AES 7170 IP-Link Transceiver
(Remote & Local)

Installation and Operation Manual
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1.0 Product Description: AES 7170 IP-Link System:

MultiNet is an AES IntellinNet system that uses the Internet to forward received radio signals to a central location. At the central location a MultiNet receiver is the central controller. IP-Link Transceivers are deployed in local and or remote locations to collect IntellinNet radio signals from Subscribers that are then forwarded using the Internet, local network or backup modem, to the central MultiNet Receiver for processing and distribution.

Figure A below illustrates a typical IP-Link system deployment.

Figure A. Typical IP-Link Network Configuration

The AES 7170 IP-Link System is available in a single or dual configuration. In a dual configuration, the second IP-Link Transceiver acts as the backup. Each IP-Link Transceiver will be configured to monitor and be monitored by a MultiNet receiver. Detection of troubles and switching between primary and secondary is automatic.

This product shall be installed in accordance with NFPA 72, NEC, UL 827 and all applicable local codes.
Following is a list and diagram of key components.

**Figure B. Typical 7170 IP-Link Transceiver Installation**

All wiring and installation must comply with relevant UL installation standards and local building codes. RG8 Coax must be physically protected in conduit between the antenna and the 7170’s enclosure. Transformer and its wiring must be protected in conduit and in an AES 1640-ENCL enclosure. Unit must bonded to Earth Ground via the ground lug on PCB. Customer shall be responsible for design of site-specific conduit detail including but not limited to the usage of enclosures to house the IP-Link, Bandpass cavity and Surge Suppressor for the purpose of protecting the coax and transformer wiring in conduit.

**A. 7170 IP-Link Transceiver:**

The 7170 IP-Link Transceiver acts as a remotely installed hub or receiver that forwards all the signals received from a cluster of AES Subscriber Units to an AES MultiNet Receiver via a LAN, WAN, the Internet or a backup modem. The MultiNet receiver then forwards the signals to the appropriate system. This allows the customer to expand their geographical market reach without direct radio connectivity to the Central Station Receiver. For AES customers with busy networks, the MultiNet system provides significantly increased capacity for their IntelliNet system without adding a new frequency. It also allows adding a new frequency to a RF congested area.

It is housed in a rugged NEMA style enclosure for positioning near the antenna. This assures minimal RF loss from longer coaxial cables. A battery for backup is located in the same enclosure. The battery powers the IP-Link Transceiver in event of a power failure. It also, more efficiently provides extra current the transceiver needs when transmitting. As with any AES central station receiver a Surge Suppressor and Cavity Filter are recommended. Flanges are provided for wall mounting. Approximate enclosure size is 14”h x 11.5” w x 6”d.
B. Bandpass Cavity Filter(s):
Heavy duty radio filter minimizes interferences from other RF Sources and maximizes the range of the system. Dual System includes two EMR Corp. model 65610 Band Pass cavity filters. Sizes vary according to radio frequency. Typical size of a 465 MHz (UHF) filter is 17”h x 10”w x 10”d.

C. Antenna(s):
Rugged large antenna to maximize the range of the Base station IP-Link Transceiver. Size and gain vary according to the installation requirements and radio frequency. Typical size for a UHF antenna is approximately 8 feet in height, with 9db gain. See Section 5 for equipment and antenna separation note. The use of High Gain Antennas is not approved for use in a UL installation or for NFPA 72 compliance.

D. Cables and connectors:
Low-Loss RG-8 (Belden 9913 type) coax cable is supplied with appropriate “N-Type” connectors for maximum performance. For NFPA 72 compliance the RG8 Coax must be physically protected in conduit between the antenna and the 7170’s enclosure.

E. Surge Suppressor(s):
A device installed in the coaxial transmission line to help protect components and structure against surges like those produced by lightning. The device dissipates surges to an earth ground that is connected to the device’s mounting bracket. Use only AES part 52-0054.

F. Internal Modem:
IP-Link’s are equipped with an internal Modem for backup communication when TCP/IP communication is delayed or unavailable. During the IP-Link’s initialization process the modem is tested using both programmed phone numbers. During those tests the Modem LED will be on and the Console Port unavailable. If either number fails to connect to an assigned MultiNet Receiver, it will be re-tested randomly every 5 to 10 minutes until it passes or the maximum number of 5 attempts is reached.

If during normal operation TCP/IP heartbeat fails, the IP-Link’s RF goes offline transmitting a “Receiver Not in Service” message. That message will notify other IntelliNet devices to select a secondary IP-Link for communicating. The modem is again tested, and if it passes any stored messages are passed to the MultiNet receiver and RF goes back online by transmitting a “Receiver Ready” message. Until the TCP/IP connection returns satisfactorily, communication to the MultiNet receiver will occur using the modem. Sending of Alarm messages via modem are attempted immediately after reception. All other less significant messages may be discarded.

The modem, using both phone numbers is tested daily. Interval between daily test attempts is 24 hours plus a random number of minutes up to 30, after the preceding tests pass. This means that the time of day that the daily modem tests occur, randomly advance. This helps to spread out multiple IP-Link testing.

G. Typical Unique Installation Tool Requirements:
The primary tools required to install an IP-Link Transceiver are as follows.

- Power or SWR Meter
- Large Wire Cutters
- Weatherproof Tape
- Coax Connector Crimping Tool
- RG-8U Coax Strippers
- Serial Terminal or PC running a terminal program
- Silicon Sealant

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2.0 Safety Considerations:
The following items are safety related precautions that you should take into consideration when installing your AES IntelliNet system. They are for your safety as well as others and the safety of your equipment.

- Use caution when installing antennas to keep them away from electrical wires which could cause serious injury or death if antenna makes contact with live wires.
- All equipment must be installed in accordance with National Electric Code, applicable UL Standards and local building codes.
- Be certain to properly ground the antenna and surge suppressor to help dissipate surges away from equipment and personnel. The grounding of the antenna and surge suppressor is for your safety and the safety of your equipment and should not be neglected.

3.0 Environmental Considerations:
The following environmental related suggestions are to help insure an installation that will provide you with a system that will operate at its optimum long into the future.

- The provided EMR Corp. Model 65610 Band Pass Cavity Filter is not supplied in a weather tight enclosure and must be installed in a dry indoor environment.
- The provided AES 52-0054 surge suppressor should be installed in a weather tight enclosure such as a UL Listed NEMA4 enclosure.

4.0 Technical Specifications:
Listed below are the technical specifications for the 7170 IP-Link Transceiver.

- Electrical Input rating is 16.5 Volts AC at 40 VA.
  - Use only provided Amseco Model XF-1640. For replacement Order AES P/N 1640
- DC Current Draw: 370mA standby, 900mA transmit
- 7170 DC operating voltage is 12 Volts nominal.
- Onboard Fuse; Self Resetting / Not User Serviceable
- Rechargeable Gel Type Battery Required: 12V, 10AH
- Low Battery Condition, AC Fail and Charger Trouble are reported to Central Station.

Figure C – Enclosure Dimensions
5.0 Installation and Equipment Separation:

The IP-Link Transceiver installation site is a critical element of the AES IntelliNet network. Every installation is unique, taking into account structure, geography and other factors. This section covers elements of the system installation and operation. Read the entire document before proceeding with your installation.

- Read the Manual and any other provided documents.
- Study each component to understand its mounting and installation characteristics.
- Decide how each component will be installed in your facility.
- Proceed with the installation in a manner that serves your needs best.
- Test your installation as outlined in section 8.

Equipment Separation: Any antenna, Subscriber enclosure or IP-Link Enclosure in the MultiNet system must be separated from this installation’s antenna or enclosure by a minimum of 200 feet. This separation is necessary for the antenna supervision to function per requirements of paragraph 40.5.10 of UL864 and NFPA 72.

A. 7170 IP-Link Transceiver Enclosure Mounting:

Mount the enclosure on a steady permanent surface. A plywood backboard attached to a wall works well. Locate it so that the coax runs to the cavity without tight bending, kinking or producing strain on the coax and its connectors. Use mounting hardware of appropriate size to support the weight of the enclosure.

B. Bandpass Cavity Filter Mounting:

Mount the enclosure on a steady permanent surface. The mounting brackets are shipped attached to the cavity enclosure in a way to help protect the tuning rod during transit. Remove them and re-attach across the back as shown in the illustrations throughout this document. With the threaded tuning rod vertical the brackets should be horizontal. See Figure B for an illustration showing a cavity and the mounting bar orientation.

C. Antenna:

It is a requirement in a commercial operation when growing a network to cover a large area. For a professional installation, you can install the major components, run the required cables, and then retain a qualified radio technician to perform the RF portion of the installation:

1- Antenna, Mounts and connectors
2- All RF Connectors /Terminations
3- RF Lightning Suppressor / Grounding
4- Final check to assure that your installation is getting maximum performance.

Contact the radio technician BEFORE you begin any part of the installation, which is a mix of science and art. Radio signal distance is in part related to the height of the antenna. Select an antenna height that clears all or as many obstructions as possible. If mounting on the side of a metal tower you should try to place the antenna at least 5 feet off the tower if possible, with 2 ½ feet off the tower as the absolute minimum.
D. Coaxial Cabling and Connections:

The length of the coaxial cable is important. Coax causes loss of signal, the longer the coax the greater the loss. You do not want to sacrifice signal loss for antenna height that is not necessary. Ideally, select an antenna height and the 7170 IP-Link Transceiver location that will use less than 50 feet of coax. If you must exceed 50 feet absolutely do not exceed 100 feet unless you use a lower loss cable than provided with the standard system. AES provides a Belden 9913 or equivalent which is a lower loss cable than standard RG-8/U. 9913 is specified as about 3 dB per 100 feet at 400 MHz, which means a loss of 50% of power in 100 feet of coax.

1- Terminate the 9913 N-Type connectors at the coax ends that connect to the antenna, the bandpass cavity, the surge suppressor, (if applicable, make sure it faces the right direction) and to the 7170 IP-Link Transceiver. AES pre-installs one connector on the provided spool of coax. Route or pull your coax such that this connector connects to the base of the antenna if possible.

2- Run the ground cable from surge suppressor to a suitable earth ground in accordance with the local building codes.

Coax Cable Run Diagram:

This diagram illustrates an alternate installation method for the Cavity Filter than that shown earlier in Figure B.

![Coax Cable Run Diagram](image)

Figure D – Alternate Cavity Installation

Installation of Crimp Style N-Type connectors:

**Step 1** Strip cable jacket, braid, and dielectric to dimensions shown. All cuts are to be sharp and square. **Important:** Do not nick braid, dielectric, or center conductor. Tinning of center conductor is not necessary if contact is to be crimped. For solder method, tin center conductor avoiding excessive heat.

**Step 2** Slide outer ferrule onto cable as shown. Flare slightly end of cable braid as shown to facilitate insertion of inner ferrule. **Important:** Do not comb out braid. Place contact on cable center conductor so it butts against cable dielectric. Center conductor should be visible through inspection hole in contact. Crimp or solder contact in place as follows:

![Crimp Style N Connector](image)

Strip Dimensions, inches (mm)

a: .0539 (13.7)
b: 0.250 (6.4)
c: 0.158 (4.0)
Crimp Method: Use Die Set Cavity for contact indicated in table above.

Solder Method: Soft solder contact to cable center conductor. Do not get any solder on outside surface of contact. Avoid excessive heat to prevent swelling of dielectric.

Step 3 Install cable assembly into body assembly so inner ferrule portion slides under braid, Push cable assembly forward until contact snaps into place in insulator. Slide outer ferrule over braid and up against connector body. Crimp outer ferrule using Die Set Cavity specified in table above.

Installation of Clamp Style N-Type connectors:

This style connector is no longer provided by AES. The illustration is provided in case you come across one.

E. Surge Suppressor:

Install the Surge Suppressor in the coaxial transmission line outside to help keep surges from entering the building. We recommend installing it in a user provided weather tight enclosure or seal it from moisture with user provided sealant or weather sealing tape such as self-fusing tape.

F. Grounding:

Attach a good earth ground to the surge suppressor and the antenna mounting bracket(s). The grounding of the antenna and surge suppressor is for your safety and the safety of your equipment and should not be neglected.
6.0 Wiring (Electrical Inputs and Outputs):
Listed below are the termination points and connectors in the IP-Link Transceiver. Each connection is described in detail. All connections need to be completed before the IP-Link Transceiver will be fully functional.

Connections on the Interface Board. This is the 2nd board up from the bottom.

J2 (16.5VAC) – AC Input. Attach the provided 16.5 VAC 40 VA source to this terminal. Use min. 18 Ga., wiring between transformer and J2 AC Input.

Telephone – Attach to the phone system for proper line seizure functionality via an RJ-31X jack, using minimum 26 AWG wire. This is used for modem backup communication to IP-Link Server. This line must be protected with a UL Listed 497A Secondary Protector. The modem feature has not been evaluated by UL.

Ethernet Jack – Attach to the LAN or WAN that connects to the IP-Link Server. Use standard CAT-5 Ethernet cable. This line must be protected with a UL Listed 497B Secondary Protector.

Console Port – dB-9 Serial port used to program and configure the IP-Link’s parameters. Use standard serial cable appropriate for terminal being used.

Connections on Radio Control Board. This is the bottom Board. It is an AES 7001 PCB.

Radio Transceiver Cable – Connect the dB-9 male connector on the end of this cable to the dB-9 female connector on the radio transceiver.

No other user connections are required on this board.

Figure G. Illustration of IP-Link Transceiver PCB Stack

★ CAUTION! Pressing the IP-Link Interface Board Reset Button can cause damage to the file system on the Flash Memory. Changes are stored in cache and written at an appropriate time, determined by the operating system out of the control of the user or IP-Link specific programs. Contact AES Support for additional information and safe usage of this button.
NOTE: DO NOT POWER UP THE IP-LINK TRANSCEIVER UNTIL ITS MULTINET RECEIVER IS ON-LINE AND READY FOR THIS UNIT TO ATTEMPT TO CONNECT.

A. Enclosure Label, Inside Cover:

Below is an illustration of the label that is adhered to the inside of the cover. Notes and example connection details are included.

Figure H. Enclosure Inside Door Label
**B. Terminal Block Connection Details:**

The terminal designations for the Power Connector terminal block are shown in the diagram to the right. Connect your 16.5 VAC transformer to the designated terminals. Connect Ground to the center terminal. **DO NOT apply power to these until the MultiNet Receiver is set up and you are ready to proceed with configuration of this Unit.**

![Power Connector Diagram](image)

**Figure I. Power Connector**

The terminal designations for the Telephone (TELCO) Connector terminal block are shown in the diagram to the right. These terminals should be properly connected to an RJ-31X phone jack to allow for proper line seizer functions. Refer to telephone company documentation. T and R are to Tip and Ring of phone line. T1 and R1 are for Tip and Ring to premise telephones, if any.

![TELCO Connector Diagram](image)

**Figure J. Telephone Connection**

**UL Installation Note:** When connecting the 7170 IP-Link Transceiver’s modem to a telephone line, a UL Listed 497A Secondary Protector is required to be installed on the incoming lines. Installation shall be in accordance with the NEC Article 800, the manufactures installation instructions and in accordance with all local codes.

Use only UL listed 26AWG minimum wire.

The terminal designations for the RF / Radio Controller Board Connector terminal block are shown in the diagram above.

The factory installed Enclosure Tamper Switch is connected to terminals (-) and Z4 as shown. **DO NOT USE +12, Z1 THRU Z3 AND Z5 THRU Z8** as indicated on label.

![RF Control Board Input Terminal Block Diagram](image)

**Figure K. RF Control Board, Input terminal Block**
7.0 Indicators:
There are several LED indicators and one speaker in the IP-Link transceiver. Below are
descriptions of their functions.

A. Interface Board LEDs and Speaker:

SVC (Red LED) – This LED is to indicate the status of the connection to the MultiNet receiver it is configured to communicate with. If the LED is on then the heartbeat signal that is sent to the MultiNet Receiver is receiving the proper response in return. If the LED is off, then the IP-Link Transceiver is not receiving the proper acknowledge message back in return to it’s heartbeat signal and the IP-Link is offline.

LNK + ACT (Green & Yellow LEDs) – These LEDs are for indicating the status of the Ethernet link. The LNK LED indicates the status of the Ethernet. When illuminated, the Ethernet port is receiving the Ethernet ‘heartbeat’ and is connected to a live network. If this LED is not illuminated, there is a problem with the Ethernet wiring or the network. The ACT LED indicates activity on the network. The LED will flash when a data packet is received or transmitted.

Modem (Red LED) – This LED indicates which serial device is attached to the available serial port. There is one serial port that is shared between the Console Port and the Modem. Only one device can be attached at a time. When the program wants to use the modem it switches the serial port from the Console Port connector to the on-board modem. When this LED is on the modem can be used. When it is off the Console port is active. For this reason, if the port is switched to the Modem in order for the processor to perform communication or modem test functions, commands sent to the serial port through the Console Port Connector, may not get received or cause a response.

Modem Testing and availability of Console Port: During the IP-Link’s initialization process the modem is tested using both programmed phone numbers. During those tests the Modem LED will be on and the Console Port is unavailable. If there is no active phone line attached, testing may take a prolonged period of time during which the Console Port will be unavailable.

Speaker (SP1) – The speaker is controlled by the modem and is used to monitor / troubleshoot the telephone connection. Dial tone, dialing and connection tones can be heard while the IP-Link attempts to connect with the designated MultiNet receiver.

B. RF / Radio Control Board LEDs:
These LEDs are the status indicators for the various states and functions of the Controller board.

TX (Yellow LED) – This LED indicates that the radio is transmitting.

RX (Green LED) – This LED indicates that the radio is detecting an RF transmission. If the IP-Link’s radio receiver is subject to RF Interference, this LED will illuminate steady on and remain on for more than 20 seconds. See page 18 “RF Interference”.

WA (Yellow LED) – A steady on indicates that a radio packet transmission has been attempted and the controller is waiting for an acknowledgement. Blinking indicates the RF communication is off the network. Off is a normal indication.

AL (Red LED) – This LED is a status / Troubleshooting indicator. It is currently not in use and is usually on. This LED can be ignored.
8.0 Programming and Setup of the 7170 IP-Link Transceiver:

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES

This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below.

<table>
<thead>
<tr>
<th>Program Feature or Option</th>
<th>Permitted in UL 864 (Y/N)</th>
<th>Possible functional settings</th>
<th>Settings permitted in UL 864</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP/IP Socket timeout</td>
<td>Y</td>
<td>12-30</td>
<td>12</td>
</tr>
<tr>
<td>Link Layer</td>
<td>Y</td>
<td>0-254</td>
<td>Primary IP-Link = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Secondary IP-Link = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others IP-Links = 1 not higher than 4</td>
</tr>
<tr>
<td>ACK Mode</td>
<td>Y</td>
<td>0/Normal – 1/Quick</td>
<td>Only 1 IP-Link in a Cloud Set to 1/Quick</td>
</tr>
<tr>
<td>PinG</td>
<td>Y</td>
<td>Yes / No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

To configure the IP-Link Transceiver you communicate with it via the Console Serial Port. Use a serial terminal program like Telix or Hyper Terminal (included with Windows) to configure the IP-Link Transceiver. Using this software allows you to send ASCII character instructions and view the response on the terminal’s display.

The IP-Link Transceiver has a built in 386 DOS computer with 10BASE-T Ethernet Port incorporated into the system. Configuring the IP-Link Transceiver is accomplished via a setup menu accessible from a terminal plugged into the Console port connector. It is not necessary to manually edit any ASCII text or data files. Once you have connected to the Console port with a terminal program you can access the setup menu by pressing “S” on the terminal. You may have to wait, if the port is in use by the modem indicated by an illuminated red MODEM LED. Do not continue pressing the keys if this LED is on!
A. Communicating with the 7170 IP-Link Transceiver:

In this section are instructions for configuring several terminal emulation programs. These programs can be used to directly communicate with the IP-Link Transceiver via the Console port to modify essential configuration settings.

A.1. Configure Hyper Terminal to communicate with the 7170:

Hyper Terminal is a communication program that is included with many Microsoft Windows installations. It is primarily intended for use with a modem and a phone line but works well as a terminal emulator.

1. In Windows Click on Start, Programs, Accessories, Communications and then Hyper Terminal.

2. Enter a name and choose an icon for this connection. As shown in the example to the right, “IP-Link” is a good choice for a name that you would recognize in the future. Select an icon for the connection and then select OK.

3. Do Not enter any Details for the Country/region, Area code or Phone number. Instead just pull down the “Connect using” and choose your available free Com Port and select OK.

4. Under the Connect using select the Com port that you will be using.
5. Under Port Settings change:
   “Bits per second:” to 19200.
   Other settings are:
   “Data bits:” 8,
   “Parity:” None,
   “Stop bits:” 1,
   “Flow control:” is Hardware
   then click OK.

   ![Figure N – HyperTerminal - COM Port Properties](image)

6. You are now ready to use HyperTerminal.

   ![Figure O – HyperTerminal](image)

A.2. Optionally, Configure Telix (in DOS) to communicate with the 7170:

   1. Locate and start the Telix program. Example: (assuming Telex.exe is in C:\Telix)
      CD\Telix<Enter> then Telix<Enter>.
   2. Press <Alt> P to bring up the Com Parameters window.
   3. Change communication parameters to 19200,N,8,1,COM<X> where COM<X> is
      the COM port you are connected to. Press <F> then <O> to set communication
      parameters. Press the number corresponding to the COM Port then press <Enter>
      to set Com port and exit parameters window.
   4. Press <Alt> T to change or check terminal emulation mode. Next select
      (highlight) “ANSI”. Press <Enter> to return to display window.
B. Initializing the 7170 IP-Link Transceiver:

Once your terminal program is ready (see previous pages), the 7705i MultiNet Receiver is on-line and your 7170 IP-Link Transceiver is installed and wired, you are ready to power up the 7170 IP-Link Transceiver and begin the configuration.

1. Confirm that an RS 232 Cable is connected between the serial input of the 7170 “Console” and the COM port of your PC running a terminal program.

2. Confirm that the RJ45 Ethernet Cable is connected (or ready to be connected) between your LAN or WAN Network and the Ethernet jack on the IP-Link Transceiver.

3. Confirm that the Phone line is connected (or ready to be connected) to the Phone Line jack on the 7170.

4. Please be aware that once powered up, startup messages should be displayed on your terminal program screen and you will have only 3 seconds after a prompt to efficiently get to the Setup menu.

5. While being ready to watch the console screen, connect the Battery in the IP-Link Transceiver and press the “S” key as indicated below.

   During the startup process and when prompted with:
   “Type Setup Key within 3 Sec. for Setup Menu”, press the “S” key to access the menu. If the 7170 is already powered, then only press the "S" key when the Red MODEM LED is off. See Example 1: Startup Messages.

   This will access the Setup Menu, which will be discussed later in section C.1.

   Listed here are the 3 possible responses available during the start process. Pressing the indicated key when prompted produces the listed response.

   X = Halt, go to terminal prompt. (Only use as directed by AES Support)
   S = Setup Menu
   <No key> = Proceed with Normal Operation attempting to connect to the servers.

6. Energize AC Power connected to the IP-Link Transceiver at J2.

Notes on the Shared Serial Port:

As noted elsewhere in this manual, the Console Port and the Modem share a single Serial interface. The sharing will not begin until the startup process is allowed to continue beyond the prompt “Type Setup Key…”. Pressing “X” or “S” when prompted will interrupt the startup process and the port will be available for Console use or Setup Menu access respectively. Once past this point, sharing is occurring. If the Modem LED is on, the serial port is switched to the modem and any attached terminal program will have no affect. For this reason, commands sent to the serial port may not get received or cause any response.

   If there is no active phone line attached, testing may take an extended period of time while it tries all possibilities to connect to a server via its modem, during which the Console Port will be unavailable.

   If the Port is switched to Console (Modem LED off) then the S<Enter> option should be available.

Note: Never Press the Reset Button on the IP-Link Board Unless Instructed by AES!
RF Interference:
If the IP-Link’s radio receiver is subject to RF Interference, the “RX” LED will illuminate and remain on for more than 20 seconds. The IP-Link should not be installed in this location until the source of the interference is cleared. Intermittent on and off of the RX LED is normal operation. A message is sent to the MultiNet receiver when this condition is detected and another when it clears.

Startup Screen Messages:
The Example below shows the typical startup messages sent to a connected terminal after during initialization. The example includes a message instructing an operator to press the “S” key within 3 seconds to bring up the Setup Menu that can be used to configure your IP-Link transceiver. If you miss the 3 second window, you can still press S during normal operation to get the Menu. Take notice of the Note on the previous page about the shared port, which will explain why sometimes pressing S will appear not to work,

Example 1: Startup Messages up to Type Setup Key…
To restart an IP-Link from a command line prompt:
If you pressed X during startup of the IP-Link and are at a command prompt, enter the UCMD<Enter> command, without parameters and the IP-Link will attempt connecting to your MultiNet Server.
C. Configuring the 7170 IP-Link Transceiver:

All of the settings that need to be changed to configure an IP-Link can be modified using functions in the Setup Menu. This includes the TCP/IP parameters needed to communicate with your networked components.

C.1. Set Up Menu:

There are several methods to access the Setup Menu using a terminal program attached to the Console port.

- During the initial power-up of the IP-Link, press “S” following the prompt: “Type Setup Key within 3 Sec. For Setup Menu”
- During normal operation, when the Modem is not selected for testing or backup communication, press “S” plus <Enter>.

Once the Menu is displayed you press a selected highlighted letter or number and then press <Enter> to modify its associated parameter(s) or access the function.

![Figure P – IP-Link Setup Menu](image)

1: Used to set the IP address of this IP-Link. Each device on a network needs a unique IP address. One method is to utilize a dhcp server on the network to automatically assign an available address. The other is to configure the device internally to use a particular address. You must consult with the administrator of your network to determine which method is best and to get an available unused IP address. Examples: 192.168.1.11 10.0.4.11 dhcp (* requires a dhcp server)

   * Contact AES Support before using dhcp over the Internet

2: Used to set the Gateway IP address. The Gateway is typically used to access an outside network like the Internet. Consult with the administrator of your network to determine the correct Gateway.

3: Used to set the Netmask appropriate for the attached network. Incorrectly setting this could make other devices on the same network unreachable. Consult with the administrator of your network to determine the correct Netmask.

4: Turns on Debug Logging. This should only be used at the direction of AES Technical Support or Engineering. It is typically used to troubleshoot or understand a problem.
I: Modifies the 8 digit Hexadecimal IPLinkNode ID of which the last four digits is the ID reported for this device in Radio Packets. It must be unique in the network. The last 4 digits of the ID are passed to the attached RF Board to identify the IP-Link in its Radio Network. You should include the leading four digits and they typically should be four zeroes. Do not include the “0x” shown in the displayed ID. The leading 0x signifies a Hexadecimal number and is only for display purposes. Hexadecimal digits are 0-9 and A-F (uppercase).

Although the IPLinkNode ID can be 8 hex digits in length, and will be properly reported to the MultiNet receiver, it is suggested that you always use 0000 as the radio network only uses the last or lower 4.

Example: Using the IPLinkNode ID of “12345678” will identify the IP-Link in the MultiNet Receiver as “12345678” but it will be identified in the local IntelliNet network as ID 5678. To avoid confusion use an IPLinkNode ID such as “00005678”. In many displays the leading 4 zeroes will be stripped off and not displayed.

R: Resets the IP-Link. There is up to a 70 second delay as the unit waits for the watchdog timer to initiate the reset. This is useful if you are connected using a remotely controlled computer that is attached to the IP-Link via one of its COM ports.

S: Modifies Primary Server IP1 and Backup Server IP2 addresses for the Primary and Backup (Secondary) MultiNet Receivers.

T: “Server Port1” and “Server Port2” IP port numbers used by the receiver that allows the IP-Link Transceiver to connect. Default is 7070

P: Modifies the “Primary Modem Server1 Phone#” and “Backup Server2 Phone#” numbers that the IP-Link Transceiver will call if TCP/IP fails and during periodic modem tests.

The modem feature has not been evaluated by UL.

M: Forces a test of the modem. Same as is automatically run at program start and daily.

F: Used to activate the RF Transceiver’s transmitter for up to 10 seconds to perform RF testing on the transmission line and antenna installation using a Watt Meter or SWR Meter. Note: This option may not be available if the installed firmware does not support the feature. Internal 5 second max transmit timer will control actual transmit time.

D: Displays a scrollable log with the results of the last modem test.

W: Runs tests on the power supply. Follow prompts on display.

U: TCP/IP Socket Timeout is the time that the unit waits for an ACK for a sent TCP/IP packet. Default is 30 seconds. Setting this to greater than 30 seconds could delay the switch over to Backup Modem to greater than 90 seconds. Contact AES Technical support before attempting to modify this value.

The modem feature has not been evaluated by UL.

L: Set the Linklayer (Link Layer / Level). All IP-Links should be set to 0. Link Layer or Level’s purpose is to indicate the RF hops to the Central Receiver. Where an IP-Link is the last RF device in a network, 0 is the level that will properly identify that to the Network, allowing Subscribers reporting a Link Layer of 1 to identify itself as being 1 final FR hop in a path to the MultiNet Receiver.
C: This sets the system Cypher (Cipher) Code. This code is passed to the attached RF Board and is used to authenticate transmissions by other IntelliNet devices that must use the same cipher code. The Cypher code is a 4 digit Hexadecimal number. Therefore only Hexadecimal characters 0-9 and A-F can be used. Letters must be entered in upper case (Capital) format. Any Subscriber that is to communicate to or through this IP-Link must have the identical Cypher Code programmed.

A: Set the RF Acknowledgement / Ack Mode. Use 0 for Quick ACK and 1 for Normal ACK. Only one IP-Link Transceiver in a radio cloud should be set to 0 for Quick ACK. Quick ACK means that the IP-Link Transceiver is sending a Packet Acknowledged Packet on the heels of a reception without listening for a clear frequency.

Having two IP-Links in the Quick ACK mode could cause Packet Acknowledgments to be jammed or blocked.

G: PinG - This option when enabled (On), will instruct the IP-Link Transceiver to Monitor RF traffic and report to the MultiNet receiver if it appears to be lost or silent. This must be set to Yes for UL installations and NFPA 72 compliance.

Less than 200 seconds after the frequency goes silent (≈150 Seconds), an RF Test is initiated by the IP-Link to verify its RF operation. This test verifies the RF, IP-Link, Radio, Coaxial Cable, connectors, surge protectors, Antenna and anything else in the transmission line, by transmitting a Poll Test. The test is directed to the ID of the last device for which a transmission was received. A failure to receive an Acknowledgement Packet for the transmitted Test, results in the reporting of an RF failure.

The MultiNet Receiver will generate a code to send to the Alarm Monitoring System or annunciate the RF Failure. The Ademco 685 emulation code will be “E355 00 C906”. The message indicating that the RF may be lost will be annunciated at the MultiNet Receiver or transmitted to the Alarm Monitoring System less than 200 seconds after the frequency goes silent.

Q: To Quit menu and return to normal operation.

C.4. Test the network connection:

- From a command prompt, reached by pressing “X” when prompted with “AES UIPLink UCMD Version 0.03”, after a reset initiated from the Setup Menu, you can confirm communication with the assigned MultiNet receiver by issuing the command:
  ping <MultiNetReceiverIPaddress> and looking for successful transmissions and replies. Press <Enter> to stop pinging and get a summary result.

Some Examples of using ping:

- ping 192.168.0.101<Enter> This is the factory default setting of a 7705i
- ping 10.0.1.1<Enter> Ping default gateway in a 10.0.1.xxx network
C.5. IP-Link Information:

During normal operation, when the Modem is not selected for testing or backup communication, and you are connected via a terminal, you can press “I” plus <Enter> to receive a brief output showing Information about the IP-Link configuration and its current status.

Information shown includes: IP configuration, Connected Server, Date and time, software versions, Link Layer, Modem and test info.

----------------------------------------------- Info -----------------------------------------------
MyIp:10.0.4.11 UTCTime:20:11:20; Date:06/12/08 Connected to Primary
Primary Server IP:10.0.4.101, SendNow:0, LinkLayer:00, HeartRate:5
TPLink Ver. 81.6.10. Radio Node (LLR) Version = 2.53
Both Modem Servers Failed (Pri#:NO MODEM, Bac#:101)
ModemTestTime in 3993 Secs, ModemRetry = 0

-----------------------------------------------

Example of Info output

C.5. Unknown Terminal Commands:

If you attempt to enter a command into the terminal that the IP-Link does not understand, you will be prompted as such and the suggestion to enter ? is offered. Type a “?” and then <Enter> to get a list of commands that will be accepted by the IP-Link’s terminal interface.

Unknown Command “..” Try Typing ?

The response to entering “?” <Enter> produces the following response:

Valid Commands: Setup, Info, Primary Server
9.0 Testing the 7170 IP-Link Transceiver:

There are several functions of the IP-Link Transceiver that can be tested to confirm that it is operating properly. Testing is broken up into parts with focus on increasingly advanced functionality with each part.

A. Test Basic Board Functionality:

The tests in this part are intended to check that there is power to the boards and that they have at least basic functionality.

Testing RF Board Local operation.

1. After performing a power up or Radio Reset the RX, WA, and AL LEDs will come on for about one second during the self-test process.

2. Once self-test is complete, the AL LED will come on steady.

Testing Interface Board Local operation.

The board has two LEDs that indicate the status of the Ethernet link. The LNK LED indicates the status of the Ethernet. When illuminated, the Ethernet Port is receiving the Ethernet ‘heartbeat’ and is connected to a live network. If this LED is not illuminated, there is a problem with the Ethernet wiring or the network. The ACT LED indicates activity on the network. The LED will flash when a data packet is received or transmitted.

1. If the Ethernet port your IP-Link Transceiver is correctly attached to another functioning Ethernet port there should be activity on the LNK and/or ACT LEDs as indicated above.

B. Test Local Board Functionality with terminal:

The tests in this part check the interaction between each board and the attached terminal.

A terminal connected to the “Serial Input” Port is required to perform testing of the IP-Link Transceiver at the local installed location. Instructions for connecting and configuring a terminal to the IP-Link transceiver can be found in Section 8 “Programming and Setup of the 7170 IP-Link”.

Receiving the output on your terminal’s display as shown in “Example 1: Startup Messages” on Page 18, confirms most of the basic functionality of the IP-Link Transceiver. Being able to successfully setup the IP-Link Transceiver as discussed in Section 8 confirms functionality and interaction with all the boards.
C. Test RF Signal:

Tests in this part are intended to check the transmission line and components for proper operation and problems. **This is a very important test and should be performed as soon after power up as feasible.** Operating the unit with a faulty transmission line or component could cause damage to electronics in the unit. As a precaution, you could disconnect the dB9 connector from the transceiver inside the IP-Link until this test can be performed.

To test your IP-Link’s RF signal you need to connect a power meter or SWR meter in the coax line to read power. As with other tests you need a terminal connected to the “Serial Input” of the IP-Link.

1. With the unit powered, press “S” to access the setup Menu.
2. Select “R” to begin the reset process, which can take several minutes.
3. Within 5 seconds of the prompt “AES UIPLink UCMD Version 0.03”, press X on the terminal to get to the C:\> prompt.
4. At the C:\> prompt, type IPCOMM<Enter>
5. You will be presented with a menu.
6. Type <Ctrl> + J then two exclamation points “!!” in rapid succession plus <Enter>. You should now have an AES> prompt.
7. At the AES> prompt, type using upper case, TEST 10. This will key the transmitter for up to 10 seconds showing “KEYING TX…” then a timeout or “DONE.” message at the end.
8. During the up to 10-second transmission record your meter’s reading.
9. An SWR reading of less than 3 to 1 is acceptable.
10. If the reading is greater than 3 to 1, then replace the antenna, coax and or coaxial connectors until the reading falls below the acceptable level.
11. Press <Esc> then X to exit IPCOMM and return to the C:\> prompt
12. Type UCMD<Enter> to restart normal IP-Link functions.

D. Test TCP/IP Communication Functionality:

To test that your TCP/IP configuration works, you can utilize a program called PING, which is included in the on-board PC and accessible from the C:\> prompt. You will want to ping the IP address of the new gateway that was entered during setup. Type “ping <gateway IP>” and hit enter, you should get a successful response. If not check your Ethernet connection and with the IT administrator to resolve this issue.

E. Test RF Communication Functionality:

The easiest method to locally test RF functionality is to have a programmed AES Subscriber unit with 7041 Hand Held Programmer available. Use the “Display Status” function (<Shft> + <F4>) to determine if your subscriber is connected to the network and most importantly that “RT1: #### contains the ID of the IP-Link Transceiver and that the Link Layer (Level) and NETCON are as expected. Level should be 1 higher than the Link Layer setting in the IP-Link Transceiver.

Contact an operator with access at the location of the AES MultiNet Receiver to confirm that signals are coming in from this IP-Link Transceiver. This test of course is also confirming TCP/IP communication or complete end-to-end testing as well.
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