL + F3. The following message appears:

```
SUPERVISE--OLD: NEW          SEE NOTES BELOW**
FIRE-----Y: .
```

The programming sequence first asks if any "Fire" inputs are used. Answer Y/yes if you wish to have the panel report "Trouble" conditions. Also, enter Y/yes if you using the line cut monitor**. Otherwise answer N/no (refer to chart below). The current programming is shown under the "OLD:" If you wish to change the setting, enter Y or N. To leave unchanged, simply push ENTER. Next appears:

```
INVERT FIRE- N: .
```

Here you can choose to reverse the logic for the fire input (refer to chart below). The current programming is displayed. To change the setting enter Y or N. To leave unchanged, push ENTER. Next appears:

```
ZONE BANK 0
SET ZONE (OCSFI) B0
OLD 0000 LOW>HI
NEW . . . .
```

Having chosen the Fire parameters, each zone can now be programmed. The valid programming options are shown in parentheses. The options that appear are determined by your input to the Fire/ Inverted Fire Section above. The current programming is shown next to the word OLD, Zones 1-4 in order left to right. Your new entries will appear directly below next to the word NEW. You must enter a valid letter for each of the 4 zones.

Zones Triggers 1-4 can be set for:

- O - Normally Open;
- C - Normally Closed;
- S - Supervised/E.O.L. (alarm on open or short);
- F - Fire Supervised E.O.L. (alarm on short, trouble on open) or
- I - Inverted Fire E.O.L. (alarm on open, trouble on short).

Next appears:

```
SET RESTORAL (XR) B0
OLD XXXX LOW>HI
NEW . . . .
```

You can program individual zones to report restorals - ie send a report that the zone has returned to normal status. X= Restorals Not Reported; R=Restorals Reported. The existing or OLD programming is shown for each zone. Your new entries will appear directly below next to the word NEW. You must enter a valid letter X or R for each zone. When all is complete, the OK message appears.

```
OK
```

The zones are now programmed.

Zone Reporting Chart

Zone Program:	Normally Open	Normally Closed	Supervised E.O.L.	Fire E.O.L.**	Inverted Fire E.O.L.**	
Zone Program:	O	C	S	F	I	
Input State:	Zone Status:					
Open	N	A	A	T	A	N =Normal A =Alarm T =Trouble** X =Don't Use
Resistor - 2.2K	X	X	N	N	N	
Closed/Short	A	N	A	A	T	

Zone Program Entry (Use handheld programmer, CTRL+F3):

C = Normally Closed - Closed=Normal / Open=Alarm

O = Normally Open - Open=Normal / Closed=Alarm

S = Supervised - EOL Resistor; 2.2K ohm = Normal / Open = Alarm / Short = Alarm

F = Fire - Open - EOL Resistor; 2.2K ohm = Normal / Open = Trouble** / Short = Alarm

I = Inverted Fire - EOL Resistor; 2.2K ohm = Normal / Open = Alarm / Short = Trouble**

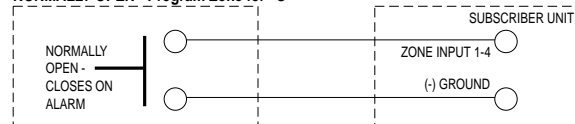
** NOTES:

- Reporting of "Trouble" messages requires version 1.70 or newer receiver. See Central Station Compatibility notes.
- The line cut is reported as a "Trouble" on Zone 5. To enable trouble reporting answer Y/yes to zone programming for Fire and/or Inverted Fire (Ctrl+F3).

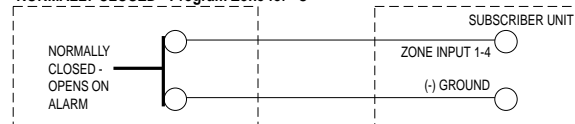
Zone Wiring

- Refer to illustration on page 1 for location of zone.
- Zones Inputs may be programmed for:
 - Normally Open
 - Normally Closed
 - E.O.L. / "Supervised" with 2.2K resistor
 - Open Collector

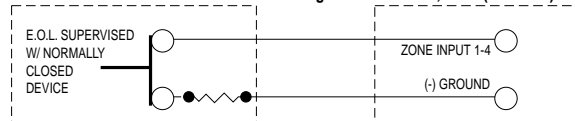
NORMALLY OPEN - Program Zone for "O"



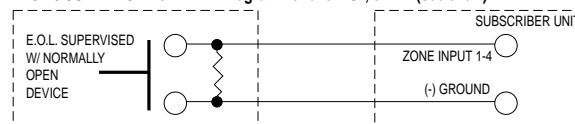
NORMALLY CLOSED - Program Zone for "C"



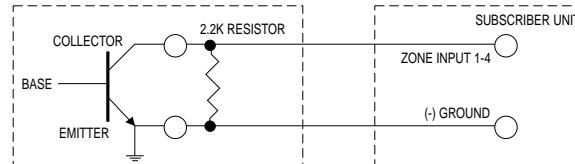
E.O.L. / SUPERVISED or INVERTED FIRE - Program Zone for "S", or "I" (see chart)



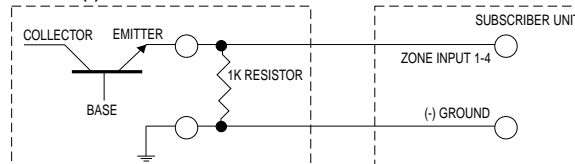
E.O.L. / SUPERVISED or FIRE - Program Zone for "S", or "F" (see chart)



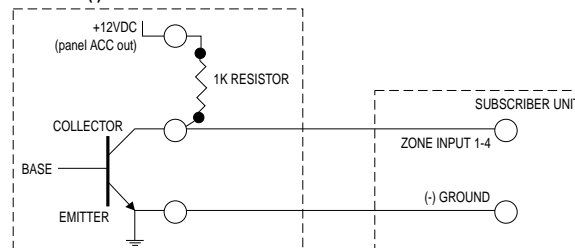
OPEN COLLECTOR TYPE DEVICE - PROGRAM FOR "S" / SUPERVISED



POSITIVE (+) VOLTAGE ON ALARM - PROGRAM FOR "C" / NORMALLY CLOSED



NEGATIVE (-) VOLTAGE ON ALARM - PROGRAM FOR "O" / NORMALLY OPEN



Notes on Central Receiver Compatibility

- The 7450 Subscriber Unit is fully compatible with Version 1.70 central receiver and up. If your receiver is pre-1.70, we recommend an upgrade to the current 2.0.
- When zones are "Fire" or "Inverted Fire" is enabled, the unit generates a new packet type for reporting "Trouble". "Trouble" data within this packet can only be received on version 1.70 and newer receivers.
- Line cuts are reported as a Trouble on Zone 5. You must answer Y to Zones must be programmed for Fire or Inverted Fire "Trouble". Messages can only be received on version 1.70 and newer receivers.

⑥ SET MODES: TELEPHONE LINE CUT MONITOR and ENABLE REPEATING

The 7450 tests the phone line for line cut. Connect the phone line to terminals at J6 (see diagram on page 1). The 7450 senses the voltage on the line. If the line voltage drops below 3V for at least 2 minutes, the 7450 transmits a "Trouble" on "Zone 5" to the central receiver.

NOTES: • **Line Cut Reporting requires version 1.70 or newer receiver.** See Central Station compatibility notes on page 3.

• The line cut is reported as a "Trouble" on Zone 5. **To enable full trouble reporting, you must answer Y/yes to zone programming for Fire and/or Inverted Fire (Ctrl+F3).** See page 3, section 5.

Use handheld programmer: press keys CTRL + F4. The following message appears:

```
SET MODES--OLD: NEW
ENABLE RPTNG-Y: .
```

Enter Y to enable the 7450 repeating capability. Default is Y.

The following message appears:

```
TEST LINECUT-N: .
```

Enter Y/yes to enable the line cut monitor, enter N/no to disable the feature. Default is N.

⑦ INITIALIZING THE SUBSCRIBER UNIT

Having programmed the unit, you are now ready for a final check.

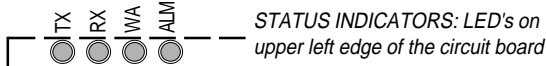
Plug in the handheld programmer if available. Push the Reset button on the controller board (see diagram page 1).

At this point, the message on the programmer should read:

```
SELFTEST - PASS
SUB [rev#] 7450
ID#:NNNN (C)[date] AES
```

If an "Fail" error message is displayed, push the reset button. If an error persists, see page 2 for a list of error codes.

When the subscriber unit goes on the air, the status lights indicate the network log on process:



- RX, TX and WA lights come on briefly, testing the LED's.
- RX comes on during loop back test (a self test);
- TX comes on sending a "Receiver Not in Service" message -
- AL + WA blink at different but steady rates
- TX comes on as unit transmits a "Request for Reply"
- WA stops flashing after about 30 seconds **IF** one or more other subscriber units reply to the "Request", (otherwise the WA continues to flash, indicating the unit is not on the network);
- TX comes on again (if WA stops flashing) to send first "Check-In";
- AL blinks at a steady rate, indicating a normal condition.

When the unit receives a valid acknowledgment, the WA light turns off. This indicates that the new subscriber unit is now on the network.

IMPORTANT NOTE: A flashing WA light (blinking at a steady rate) indicates that the subscriber has NOT linked itself into the network. Check antenna and all cables; be sure that correct system cipher has been programmed in to the unit.

AES ONE YEAR OWNER WARRANTY

We warrant AES products to be free from defects in material and workmanship for one (1) full year from date of purchase.

At no cost to the original purchaser for parts or labor, AES will repair or replace any part or parts which are judged defective under the terms of this Warranty.

Defective products must be returned to AES directly, provided they are properly packed, postage prepaid. Or exchange may be made through any authorized direct factory representative for any products which are judged defective under the terms of this Warranty.

This Warranty is in lieu of all other Warranties expressed or implied and of all other obligations or liabilities on the part of AES. This Warranty does not apply to any product or any part thereof which has been repaired or altered outside our factory in any way to affect its stability or reliability, or which has been subjected to misuse, negligence or accident, or which has had the serial number effaced or removed. Neither shall this Warranty apply to any product which has not been installed, applied or used in strict accordance with our instructions.

AES Corporation cannot be aware of, or responsible, for the differing values of property to be protected by its alarm reporting systems. The above Warranty is given in lieu of all other Warranties, either expressed or implied, including a Warranty of fitness for a particular purpose, and manufacturer shall not be liable for any defect, incidental or consequential, loss or damage arising out of the failure of the product to operate.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

SERVICE PROCEDURE: Contact AES Corp. at 978-535-7310 (fax 978-535-7313) to receive a Return Authorization Number and instructions for shipping the unit to the AES service center.

⑧ STATUS CHECK - SHIFT +F4

Performs a quick diagnostic check at any time. Use the handheld programmer: press SHIFT+F4 . The following message appears:

```
SUB [rev#] 7450
ID#[NNNN] (C)YYYY AES
RT1:NNNN LEVEL: NNN
STAT:NNN NETCON: N
```

EXPLANATION OF STATUS CHECK TERMS

ID#: 4 digit ID number programmed into this unit.

RT1: Route #1, the ID of the next subscriber in the "best" route to the central station. If RT1 is 0000, the unit is communicating directly with the central station. If XXXX appears, the unit is not on the network.

LEVEL: Subscriber unit "level" or "link layer", which indicates how many "hops" to the central station. A unit level = 255 indicates that unit is not on network.

STAT: Status shows the self-test data (see page 2, under PowerUp)

NETCON: Internal rating used in the automatic positioning of this unit in the network. The normal range is from 0-7, 0 being best. Note that while a low number is better, any NetCon from 0 to 6 is OK, 7 may indicate a problem with this unit or a unit in its path the receiver.

Quick Programmer Command Guide

Handheld Programmer Commands

CTRL+F1	SETUP UNIT - ID#, Cipher
CTRL+F2	SET TIMERS - Check-In Interval
CTRL+F3	SET ZONES - NO/NC/Supervised/Fire
CTRL+F4	SET MODES - Repeating; Line Cut
CTRL+F5	RESET RAM - Y/N, resets factory defaults except ID# and Cipher
CTRL+N	TEST AC - "A+" = OK; "A-" = AC Fail
SHFT+F1	RX MONITOR ON / OFF (toggle)*
SHFT+F2	TX MONITOR ON / OFF (toggle)*
SHFT+F3	MONITOR ALL ON / OFF (toggle)*
SHFT+F4	TEST STATUS
SHFT+F5	KEY TRANSMITTER (5 seconds)
F5	SEND TEXT MESSAGE

* Turn off monitor functions when done

Antenna Cut / Ack Delay Output

If the radio channel is "quiet" for more than 4 minutes (as would be the case if the antenna was cut) the 7450 subscriber sends a test message to another subscriber. If that message is not acknowledged within the programmed acknowledgment delay period (default is 2 minutes*), a fault condition exists. This fault is annunciated by a ground (+12V open collector) at the pins on J4 (see diagram, page 1). The voltage can be used to drive a relay, sounder or other device to notify someone of the condition. Maximum load is 200ma.

Mating Output Connectors: Order part number 12-0388-J4 for a package of 10 mating connectors for the J4 output pins.

FCC Identification: AES Model 7450 Subscriber Unit

This unit complies with FCC part 68 as of date of manufacture.

FCC# 5IWUSA-47000-MO-N Ringer Equivalence 0.0B Jack: Barrier Block

• FCC COMPLIANCE

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and the receiver; Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help. CAUTION: Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

• CANADIAN COMPLIANCE

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of Industry Canada.

Cet appareil numérique respecte les limites de bruits radio électriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictés par l'Industrie Canada.