AES Central Station
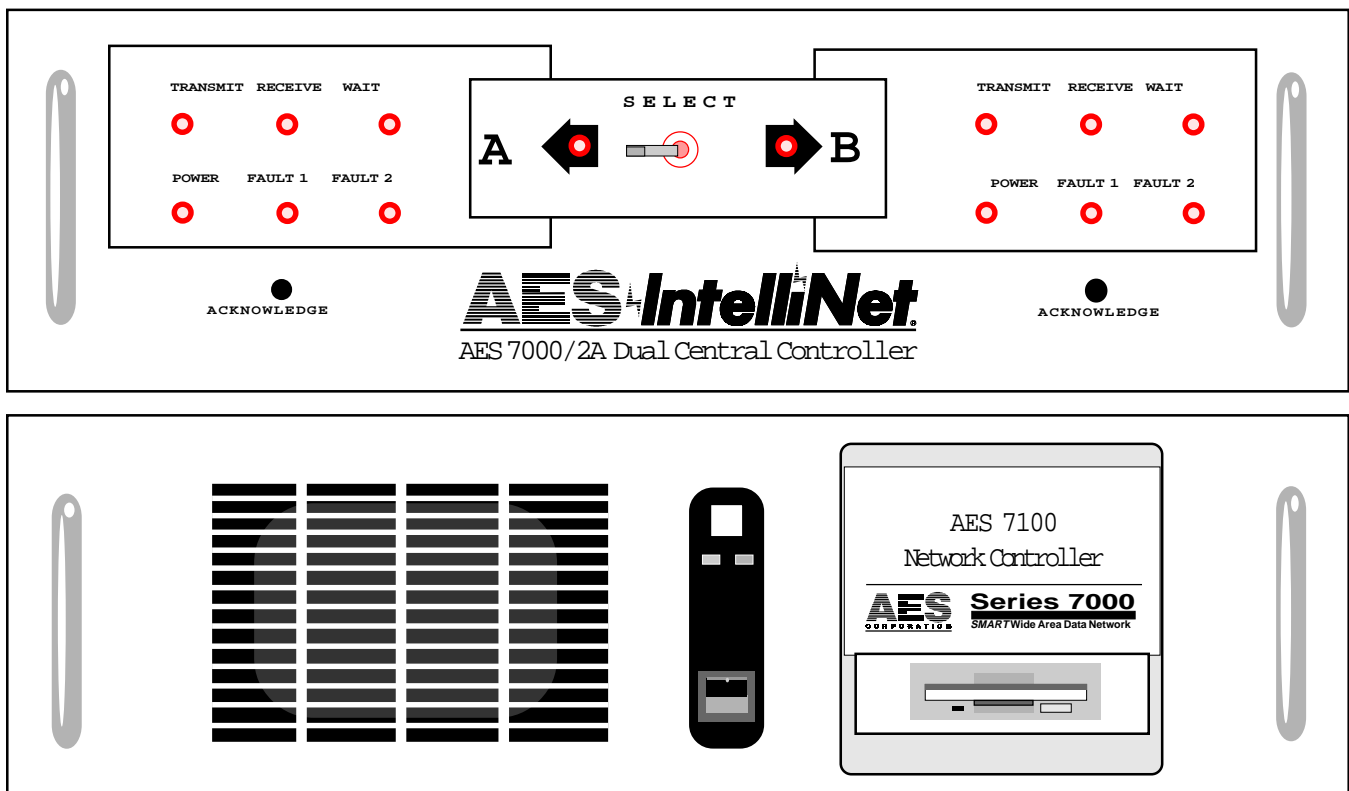
INCLUDING:
• 7000/2 Dual Receiver
• 7100 Network Controller
• 7030 Transceiver

INSTALLATION & OPERATION MANUAL

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Copyright 1996

Table of Contents

Central Station: Typical Dual Configuration

Two Computers & Two Transceivers

- **Controller "A" is the primary,**
- **Controller "B" is "hot" backup**

  To Use "B" Controller: Set toggle switch on front of 7000/2 unit to "B" position; Set "A-B" switch boxes to "B" position.

7030 Transceiver "B"

Antenna "B"

7030 Transceiver "A"

Antenna "A"

12V Backup Battery(s)

Trans-ceiver

Band Pass Filter

12V Backup Battery(s)

Trans-ceiver

Band Pass Filter

7000/2 Dual Controller – Back

Local Printer

Network Interface

Auxiliary 12V Power for Printer

Alarm Output

Molex Connector Transceiver

B

Local Printer

Network Interface

12V Power for Printer

Alarm Output

Molex Connector Transceiver

A

See wiring diagram

"B" Power Input

"A" Power Input

IMPORTANT NOTE: Chassis MUST BE GROUNDED to a Good Earth Ground!

B <<-->> A Switch Box

12VDC Power Input

Parallel Input

Local Event Printer

B <<-->> A Switch Box

B <<-->> A Switch Box

Alarm Monitoring Computer

(User Supplied)

RS-232 Serial Interface - for Automation Software

Network Interface AES Net7000 Software -

AES 7100 Network Controller

Key Component Locations

Shown: Typical Installation, with Dual / Redundant Back-Up System.
All wiring and installation must comply with relevant UL standards and local building codes.

Typical Tool Requirements:

- SWR Meter
- Large Wire Cutters
- Soldering Iron
- RG8/U Coax Strippers

- AMP Service Tool II
- 11/16" Wrench
- 5/8" Wrench
- Wire Strippers 18-22 AWG

- Weatherproof Tape
- Silicone Sealant
- Silicone Grease

It is strongly recommended that installation be completed by an AES authorized technician. Local installers can perform wire runs and equipment placement, but <u>final connections, testing and acceptance should be completed by an AES authorized installer.</u>

Installation

Installation of Antenna, Transceiver, Cables (See illustrations on pages 3,4.)

The central receiving site is a critical element of the AES•*IntelliNet* system. Every installation is unique, with consideration given for location, structure, geography and other factors. *This section is intended as a guide only, to assist you in planning for your installation.* It is strongly recommended that an AES certified technician be consulted before any planning or installation begins. Read this section to familiarize yourself with the key elements and considerations for installation.

•.   Install antenna(s) on top of building, at a minimum of 10 feet away from any electrical lines and/or metal objects.   Install the antenna as high as possible for maximum range.

•   Identify suitable grounding for lightning surge suppression in compliance with National Electric Code 810-20/57 and all applicable building codes.

   NOTE: Avoid tight cable bends wherever possible - Do not bend cable less than a 3 inch radius. Make antenna cable runs as short as possible to minimize signal loss.

•   Install Surge Arrestor at entry point of Coax cable to structure. Connect ground lug of Surge Arrestor to ground using proper grounding strap or cable. If surge arrestor is located outside, it must be housed in a weathertight enclosure - select a box that allows minimal wire bends.

•   Install Bandpass Cavity(s) as close to the 7030 unit(s) as possible. **NOTE**: Bandpass Cavity(s) must be located in a climate controlled area, avoiding extremes of heat or cold.

•   Install 7030 transceiver(s) to a suitable, strong surface, using proper fasteners. To minimize signal loss, mount 7030 as close to antenna as possible. **NOTE:** 7030 transceiver(s) must be located in a climate controlled area, avoiding extremes of heat or cold.

NOTE: Cables, connectors and terminations are CRITICAL to the proper operation of this system. Read all instructions carefully.

•   Run one length of RG8/U Cable from each Antenna to a 7730. Do not make
        bends of less than 3" in radius. Leave 5 to 10 feet of extra cable at each end.
        NOTE: MAXIMUM ANTENNA CABLE LENGTH IS 50 FEET. If cable length is greater
        than 50 feet, special low loss cable must be used. Contact AES for more information.

•   Run one length of 10 conductor* (AES#13-0351) from each 7030 to the 7000/2 Central Receiver unit, leaving at least 5-10' of extra cable at each end. **NOTE: Maximum cable length must not exceed 100 feet.   * Use *only* the special cable supplied by AES with this system.**

•   **ALL CABLES MUST BE RUN IN ACCORDANCE WITH UL REQUIREMENTS, NATIONAL ELECTRIC CODES AND LOCAL BUILDING CODES.**

7030 Transceiver -to- 7000/2 Receiver Cable, *cont.*

At the 7030 Transceiver:

- Pull about one foot of 10-conductor cable through the watertight connector on the 7030 and strip off about 6" of insulating jacket. Remove plastic and foil coverings from the wire pairs and remove the inner filler.

- **NOTE:** Drain wires are uninsulated and are found in every shielded jacket

- Strip all wires to expose 1/4" of conductor.

- Refer to next page for pin configuration. Tighten the cable clamp.

At the 7000/2 Central Receiver:

- Pull enough of the 10-conductor cable to reach the receiver and still have adequate slack for servicing, usually 3 feet. Strip of about 6" of insulating jacket. Remove plastic and foil coverings from the wire pairs and remove the inner filler.

- Strip off about 1/8" from all wires. Using the AMP crimper, crimp both the green and drain wires in the female connector pins provided by AES. Do the same to the other wires. Insert pins into the 12-pin Molex connector as described in the table on the next page.

- **Do Not connect power to 7000/2 at this time. Connect antenna first! (See Next Section) Powering the transceiver with no antenna attached may result in permanent damage.**
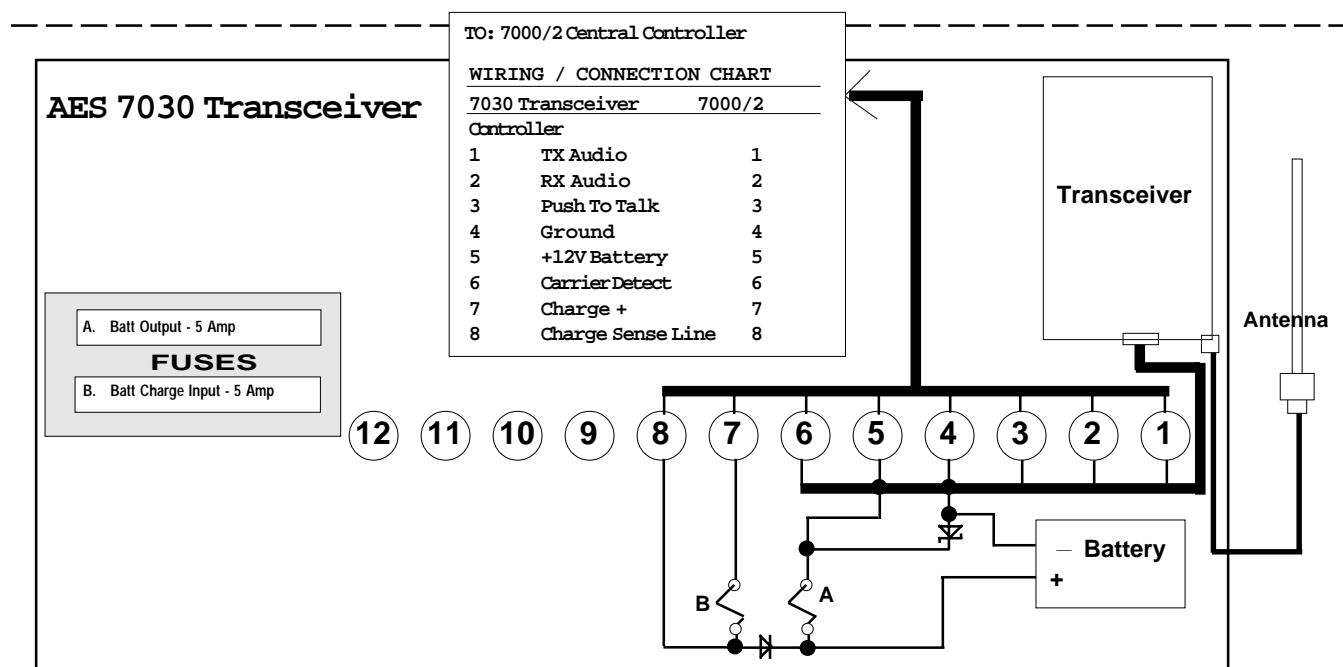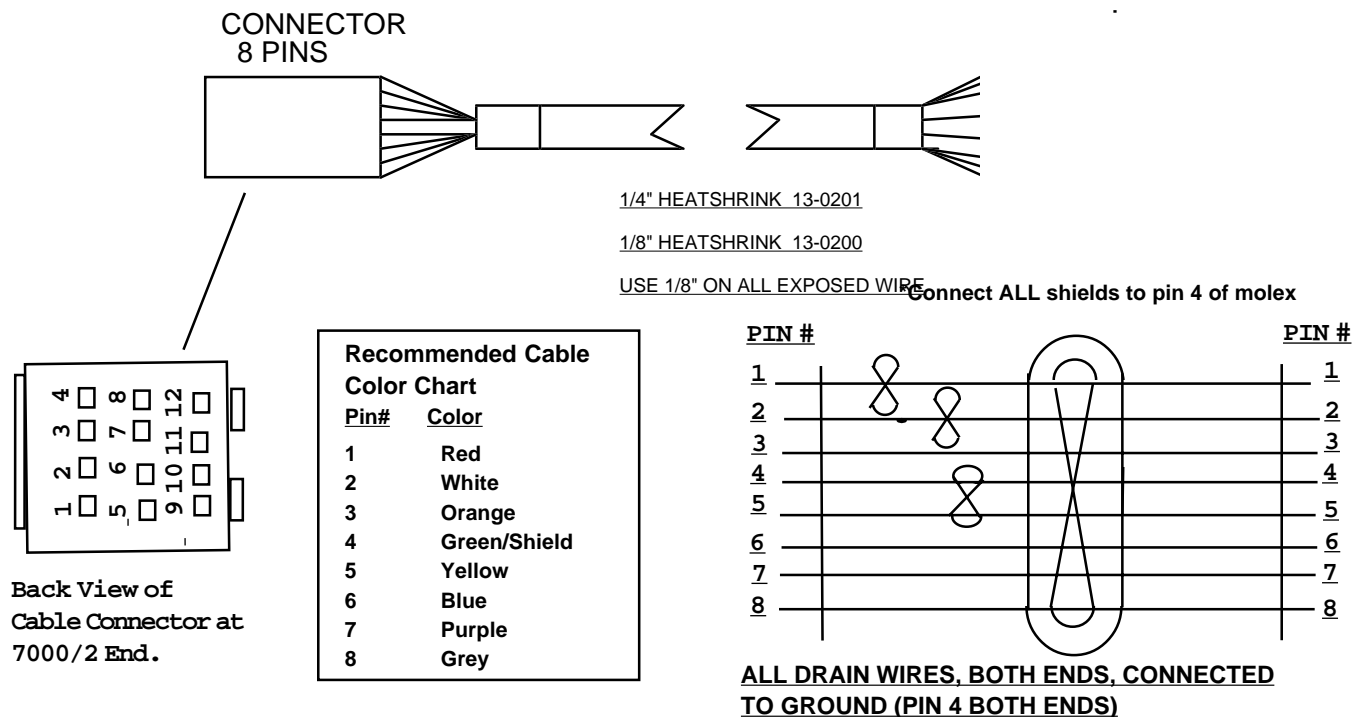
  FINAL CONNECTIONS AND TEST SHOULD BE PERFORMED BY AN AES AUTHORIZED TECHNICIAN.

7030 Transceiver <- to -> 7000/2 Receiver Cable, *cont.*

Included with the central station are the raw parts needed to make a cable to link the 7000/2 unit and the 7030 transceiver (2 cables for dual setups). Provided with this system are:
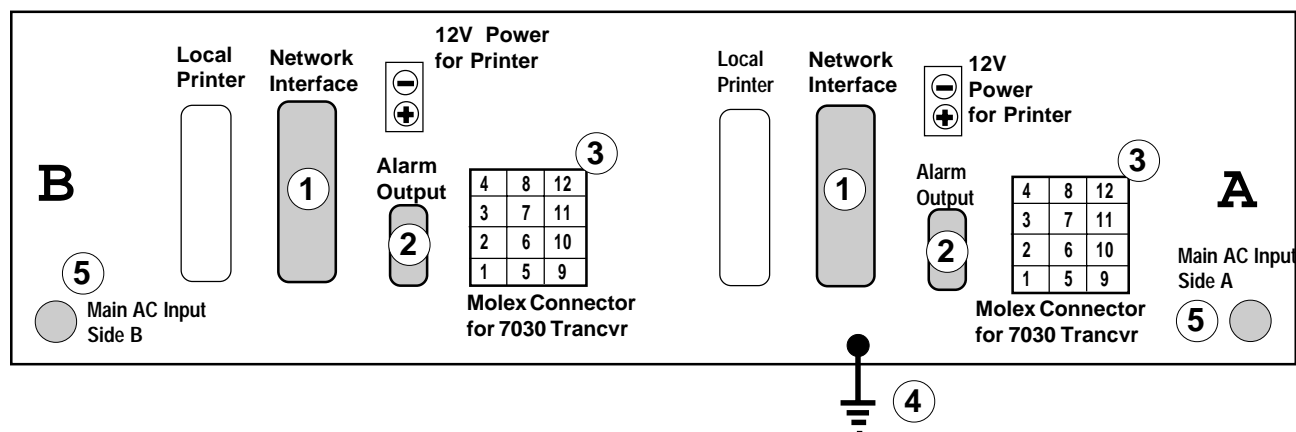
> • Molex brand plug and pins
> • Fork Lugs
> • Special Shielded cable - note shielded pair must be used for
> conductors 1 & 2 (TX and RX Audio).

NOTE: Typical cable shown — other cable may be supplied according to availability and project type. For this reason, color coding is not shown - please use your own color code scheme (see color chart lower left).

CONNECTOR
8 PINS

1/4" HEATSHRINK 13-0201

1/8" HEATSHRINK 13-0200

USE 1/8" ON ALL EXPOSED WIRE **Connect ALL shields to pin 4 of molex**

Back View of
Cable Connector at
7000/2 End.

Recommended Cable Color Chart	
Pin#	**Color**
1	Red
2	White
3	Orange
4	Green/Shield
5	Yellow
6	Blue
7	Purple
8	Grey

PIN #   PIN #
1   1
2   2
3   3
4   4
5   5
6   6
7   7
8   8

ALL DRAIN WIRES, BOTH ENDS, CONNECTED
TO GROUND (PIN 4 BOTH ENDS)

AES 7030 Transceiver

TO: 7000/2 Central Controller		
WIRING / CONNECTION CHART		
7030 Transceiver		7000/2 Controller
1	TX Audio	1
2	RX Audio	2
3	Push To Talk	3
4	Ground	4
5	+12V Battery	5
6	Carrier Detect	6
7	Charge +	7
8	Charge Sense Line	8

Transceiver

Antenna

A.	Batt Output - 5 Amp
FUSES	
B.	Batt Charge Input - 5 Amp

(12) (11) (10) (9) (8) (7) (6) (5) (4) (3) (2) (1)

B   A

Battery
− +

Wiring / Connector / Pin-out:

7000/2 Dual Controller - (Back)

① "Network Interface"

Function: RS-232 serial link to the COM port of the PC computer operating the Net7000 software.

Location: 25 pin male connector on rear of 7000/2 - pin-outs are the same for A or B side.

Pin #

7000/2	Signal	I/O	at 9-pin	at 25-pin
2	Receive Data	I	3	2
3	Transmit Data	O	2	3
6	Data Set Ready	O	6	6
7	Signal Ground	-	5	7
20	Data Term Ready	I	4	20

② "Alarm Output"

Description: RS-232 serial link to the COM port of the PC computer operating Alarm Automation Software. (See separate section on data format).

Location: 9 pin male connector on rear of 7000/2 - pin-outs are the same for A or B side.

Pin #

7000/2	Signal	I/O	at 9-pin	at 25-pin
2	Transmit Data	O	2	3
3	Receive Data	I	3	2
4	Data Term Ready	I	4	20
5	Signal Ground	-	5	7
6	Data Set Ready	O	6	6

NOTE: A custom cable may be required for Alarm Automation. Consult with AES technicians and Automation Software provider for details.

③ 7000/2 Controller
<- to -> 7030 Transceiver
Wiring / Connections Chart

7030 Transceiver 7000/2 Controller

1	TX Audio	1
2	RX Audio	2
3	Push To Talk	3
4	Ground	4
5	+12V Battery	5
6	Carrier Detect	6
7	Charge +	7
8	Charge Sense Line	8

Molex Type Pin Connector: Pin Numbering, shown from Rear, Outside of 7000/2 panel.

4	8	12
3	7	11
2	6	10
1	5	9

④ WARNING: Earth Ground

All AES equipment MUST BE GROUNDED to a good earth ground. Connect ground wire to any screw on the chassis frame. Failure to do so may result in serious injury or even death
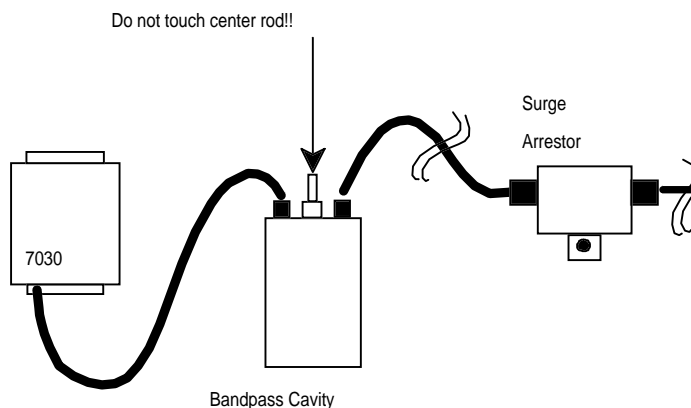
⑤ Main Power Input

2 complete, separate AC inputs are provided, one for each side A&B. U.S. units use 120V, 60 Hz. Other units include an 115/230V, 50/60 Hz input.

COAX / RF Cable Installation and Test

IMPORTANT NOTE: Final connections should only be made by an AES authorized installer. Coaxial connectors and cable are CRITICAL to system performance, and should only be made by an experienced technician. The procedure and diagrams here is provided for reference.
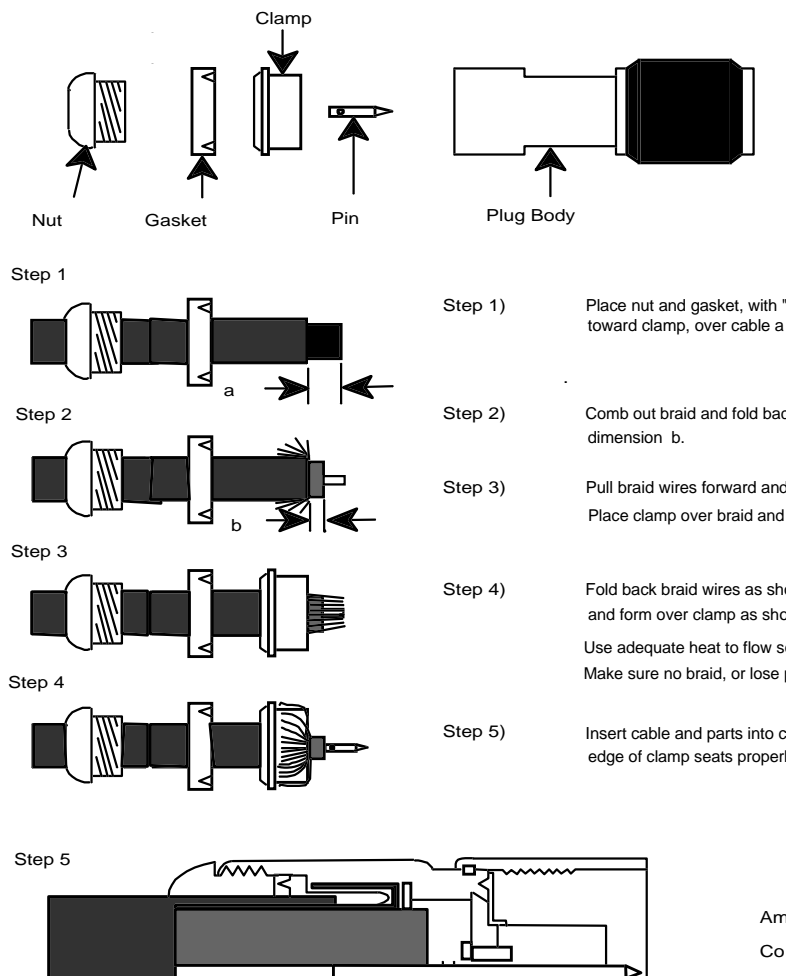
- Terminate the RG-8/U N-type connectors at the COAX end that connects to the Antenna, the Bandpass Cavity, the Surge Arrestor (make sure it faces the correct direction) and from the Bandpass Cavity to the 7030.

- Run ground cable from Surge Arrestor to good earth ground in accordance with local codes.

- After terminating the Coax, make a small patch cable (1-2') from the RG8/U with a N-type connector on both ends.

- To Test Cables and Connectors, connect power to the 7000/2 Central Receiver, which provides power for the 7030 Transceiver.

- Connect the patch cable to the Antenna. Connect the power meter to the RG8/U coax, making sure that the orientation of the power meter is correct. Connect cables to the Bandpass Cavities and the 7030 cases.

- With a Power Meter set on "Power", activate the transmitter by connecting test clip leads across terminals 3 and 4 on the 7030. *WARNING:* DO NOT transmit longer than 10 seconds.

- On the Power Meter watch for a reading of 2 watts of power.

- If Power is too low: check that power input is at 13.8VDC; check all cable terminations.

- Change the Power Meter setting to "Reflected Power" and watch for a reading of 0 - .3 watts of reflected power.

- If Reflected Power is too high: check the connectors and re-terminate if necessary.

- Disconnect jumper, power and meter, and reconnect Antenna.

- Using weatherproof tape, tape all coax connectors tightly and apply silicone sealant on all "N" type threads to prevent water damage.

- Repeat steps for second antenna in redundant / backup system.
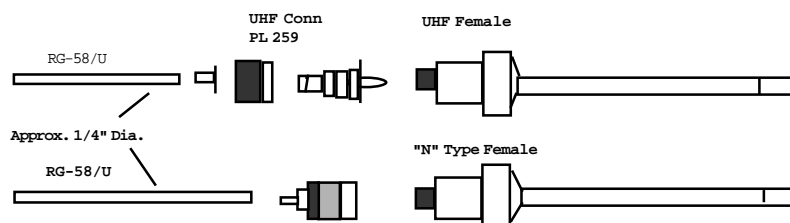
COAX Cable Run Diagram

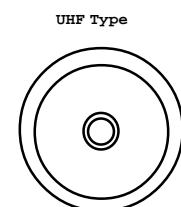"N" Type assembly instructions (Clamp Type)

Installation of N-type Connectors

Nut   Gasket   Clamp   Pin   Plug Body

Step 1

Step 1)   Place nut and gasket, with "
toward clamp, over cable a

a

Step 2

Step 2)   Comb out braid and fold bac
dimension b.

Step 3)   Pull braid wires forward and
Place clamp over braid and

b

Step 3

Step 4)   Fold back braid wires as sh
and form over clamp as sho

Use adequate heat to flow s
Make sure no braid, or lose

Step 4

Step 5)   Insert cable and parts into c
edge of clamp seats properl

Step 5

Am

Co

Installation of Antennas with UHF-type Connectors

<u>1) If you are using RG–58/U cable</u>

RG–58/U   UHF Conn PL 259   UHF Female   "N" Type

Approx. 1/4" Dia.

RG–58/U   "N" Type Female

<u>2) If you are using Belden 9913 cable</u>

Belden 9913   "N" to UHF plug   UHF Female   UHF Type

Approx. 1/2" Dia.

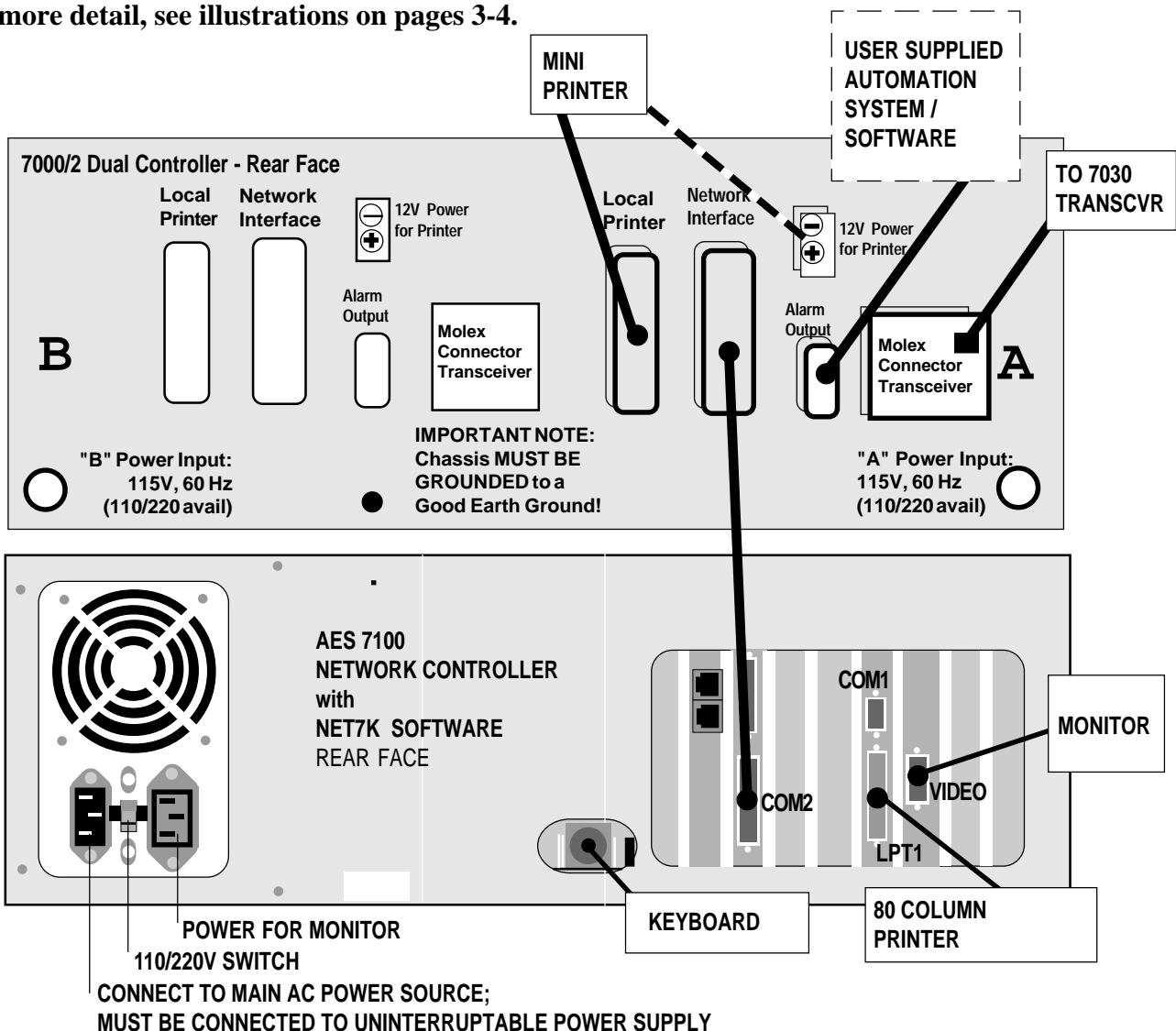Belden 9913   "N' Type   "N" Type Female
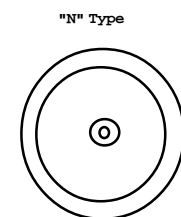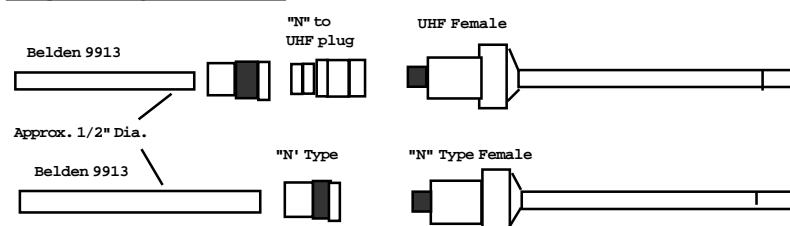
Connect 7100 Network Controller & Accessories

• Identify locations for: • 7000/2 Central Receiver, rack mount
  • 7100 Network Controller, Monitor and Keyboard
  • Mini Printer for 7000/2 Receiver,
  • 80 Column Printer 7100 Controller

• Use cables provided to connect the AES central receiver, network controller and printers as shown in the illustration on preceding pages.
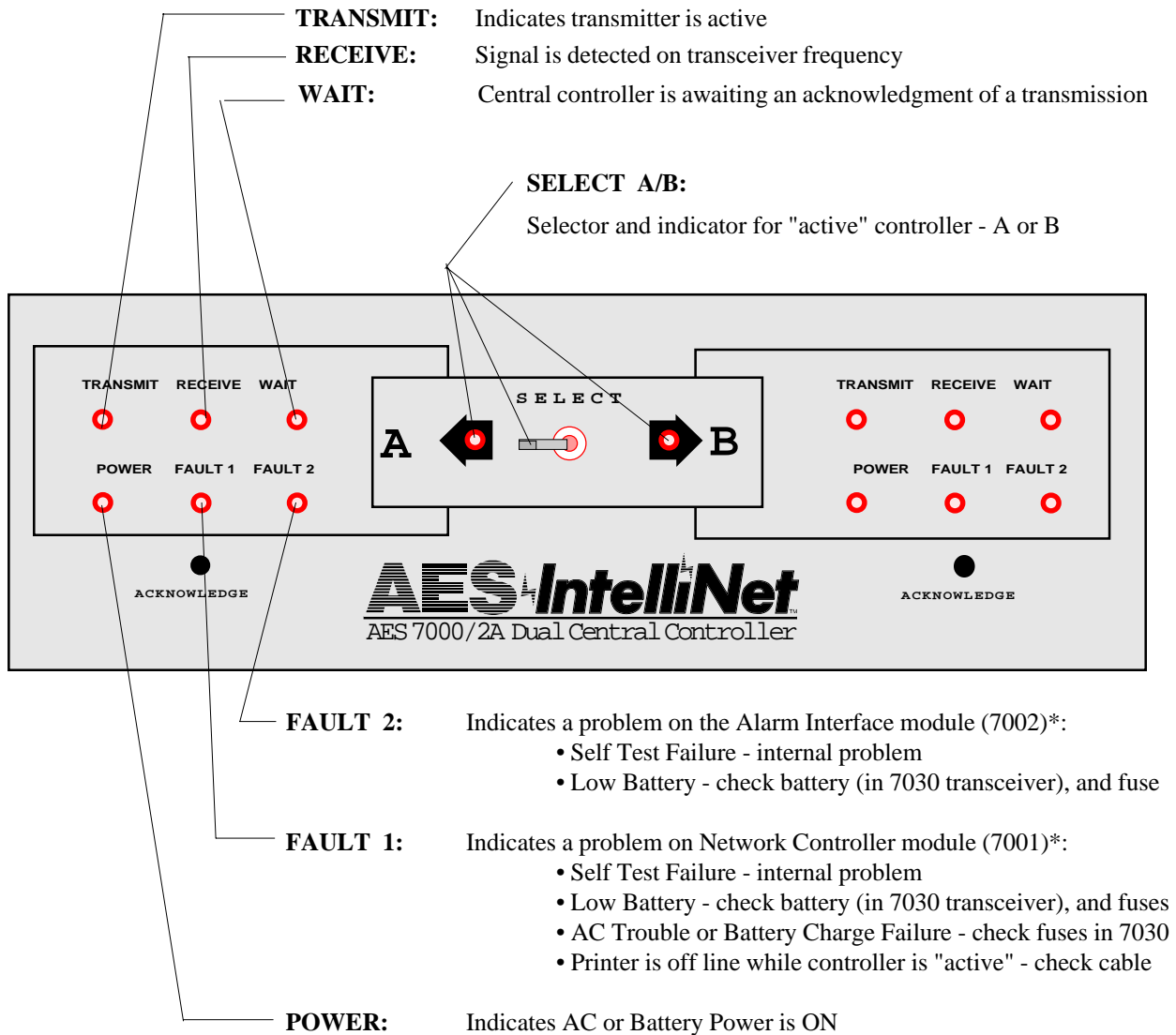
All equipment must be installed in accordance with National Electric Code, applicable UL Standards and local building codes.

Uninterruptable Power backup must be provided for all elements of the system, capable of operating this system in accordance with applicable UL standards.

For more detail, see illustrations on pages 3-4.

MINI PRINTER

USER SUPPLIED AUTOMATION SYSTEM / SOFTWARE

7000/2 Dual Controller - Rear Face

Local Printer

Network Interface

12V Power for Printer

TO 7030 TRANSCVR

Local Printer

Network Interface

12V Power for Printer

Alarm Output

B

Molex Connector Transceiver

Alarm Output

Molex Connector Transceiver

A

"B" Power Input: 115V, 60 Hz (110/220 avail)

IMPORTANT NOTE: Chassis MUST BE GROUNDED to a Good Earth Ground!

"A" Power Input: 115V, 60 Hz (110/220 avail)

AES 7100 NETWORK CONTROLLER with NET7K SOFTWARE REAR FACE

COM1

MONITOR

COM2

VIDEO

LPT1

KEYBOARD

80 COLUMN PRINTER

POWER FOR MONITOR
110/220V SWITCH
CONNECT TO MAIN AC POWER SOURCE;
MUST BE CONNECTED TO UNINTERRUPTABLE POWER SUPPLY

AES 7000 / 2 Front Panel and Function Identification

TRANSMIT: Indicates transmitter is active

RECEIVE: Signal is detected on transceiver frequency

WAIT: Central controller is awaiting an acknowledgment of a transmission

SELECT A/B:

Selector and indicator for "active" controller - A or B

FAULT 2:   Indicates a problem on the Alarm Interface module (7002)*:
- Self Test Failure - internal problem
- Low Battery - check battery (in 7030 transceiver), and fuse

FAULT 1:   Indicates a problem on Network Controller module (7001)*:
- Self Test Failure - internal problem
- Low Battery - check battery (in 7030 transceiver), and fuses
- AC Trouble or Battery Charge Failure - check fuses in 7030
- Printer is off line while controller is "active" - check cable

POWER: Indicates AC or Battery Power is ON
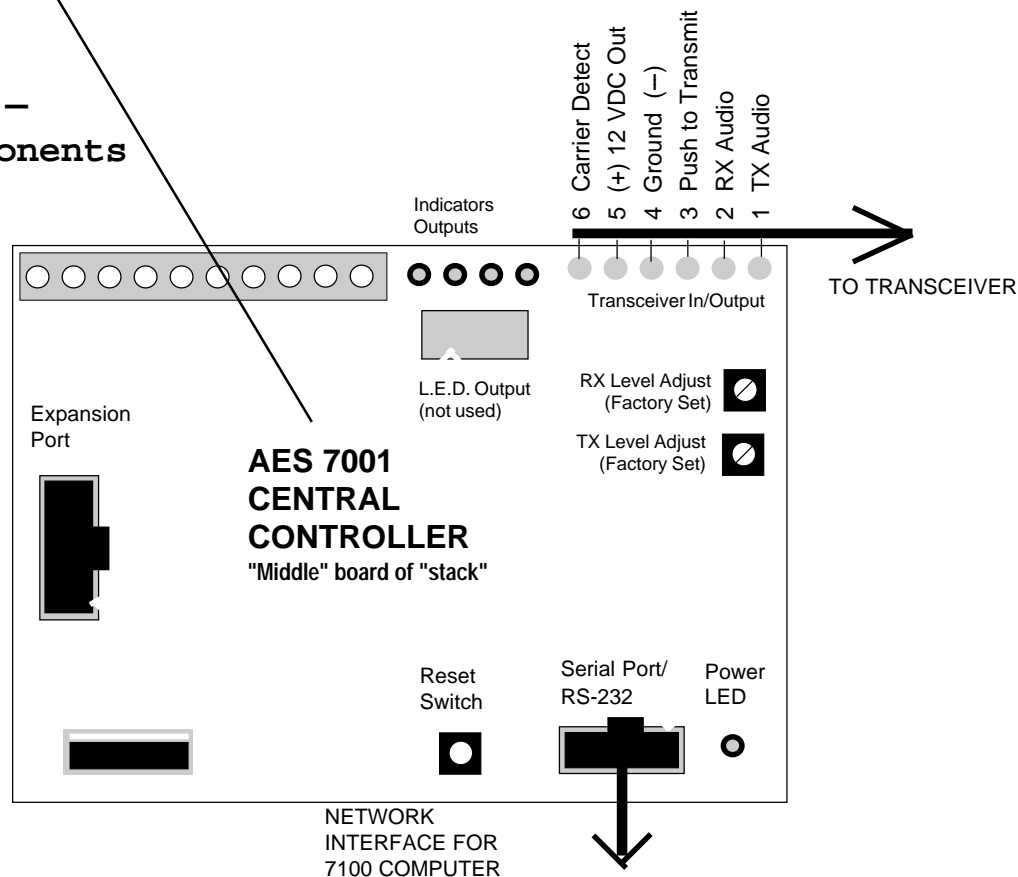
NOTE: A specific status changes are printed on the event printer

* See internal parts diagram later in this section.

7000 / 2 Internal Parts Diagram, Top View

BACK

7000/2 Internal Parts - 1/2 Amp

"A" FUSES

Printer Output - 3 Amp

Upper Fuse Block

Backup Battery(s):
12V, 4AH minimum
located in 7030
transceiver(s)

Power Supply "A":
Fuse Inside - 3A
check other fuses first

7000/2 Internal Parts - 1/2 Amp

"B" FUSES

Printer Output - 3 Amp

Lower Fuse Block

Power Supply "B":

"A" CONTROLLER BOARD "STACK"

Top: Alarm Interface (7002)

Middle: Central Controller (7001)

Bottom: Printer Output (7075)

NOTE: U-13 on the 7002 board is intentionally left empty

"B" CONTROLLER BOARD "STACK"

Top: Alarm Interface (7002)

Middle: Central Controller (7001)

Bottom: Printer Output (7075)

FRONT

RESET SWITCHES

PC Board — Key Components

Indicators Outputs

6 Carrier Detect
5 (+) 12 VDC Out
4 Ground (−)
3 Push to Transmit
2 RX Audio
1 TX Audio

TO TRANSCEIVER

Transceiver In/Output

L.E.D. Output (not used)

RX Level Adjust (Factory Set)

TX Level Adjust (Factory Set)

Expansion Port

AES 7001 CENTRAL CONTROLLER

"Middle" board of "stack"

Reset Switch

Serial Port/ RS-232

Power LED

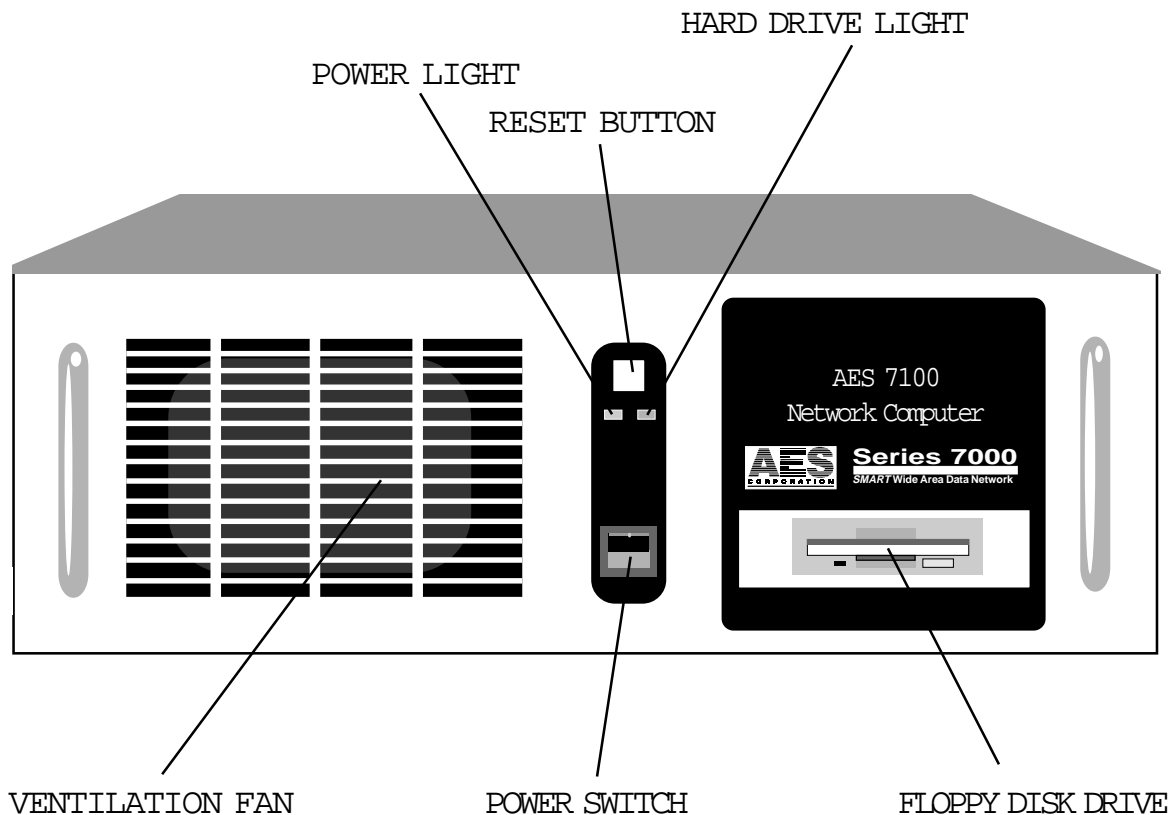NETWORK INTERFACE FOR 7100 COMPUTER

THE AES 7100 NETWORK CONTROLLER

PARTS LIST

- AES 7100 Network Controller
- Monitor
- Keyboard
- Keyboard Extension cable
- Monitor Extension Cable

- Computer Manual Package
- includes disks for DOS, assorted drivers, and manuals for all computer boards
- AES IntelliNet Manual Package

NOTE: Due to occasional improvements in manufacturing procedure, board location within your AES 7100 may vary. Please read these instructions and instructions concerning the AES• IntelliNet system carefully before installing and operating the AES•IntelliNet and the AES 7100.

HARD DRIVE LIGHT

POWER LIGHT

RESET BUTTON

AES 7100
Network Computer

AES
CORPORATION **Series 7000**
SMART **Wide Area Data Network**

VENTILATION FAN   POWER SWITCH   FLOPPY DISK DRIVE

Maintaining the AES 7100

CLEANING THE FAN FILTER
The AES 7100 fan filter must be cleared of accumulated debris on a regular basis.
Frequency of cleaning will vary according to the amount of dust in the environment.
Begin by cleaning the fan filter once every month. If collected debris appears excessive, clear the filter more often.

1. Unfasten the four screws that hold the 7100 in its cabinet.
2. Pull the 7100 approximately two inches out of its cabinet. It is not necessary to turn the 7100 off for this procedure. Be careful not to pull out any of the cables connected to the rear panel of the 7100.
3. Unscrew the filter fan screw located on the top of the 7100 case. Please refer to Figure E, below.
4. Lift the fan filter holder out of the 7100 case and remove the filter. Note that the 7100 can run for short periods of time without the filter in place. Do not, however, allow the 7100 to run for long periods of time without the filter in place.
5. Clean the filter of accumulated debris and replace in filter holder.
6. Fasten filter holder down, replace the 7100 in cabinet and fasten, once again, with screws.

FAN FILTER SCREW

FIGURE E

AES 7100
Network Computer

AES **Series**

FASTENING SCREWS
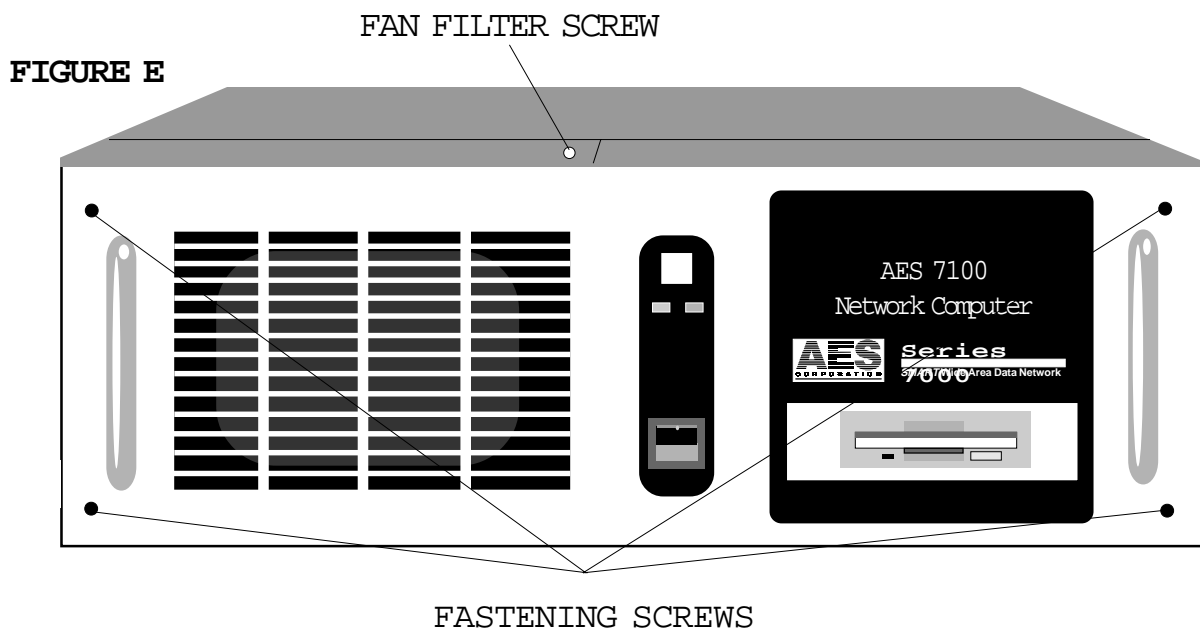
Event Printer Messages, from 7000/2 Receiver

Message Structure:
          <Date - YY-MM-DD> <Time - HH-MM-SS> <Message Type> <Source of Message; Error Code>
                                              <Text Message of Error Type>

```
96-05-08  09:08:52 STATUS CONT 02
CONTROLLER - AC TROUBLE
```

Messages Regarding Central Station Equipment Status:

Printed Message	Explanation
CONTROLLER - AC TROUBLE	AC Power Fault - Serious Problem if system relies on Uninterruptable AC source (user supplied)
CONTROLLER - AC RESTORE	End of AC Power Fault
CONTROLLER - NET7000 OFFLINE	Connection lost between 7000/2 and 7100 / Net7K; check cable, check that 7100 and Net7K program are running
CONTROLLER - NET7000 ONLINE	Connection initiated / restored between 7000/2 and Net7K
CONTROLLER - COMM TIMEOUT STATUS MESSAGE NOT ACKNOWLEDGED BY COMPUTER	Comm link lost between 7000/2 and Net7K software; check that Net7K software is running; check that proper Net7K version is running;
CONTROLLER - MANUAL ACKNOWLEDGE RECEIVED	Operator pushed Silence / Acknowledge buttons
CONTROLLER - ACTIVE MODE	7000/2 (side A or B) is "Active", ie. NOT in Standby
CONTROLLER - STANDBY MODE	7000/2 (side A or B) is in "Standby", ie. NOT Active

Messages Regarding Subscriber Units:

Printed Message	Explanation
SUPVIS nnnn 00	Subscriber Unit #nnnn Check-In, No Faults
<date> <time> SUPVIS nnnn 01	Subscriber Unit check-in after reset switch is pushed
STATUS - UNIT RESET	Subscriber Unit Reset
<date> <time> SUPVIS nnnn 02 STATUS - POWER-ON RESET	Subscriber Unit check-in after power restoral
<date> <time> FAULT nnnn 00 FAULT - NONE	Reply by Subscriber to Status Request by Operator - All is OK
FAULT - LOW BATTERY	Low Battery Detected at Subscriber Unit
FAULT - MODEM LOOPBACK	Problem with modem chip, power down & power up, or push RESET switch.
FAULT - RAM DATA	Failed RAM Check in Subscriber
FAULT - RAM BATTERY	Failed RAM Battery Check by Subscriber

Output Signals in Radionics Compatible Mode

AES Series 7000 Central Receiver, Version 1.60

INTERFACE FORMAT:

> DSR/DTR Connection Hardware Handshake
> Version 1.51 or later: 1200 bps, 7 Data bits, Odd Parity, 1 or 2 Stop Bits
> Software ACK/NAK
> No Link Test Messages

SUBSCRIBER REPORTING CODES:

Signal	Meaning
"A 00n"	Alarm Signal Zone n
"R 00n"	Restoral Zone n
"A 000"	Automatic Supervisory Check-In
"Y 80n"	Diagnostic Fault Code n - See list
"SA 00n"	Prior Alarm zone still active during Status report
"SA 80n"	Prior Diagnostic Fault Code during Status report
"T 901"	Watchdog or Pushbutton Reset *
" T 902"	Power-On Reset *
" T 903"	Communication Time-Out condition *
"ST 901"	Watchdog Reset reported during check-in *
"ST 902"	Power-On Reset reported during check-in *
"ST 903"	Communication Time-Out reported during Check-in *

> (*) Requires Subscriber Version 1.53 or later, and Central Version 1.57 or later

RECEIVER REPORTING CODES:

Signal	Meaning
"Y 80n"	Diagnostic Fault Code n - See List
"X 11"	Lowbatt
"X 12"	Lowbatt Restore
"X 13"	AC Fault (Not sent at this time)
"X 14"	AC Restore (Not sent at this time)
"X 810"	Standby Mode
"X 811"	Primary Mode
"X 812"	Multiple Central Controllers active detected
"X 20"	Printer Offline (Not sent at this time)
"X 19"	Printer Online (Not sent at this time)

Output Signals in Radionics Compatible Mode

RECEIVER REPORTING CODES (CONT'D):

Fault Code	Description
0	No Faults - Unit OK
1	Low Battery - Voltage is less than 11.0V
2	Ram Data Error - Reprogram unit
3	Ram Chip Internal Battery Bad (U11)
4	Reserved
5	Modem Chip Failed (U9)
6	Timing Error
7	Ram Chip Failure (U11)
8	Modem Loopback Failed (U9)

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.

AES•IntelliNet