Integrated Enterprise Network

Hardware Reference

Version 1.5

940043-002

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This document applies to the Hypercom Integrated Enterprise Network system and supporting software.

FCC NOTICE

The Hypercom devices described herein generates and uses radio frequency energy. If not installed and used properly, they may interfere with radio and television reception.

These devices have been tested and certified to comply with the limits for a Class A digital device, as defined in Part 15 of the Federal Communications Commission (FCC) rules. Class A limits are designed to provide reasonable protection against radio/television interference in a business environment.

To comply with FCC regulations, you must use shielded cables with these devices. Operation with unapproved equipment or unshielded cables is likely to result in interference with radio or television reception. Changes made to these devices without the approval of Hypercom, Inc., could void your authority to operate them.

These devices may cause interference even though they meet Class A limits. If there is interference, try to eliminate it by:

- Reorienting or relocating the receiving antenna of the radio or television.
- Increasing the distance between the receiver and the Hypercom equipment.
- Connecting the device to an outlet on a circuit different from that to which the receiver is connected.

Repair work on these devices must be done only by Hypercom, Inc., or a Hypercom authorized repair station.

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Introduction

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IEN HARDWARE REFERENCE

The IEN Hardware Reference is your comprehensive guide to referencing the Hypercom IEN chassis, port processors and modules, cables and adapters, and system configuration.

The IEN Hardware Reference contains the following chapters:

Chapter 2 - Chassis

This chapter describes the Hypercom solutions for network switches/routers. This chapter describes the IEN 1000, IEN 2000, IEN 3000, IEN 4000, and IEN 5000 chassis.

Chapter 3 - Port Processors and Modules

This chapter describes the Hypercom port processors and modules. It includes block diagrams, bus communications, and jumper settings.

Chapter 4 - Cables and Adapters

This chapter describes the Hypercom solutions for connectivity. This chapter includes a cable matrix and detailed specifications on Hypercom cables and adapters.

Chapter 5 - System Configuration

This chapter describes the Hypercom bus extension and node configuration. It includes bus clock settings and multi-chassis configurations.

Chapter 6 - IEN 1000 Configuration

This chapter describes the Hypercom IEN 1000 chassis. It includes additional system configuration examples.

Chassis

In This Chapter

CHASSIS SPECIFICATIONS

Table 2-1 lists the Hypercom IEN chassis specifications.

Equipment	IEN 1000	IEN 2000	IEN 3000	IEN 4000	IEN 5000
AC (90-130 or 185-255 VAC 48-400Hz)	20VA	35VA	35VA	125VA	140VA
DC 43-56 VDC	N/A	N/A	N/A	N/A	110W
Little fuse Part Number/ Rating	218025 2.5A 250V	218025 2.5A 250V	218025 2.5A 250V	216004 4A 250V	218005 5A 250V
Heat Dissipation AC	15W	30W	30W	150W	110W
Heat Dissipation DC	N/A	N/A	N/A	N/A	90W
Width	19in. 483mm	19in. 483mm	10-7/8 in. 276mm	17in. 432.3mm	19in. 483mm
Depth	14in. 360mm	14.0in. 355.61mm	17-3/4in. 451mm	12.5in. 304.8mm	21-7/8in. 556mm
Height	1-7/8in. 29mm	1.75in. 44.46mm	6-1/8in. 156mm	5.25in. 133.35mm	5-1/8in. 130mm
Weight	4.25lbs 1.9Kg	15.0lbs 6.7Kg	11.1lbs 5Kg	19lbs 8.486Kg	26lbs 11.8Kg
Operating Temperature	32-104° F 0 - 40° C	32-104° F 0 - 40° C	32-104° F 0 - 40° C	32-104° F 0 - 40° C	32-104° F 0 - 40° C
Humidity	25-95% non-condensing	25-95% non-condensing	25-95% non-condensing	25-95% non-condensing	25-95% non-condensing
Specifications are subject to change without notice.					

Table 2-1 IEN Chassis Specifications

SAFETY PRECAUTIONS

This section describes the safety precautions necessary to install the Hypercom IEN series products.

CAUTION:	**Electrical Safety:** Observe all normal electrical safety practices when operating any equipment attached to an active power source. **Authorized Service:** Covers or ground connections must be removed by a Hypercom authorized service technician. **Fire Hazard:** To avoid fire hazard, only use fuses with the required current rating and of the specified chassis type for replacement. See "Chassis Specifications" on page 3 for information on fuse requirements for each chassis. **Equipment Damage:** If you are using analog voice, do not plug 48 volt voice interfaces into RS232 or V.35 ports. If the wrong adapter interfaces or cables are installed in the IEN chassis ports, equipment damage can occur. **Electostatic Damage:** Before performing any maintenance on the chassis or the port processors, ensure that you wear a static strap and are grounded to the IEN chassis.

The IEN chassis is Safety Class 1 equipment provided with a protective ground terminal. An uninterruptedly safety ground must be provided from the 110VAC supply to the IEN chassis power connector. Whenever it is likely that the protection has been impaired, the equipment must be made inoperative and secured against any unintended operation.

Equipment servicing, adjustment, maintenance, or repair must be performed only by qualified personnel.

IEN 1000

The IEN 1000 chassis supports one WAN and one serial port. The IEN 1000 chassis can function as a simple bridge, bridge-router, or access device for a downstream controller or terminal (SDLC, Bisync). Due to its design flexibility, the IEN 1000 chassis can have three additional serial ports, an Ethernet or Token Ring router port, an eight-port UTP hub or an eight-port Token Ring multiple access unit (MAU), data compression, data encryption, integrated DSU, and 14.4Kbps dial backup.

Front Panel

The IEN 1000 chassis is a single port frame relay access device (FRAD) controller capable of interfacing with multiple protocols. Each interface status is presented on the front panel in the form of LED indicators and a two-line by 20-character display. Figure 2-1 illustrates the front panel of the IEN 1000 chassis.

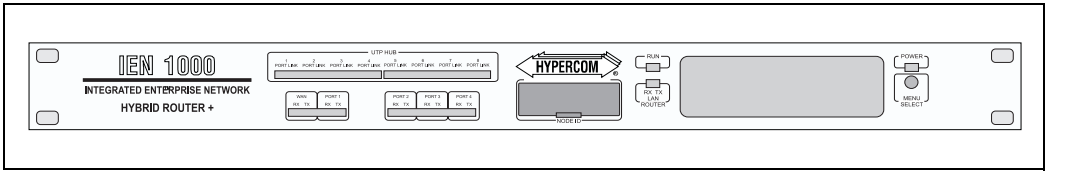

Figure 2-1 IEN 1000 Front Panel

WAN/Port 1 This status window contains LED indicators for the WAN and serial port 1 transmit and receive status.

Optional Serial Ports The Optional Serial Ports contain LED indicators for serial port 2, 3, and 4 transmit and receive status.

Node ID The Node ID contains four 16-position rotary switches used for configuration and addressing.

HUB Interface The HUB Interface contains LED indicators for the partition and link status of each port on the HUB08/16 or MAU.

- **HUB08** Refer to Chapter 3, LET10 for more information about the Ethernet upgrade module.
- **MAU08** Refer to Chapter 3, LTR10 for more information about the Token Ring upgrade module.

RUN Indicator The RUN Indicator contains an LED which flashes to indicate the CPU is running.

LAN Interface The LAN Interface contains LED indicators for the Ethernet or Token Ring LAN interface transmit and receive status.

Power Indicator The Power Indicator contains an LED that indicates power is applied.

Menu Display The Menu Display is a two-line by 20-character display used to provide port status and the software revision.

Menu Select/ Reset Button The Menu Select/Reset Button is used to scroll through the Menu Display. Pressing and holding the Menu Select/Reset Button for five seconds resets the IEN 1000.

Rear Panel

The rear panel of the IEN 1000 chassis contains connections for a standard default configuration. Additional interface connections are provided with each add-on component.

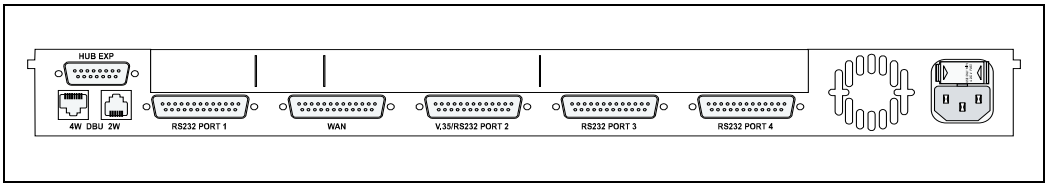

Figure 2-2 IEN 1000 Rear Panel

Hub Expansion — The HUB expansion consists of one DB15 connector used for Ring In and Ring Out connections when the UTP MAU is installed. Refer to Chapter 3, LTR10 for more information about the Token Ring upgrade module.

DBU Connections — The DBU connections consist of one RJ11 port for a 2-wire modem and one RJ45 port for a 4-wire line interface used with the optional V.32bis DBU Modem. This provides a dial backup connection.

WAN/Serial Port 1 Connections — The WAN/Serial Port 1 connections consist of one DB25 RS232/V.35 WAN port and one DB25 RS232 serial port.

Optional Serial Ports — The Serial Port connections 2, 3, and 4 consist of one DB25 RS232/V.35 serial port and two DB25 RS232 serial ports used when the optional CPA03 module is installed. Refer to Chapter 3, CPA03 for more information about the CPA03 upgrade module.

AC Power Connector — The AC Power connection consists of one power cord socket with a T5A 250V fuse.

IEN 2000

The IEN 2000 is a two-slot chassis capable of running multiple Hypercom port processors. The IEN 2000 chassis is typically used at a branch office providing support for two port processors or can be bus connected with up to three additional IEN 2000 chassis for four, six, or eight-slot configurations. This allows a user to start small and expand their IEN configuration as new requirements develop. Port processors used by the IEN 2000 chassis are the same as those used by the IEN 3000, IEN 4000 and IEN 5000, allowing a user to move to even larger configurations if required.

The IEN 2000 contains a single 110/220VAC auto sensing power supply.

Front Panel

The front panel of the IEN 2000 chassis contains the status indicator nomenclature for each of the ports. Refer to Chapter 3, Port Processors for more information about the status display indicators. Figure 2-1 illustrates the front panel of the IEN 2000 chassis.

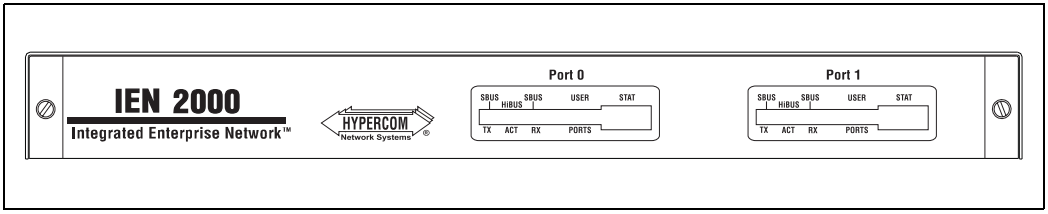

Figure 2-3 IEN 2000 Front Panel

SBUS TX — The Standard Bus Transmit is an LED indicator that indicates the unit is transmitting data to the standard packet bus.

HiBUS ACT — The High Speed Bus Activity is an LED indicator that indicates the port is transmitting data on the high speed bus. Older Z80 port processors do not have high speed bus capability. This indicates low speed bus activity on the Z80 port processor.

SBUS RX — The Standard Bus Receive is an LED indicator that indicates the unit is receiving data from the standard packet bus.

USER PORTS — The User Ports is an LED indicator that indicates a signal from the DCE (modem or printer) to the DTE, indicating it is receiving a carrier signal from the DCE at the other end of the telephone circuit.

STAT — The Status (STAT) is a seven-segment LED display that provides a current operational status of the port processor.

Rear Panel

The rear panel of the IEN 2000 chassis contains the cabling connectors. The two DB25 connectors are used with adapter interfaces or cables to support media, such as RS232, V.35, Thinnet or AUI Ethernet, and analog voice. Figure 2-4 illustrates the rear panel of the IEN 2000 chassis.

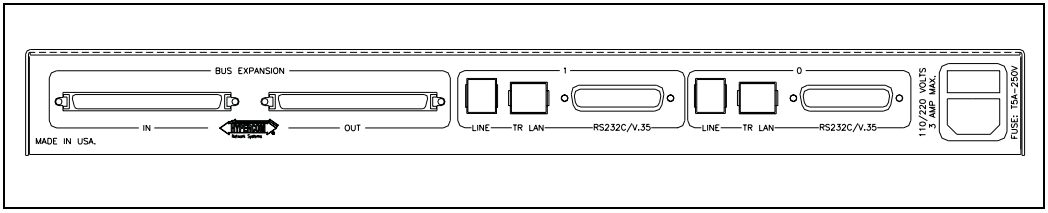

Figure 2-4 IEN 2000 Rear Panel

The two RJ11 connectors are used with adapter interfaces or cables to support media, including analog dial, UTP Ethernet, DS1/T1, DDS and ISDN. The two RJ45 connectors support a standard Token Ring UTP connection.

There are also two bus expansion ports, one labeled IN and one labeled OUT. The bus expansion ports are used for interconnecting an IEN 2000 with up to three additional IEN 2000 chassis.

Up to four IEN 2000 chassis can be bus connected using a Hypercom Type HB2 cable. Two chassis are connected by inserting a Type HB2 cable into the OUT port of the first chassis and into the IN bus expansion port of the second chassis. Use of the IEN 2000 bus expansion actually extends the backplane, providing a common high-speed, standard and TDM bus between chassis. Redundant power capabilities are also provided using the Type HB2 cable.

Ethernet or Token Ring bus extension is required when exceeding the eight port IEN 2000 chassis stack.

IEN 3000

The IEN 3000 chassis is a six-slot chassis capable of running each Hypercom port processor. The IEN 3000 chassis is typically used at large remote sites that exceed the capacity or functions supported by the IEN 1000 chassis. As a stand-alone unit, the IEN 3000 chassis can perform as a powerful multiprotocol router.

The IEN 3000 chassis contains redundant power supplies. Power supplies are available in 110VAC, 220VAC and 48VDC configurations. A single power supply failure results in an alarm being transmitted to IENView.

Front Panel

The front panel of the IEN 3000 chassis contains the status indicator nomenclature for each port. Refer to Chapter 3, Port Processors/Modules for more information about status display indicators. Figure 2-5 illustrates the front panel of the IEN 3000 chassis.

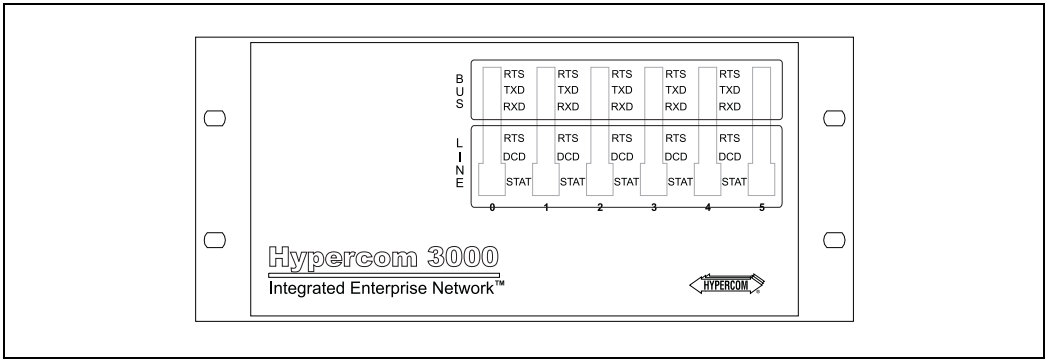

Figure 2-5 IEN 3000 Front Panel

RTS The Request to Send (RTS) is an LED indicator that indicates the unit is transmitting data to the standard packet bus.

TXD The Transmit Data (TXD) is an LED indicator that indicates the port is transmitting data on the high speed bus. Older Z80 port processors do not have high speed bus capability. This indicates low speed bus activity on the Z80 port processor.

RXD The Receive Data (RXD) is an LED indicator that indicates the unit is receiving data from the standard packet bus

RTS DCD The Request to Send (RTS) and Data Carrier Detect (DCD) are LED indicators that indicate a signal from the DCE (modem or printer) to the DTE, indicating it is receiving a carrier signal from the DCE at the other end of the telephone circuit. The LEDs vary by the type of port processor.

STAT The Status (STAT) is a seven-segment LED display that provides a current operational status.

Backplane

The IEN 3000 chassis supports six port processors. The card cage also contains the power supplies. Figure 2-6 illustrates the backplane of the IEN 3000 chassis.

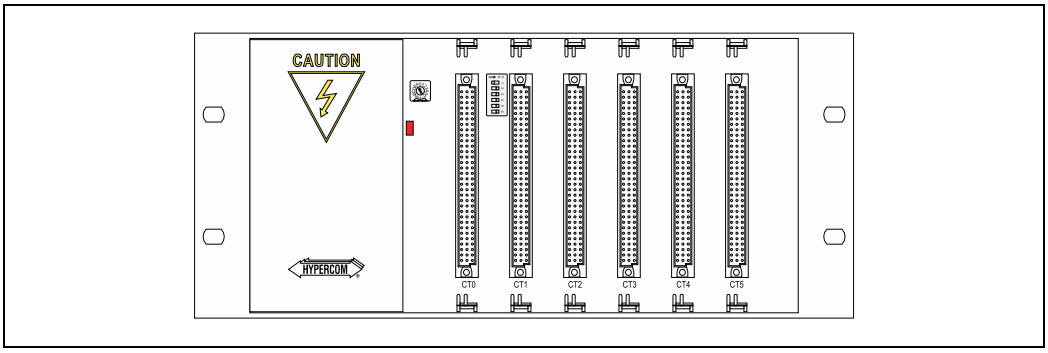

Figure 2-6 IEN 3000 Backplane

The backplane contains the port processor connectors, bus circuitry, and power connections. The IEN 3000 chassis backplane is passive. That is, no one port processor need be installed in a specific slot.

The IEN 3000 chassis backplane also contains configurations switches used to configure multiple chassis as a single IEN node. Refer to Chapter 5, IEN 3000 Configuration for more information about the IEN 3000 chassis backplane configuration switches.

Rear Panel

The rear panel of the IEN 3000 chassis contains the cabling connectors. There are six DB25 connectors, labeled ‘0’ through ‘5’, and six RJ11 LAN connectors and six RJ11 Line connectors each labeled ‘0’ through ‘5’. Figure 2-7 illustrates the rear panel of the IEN 3000 chassis.

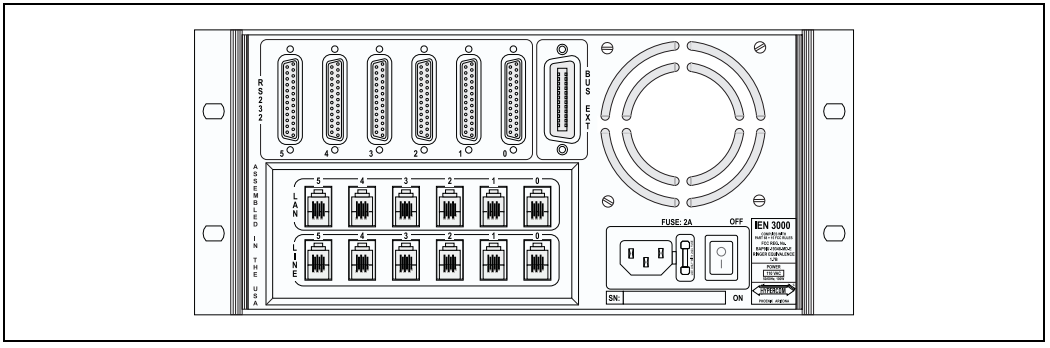

Figure 2-7 IEN 3000 Rear Panel

Note: *When using the DB25 connector for RS232, the connector is DTE. To perform as DCE, use the appropriate interface adapter cable. Refer to Chapter 4, Cable Specifications & Adapters for more information about specific cabling parameters.*

The six RJ11 LAN connectors are used only with the Hypercom RS485 terminal LAN. The six RJ11 line connectors are used with adapter interfaces or cables to support media in addition to the standard RJ11 dial capability. For example, UTP Token Ring or Ethernet, DS1/T1, DDS, and 4-wire leased line.

Also available is a bus extension connector on the rear of the IEN 3000 chassis. Refer to Chapter 5, IEN 3000 Configuration for more information about IEN 3000 chassis bus extension capabilities.

IEN 4000

The IEN 4000 is an eight-slot, branch or regional concentrator chassis. Each IEN 4000 chassis supports a maximum of eight port processors. The chassis can be bus connected with up to two additional IEN 4000 chassis for a 16, 24, or 32-slot configuration.

The IEN 4000 chassis uses hot swappable 110/220VAC auto sensing power supplies. The IEN 4000 chassis comes standard with a single power supply and has the option of installing a redundant power supply.

The IEN 4000 chassis come standard with a single power supply and a second redundant power supply. When IEN 4000s chassis are bus connected, the standard and high speed bus are extended.

The IEN 4000 chassis allows different technologies to come together on a centrally managed platform, including SNA/SDLC, ASYNC, BSC 3270, IP and IPX. It also integrates multiple traffic types over a single WAN interface, such as ISDN, X.25, or frame relay. The IEN 4000 chassis comes with the ability to add an asynchronous transfer mode (ATM) T1 or OC3 interface to utilize the performance advances of cell relay.

Digital or analog voice interfaces can be used to provide compressed or channelized voice capability. Each voice port processor supports four, 2-wire or two, 4-wire voice channels per port processor for a maximum of 48 voice channels for each IEN 4000 chassis.

Front Panel

The front panel of the IEN 4000 chassis contains the status indicator nomenclature for each port and power supplies. Refer to Chapter 3, Port Processors for more information about status indicators. Figure 2-8 illustrates the front panel of the IEN 4000 chassis.

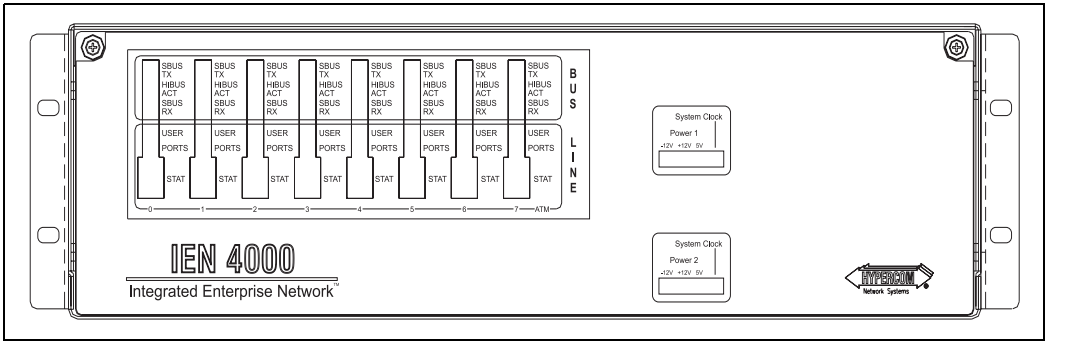

Figure 2-8 IEN 4000 Front Panel

SBUS TX — The Standard Bus Transmit is an LED indicator that indicates the unit is transmitting data to the standard packet bus.

HiBUS ACT — The High Speed Bus Activity is an LED indicator that indicates the port is transmitting data on the high speed bus. Older Z80 port processors do not have high speed bus capability. This indicates low speed bus activity on the Z80 port processor.

SBUS RX — The Standard Bus Receive is an LED indicator that indicates the unit is receiving data from the standard packet bus.

USER PORTS — The User Ports is an LED indicator that indicates a signal from the DCE (modem or printer) to the DTE, indicating it is receiving a carrier signal from the DCE at the other end of the telephone circuit.

STAT — The Status (STAT) is a seven-segment LED display that provides a current operational status of the port processor.

Power 1 and 2 -12 Volts — The LED indicates that -12V is supplied by the power supply.

Power 1 and 2 +12 Volts — The LED indicates the +12V is supplied by the power supply.

Power 1 and 2 +5 Volts — The LED indicates that +5V is supplied by the power supply.

Power 1 and 2 System Clock — The LED indicates that the system clock is active.

Rear Panel

The rear panel of the IEN 4000 chassis contains the cabling connectors. Figure 2-9 illustrates the rear panel of the IEN 4000 chassis.

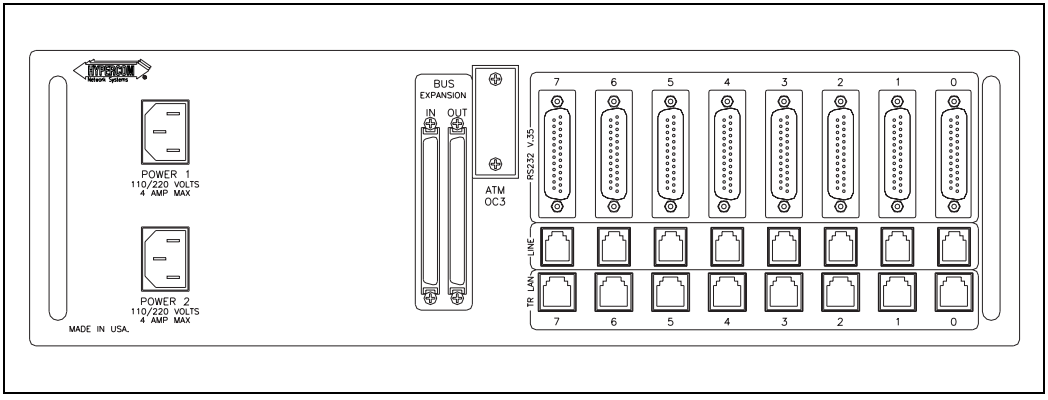

Figure 2-9 IEN 4000 Rear Panel

The eight DB25 connectors are used with adapter interfaces or cables to support media, such as RS232, V.35, Thinnet or AUI Ethernet, and analog voice.

The eight RJ11 connectors are used with adapter interfaces or cables to support media, including analog dial, UTP Ethernet, DS1/T1, DDS and ISDN. The eight RJ45 connectors support a standard Token Ring UTP connection.

There are also two bus expansion ports, labeled IN and OUT. The bus expansion ports are used for interconnecting an IEN 4000 with up to two additional IEN 4000s chassis.

Note: *Only high speed and standard busses are extended on the IEN 4000 chassis.*

Power Supply

The IEN 4000 contains two removable power supplies that are hot swappable, are user serviceable, supplies redundant backplane clock, supplies universal AC input, and supplies 110/220V auto sensing. The status LEDs on the front of the power supply indicate the proper power output. Figure 2-10 illustrates the face plate of the IEN 4000 removable power supply.

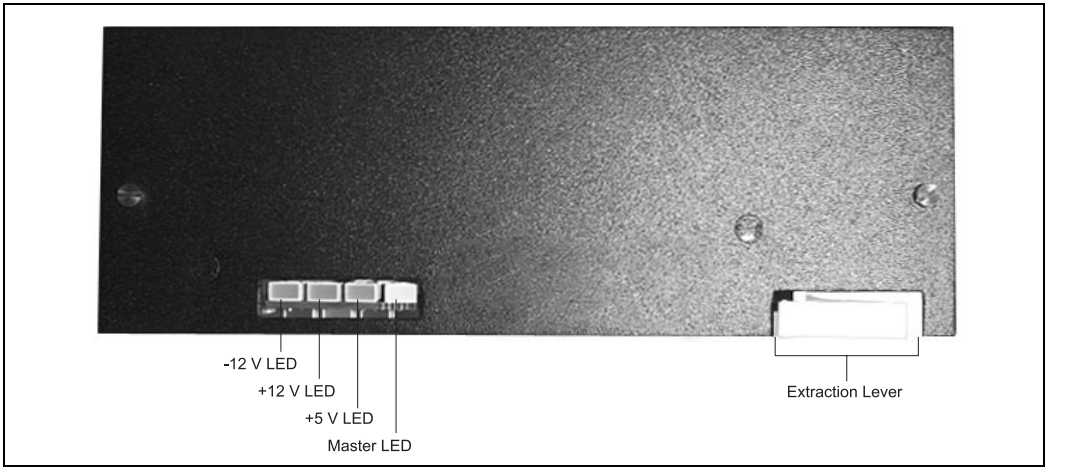

Figure 2-10 IEN 4000 Removable Power Supply Face Plate

Figure 2-11 illustrates the rear view of the IEN 4000 removable power supply.

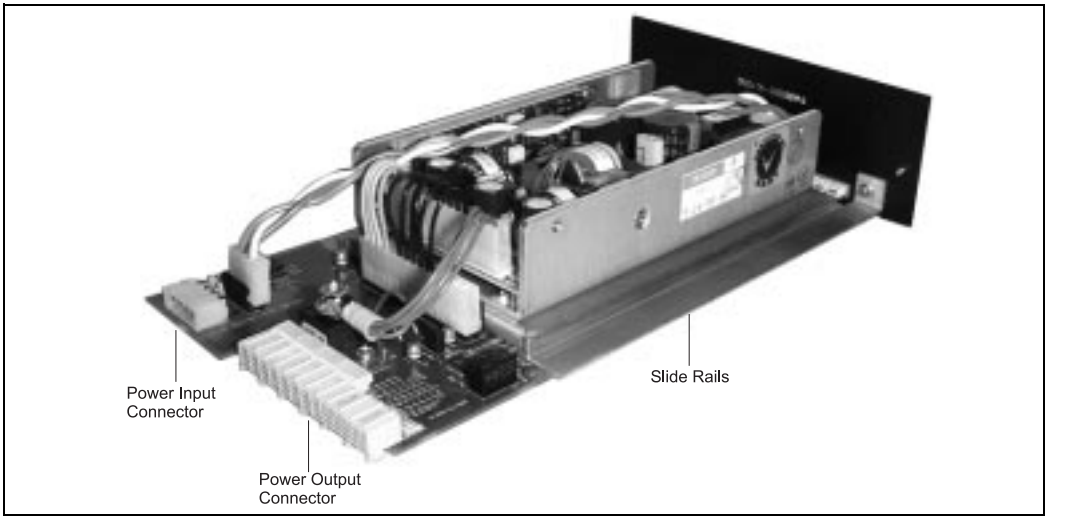

Figure 2-11 IEN 4000 Removable Power Supply Rear View

IEN 5000

The IEN 5000 chassis has sixteen full-function slots labeled 0 through 15, that are capable of running each Hypercom port processor. A seventeenth slot, labeled C, is thinner than slots 0 through 15 and does not access the high-speed bus. The C slot is used by port processors that do not have modules attached, do not require an RJ11 port, and do not require access to the high-speed bus.

The IEN 5000 chassis is typically used at host or regional sites where port density and scalability are important. The IEN 5000 chassis can function as a regional concentrator of feeder nodes. As a stand-alone unit, it can perform as a powerful multiprotocol router.

The IEN 5000 chassis contains redundant power supplies. Power supplies are available in 110VAC, 220VAC and 48VDC configurations. A single power supply failure results in an alarm to IENView.

Front Panel

The front panel of the IEN 5000 chassis contains the status indicator nomenclature for each port. Refer to Chapter 3, Port Processors/Modules for more information about status display indicators. Figure 2-12 illustrates the front panel of the IEN 5000 chassis.

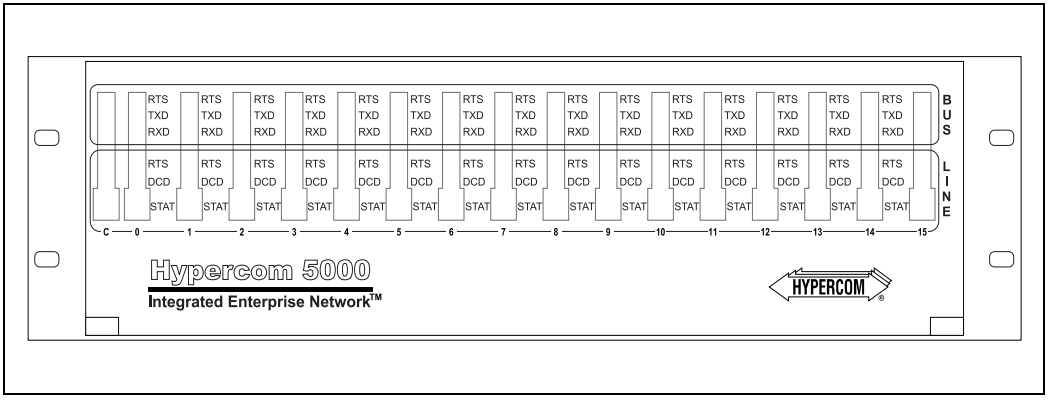

Figure 2-12 IEN 5000 Front Panel

RTS The Request to Send (RTS) is an LED indicator that indicates the unit is transmitting data to the standard packet bus.

TXD The Transmit Data (TXD) is an LED indicator that indicates the port is transmitting data on the high speed bus. Older Z80 port processors do not have high speed bus capability. This indicates low speed bus activity on the Z80 port processor.

RXD The Receive Data (RXD) is an LED indicator that indicates the unit is receiving data from the standard packet bus.

RTS DCD The Request to Send (RTS) and Data Carrier Detect (DCD) are LED indicator that indicates a signal from the DCE (modem or printer) to the DTE, indicating it is receiving a carrier signal from the DCE at the other end of the telephone circuit

STAT The Status (STAT) is a seven-segment LED display that provides a current operational status.

Backplane

The IEN 5000 chassis supports sixteen full-width and one half-width port processors for a total of seventeen slots. Figure 2-13 illustrates the backplane of the IEN 5000 chassis.

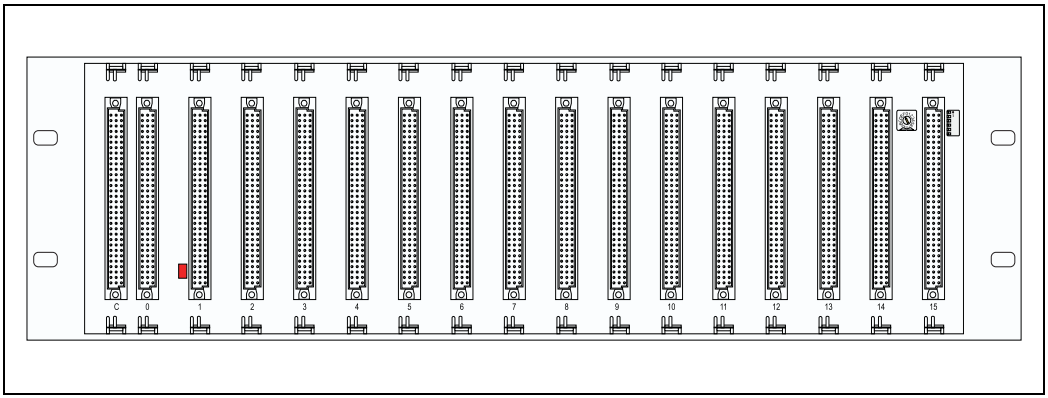

Figure 2-13 IEN 5000 Backplane

The backplane contains the port processor connectors, bus circuitry, and power connections. The IEN 5000 chassis backplane is passive. Therefore, no one port processor need be installed in a specific slot. However, the first slot marked C, is a thin slot. You cannot install a port processor with a module in slot C. In addition, slot C does not support the high-speed bus, or media requiring an RJ11 connector.

The IEN 5000 chassis backplane also contains configuration switches used to configure multiple chassis as a single IEN node. Refer to Chapter 5, Bus Extension for more information about the IEN 5000 chassis backplane configuration switches.

Rear Panel

The rear panel of the IEN 5000 chassis contains the cabling connectors. There are seventeen DB25 connectors, labeled 0 through 15 and CPC. The CPC connector corresponds to slot C. There are sixteen RJ11 connectors, labeled 0 through 15. Figure 2-14 illustrates the rear panel of the IEN 5000 chassis.

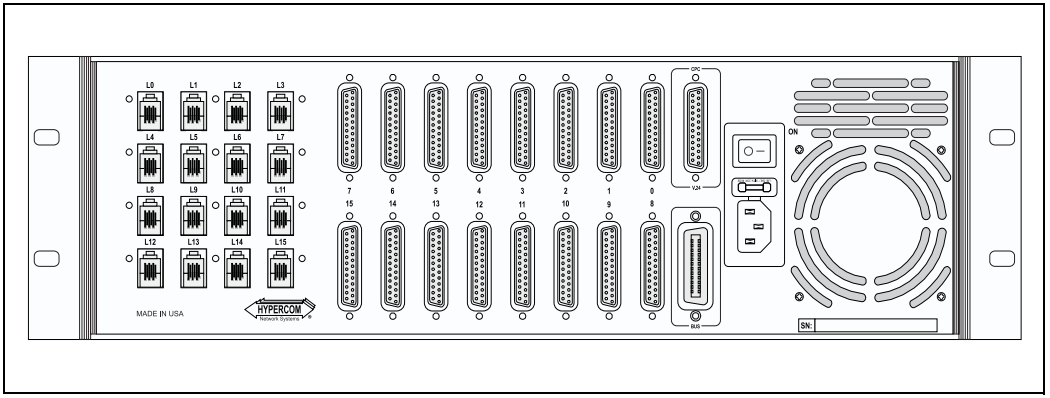

Figure 2-14 IEN 5000 Rear Panel

The DB25 connectors are used with adapter interfaces or cables to support media in addition to the standard RS232 DTE interface.

Note: *When using the DB25 connector for RS232, the connector is DTE. To perform as DCE, use the appropriate interface adapter cable. Refer to Chapter 4, Cable Specifications & Adapters for more information about specific cabling parameters.*

The RJ11 connectors are used with adapter interfaces or cables to support media in addition to the standard RJ11 dial capability. For example, UTP Token Ring or Ethernet, DS1/T1, DDS, and 4-wire leased line.

There is also a bus extension connector on the back of the IEN 5000 chassis. Refer to Chapter 5, Bus Extension for more information about IEN 5000 bus extension capabilities.

BUS ARCHITECTURE

The IEN 2000, IEN 3000, IEN 4000 and IEN 5000 chassis backplanes use the same bus architecture. This allows each chassis to accommodate all the port processors. Each chassis supports the following buses:

- High-Speed
- Standard
- Time Division Multiplexed (TDM)

Figure 2-15 illustrates the three bus types used by the IEN 2000, IEN 3000, IEN 4000 and IEN 5000 chassis.

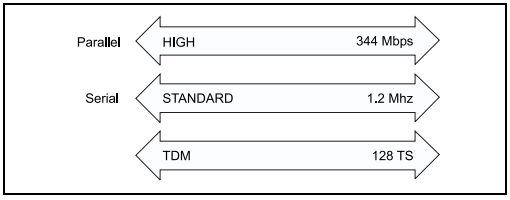

Figure 2-15 Bus Architecture

High-Speed Bus

The high-speed bus is a parallel bus used to transport data frames between the 32-bit port processors. The data may contain LAN, Legacy, or packetized voice. Figure 2-16 illustrates the high-speed bus.

Figure 2-16 High-Speed Bus

The high-speed bus is used by the Hypercom second generation port processors, LET61, LTR61, CID61, and CID63 port processors. These second generation port processors use the Motorola 68340 or 68302 microprocessors. Refer to Chapter 3, Port Processors/ Modules for more information about these, and other Hypercom port processors.

The 32-bit port processor communicate on both the high-speed bus and standard packet bus. Should there be a failure on the high-speed bus, the 32-bit port processor automatically revert to the standard bus and notify IENView. If a port processor is removed or powered off, the other port processors detect this state, and an alarm is transmitted to IENView.

Standard Bus

Similar to the high-speed bus, the standard bus is used to transmit data frames between port processors. The standard bus supports all port processors. The 32-bit port processors use the standard bus for communication with the first generation port processors, and as a backup to the high-speed bus. The first generation port processors use the standard bus for all data communications. Figure 2-17 illustrates the standard bus.

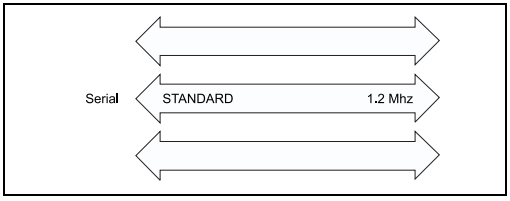

Figure 2-17 Standard Bus

If a port processor is removed or powered off, the other port processors detect this state, and an alarm is transmitted to IENView.

TDM Bus

The Time-Division Multiplexed, or TDM bus is actually four TDM buses consisting of thirty-two time slots each (64K DS0s). The TDM bus is used for FT1, T1, E1, drop and insert, voice, and data. Figure 2-18 illustrates the TDM bus.

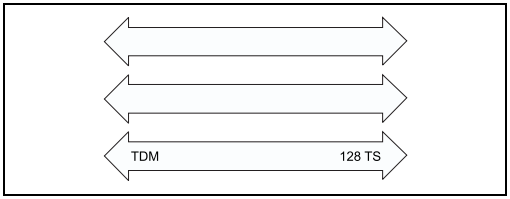

Figure 2-18 TDM Bus

The IEN 2000, IEN 3000, IEN 4000 and IEN 5000 chassis can terminate up to four T1/E1s. The TDM bus is accessible by the DTC11, CID61, CID63, and DLA14 port processors. Refer to Chapter 3, Port Processors/Modules for more information about these, and other Hypercom port processors.

CHASSIS PORT PINOUTS

This section describes the pin assignments associated with each of the chassis. The pin assignments are divided up by connector type, RJ11 and DB25, and interface.

Note: *The signal assignments for the IEN chassis port interface connectors are determined by the port interface card located in the associated card slot.*

- Refer to Chapter 3, Port Processors/Modules for more information about a specific port processor.
- Refer to page 2-5, IEN 1000 for more information about the IEN 1000 chassis specifications.
- Refer to page 2-8, IEN 2000 for more information about the IEN 2000 chassis specifications.
- Refer to page 2-10, IEN 3000 for more information about the IEN 3000 chassis specifications.
- Refer to page 2-13, IEN 4000 for more information about the IEN 4000 chassis specifications.
- Refer to page 2-17, IEN 5000 for more information about the IEN 5000 chassis specifications.

T1

Table 2-2 lists the RJ11 pin assignments for a T1 physical interface.

PIN	T1 Pin Assignment	Key
1	Receive Ring	RR
2	Receive TIP	RT
3	Transmit Ring	TR
4	Transmit TIP	TT
5	Ground	T
6	RC	T1

Table 2-2 RJ11 T1

2-Wire E&M

Table 2-3 lists the RJ11 pin assignments for a 2-Wire E&M physical interface.

PIN	2-Wire E&M Pin Assignment	Key
1	Signal Battery	SB
2	Mouth	M
3	Ring	R
4	TIP	T
5	Telco Ground	GND
6	Ear	E

Table 2-3 RJ11 2-Wire E&M

Dial/Leased Line

Table 2-4 lists the RJ11 pin assignments for a dial or leased line physical interface.

PIN	Dial/Lease Line Pin Assignment	Key
1	Receive Ring (4-wire only)	RR
2	Receive TIP (4-wire only)	RT
3	Ring	R
4	TIP	T
5	Pin not used	N/A
6	Pin not used	N/A

Table 2-4 RJ11 Dial/Lease Line

10Base-T

Table 2-5 lists the RJ11 pin assignments for a 10Base-T physical interface.

PIN	10Base-T Pin Assignment	Key
1	Transmit Positive	TX+
2	Transmit Negative	TX-
3	Receive Positive	RX+
4	Pin not used	N/A
5	Pin not used	N/A
6	Receive Negative	RX-

Table 2-5 RJ11 10Base-T

Token Ring UTP

Table 2-6 lists the RJ11 pin assignments for a Token Ring UTP (Unshielded Twisted Pair) physical interface.

PIN	T1 Pin Assignment	Key
1	Pin not used	N/A
2	Pin not used	N/A
3	Transmit Positive	TX+
4	Receive Positive	RX+
5	Receive Negative	RX-
6	Transmit Negative	TX-

Table 2-6 RJ11 Token Ring UTP

RS485 LAN

Table 2-7 lists the RJ11 pin assignments for an RS485 LAN physical interface.

PIN	RS485 Pin Assignment	Key
1	Pin not used	N/A
2	LAN Positive	LAN+
3	Frame Ground	GND
4	Pin not used	N/A
5	LAN Negative	LAN-
6	Pin not used	N/A

Table 2-7 RJ11 RS485 LAN

Note: *The RS485 LAN interface is used only by the IEN 3000 chassis.*

V.35

Table 2-8 lists the DB25 pin assignments for a V.35 physical interface.

PIN	V.35 Pin Assignment	Key
1	Frame Ground	FG
2	Pin not used	N/A
3	Pin not used	N/A
4	Request To Send	RTS
5	Clear To Send	CTS
6	Data Set Ready	DSR
7	Signal Ground	SG
8	Data Carrier Detect	DCD
9	Transmit Clock B	TC-B
10	Receive Clock B	RC-B
11	Transmit Data B	TD-B
12	Receive Data B	RD-B
13	External Transmit Clock B	ETC-B
14	Receive Data A	RD-A
15	Pin not used	N/A
16	Pin not used	N/A
17	Pin not used	N/A
18	Pin not used	N/A
19	Receive Clock A	RC-A
20	Data Terminal Ready	DTR
21	Transmit Clock A	TC-A
22	Pin not used	N/A
23	Transmit Data A	TD-A
24	Pin not used	N/A
25	External Transmit Clock A	ETC-A

Table 2-8 DB25 (V.35)

V.24 RS232C

Table 2-9 lists the DB25 pin assignments for a V.24 RS232C physical interface.

PIN	V.24 RS232C Pin Assignment	Key
1	Frame Ground	FG
2	Transmit Data	TD
3	Receive Data	RD
4	Request To Send	RTS
5	Clear To Send	CTS
6	Data Set Ready	DSR
7	Signal Ground	SG
8	Data Carrier Detect	DCD
9	Pin not used	N/A
10	Pin not used	N/A
11	Pin not used	N/A
12	Pin not used	N/A
13	Pin not used	N/A
14	Pin not used	N/A
15	Transmit Clock	TC
16	Pin not used	N/A
17	Receive Clock	RC
18	Pin not used	N/A
19	Pin not used	N/A
20	Data Terminal Ready	DTR
21	Pin not used	N/A
22	Ring Indicator	RI
23	Pin not used	N/A
24	External Transmit Clock	ETC
25	Pin not used	N/A

Table 2-9 DB25 (V.24 RS232C)

Note: *The CID15H uses pin 24 to provide clocking when set to internal clock. The CID61 and CID63 port processors provide clock on pin 15 when set to internal clock.*

10Base-2 LAN

Table 2-10 lists the DB25 pin assignments for a 10Base-2 LAN physical interface.

PIN	10Base-2 LAN Pin Assignment	Key
1	Frame Ground	FG
2	Pin not used	N/A
3	Pin not used	N/A
4	Pin not used	N/A
5	Pin not used	N/A
6	Pin not used	N/A
7	Signal Ground	SG
8	Pin not used	N/A
9	Receive Positive	RX+
10	Positive Five volts	+5V
11	Transmit Positive	TX+
12	Pin not used	N/A
13	Carrier Detect Positive	CD+
14	Positive Twelve volts	+12V
15	Pin not used	N/A
16	Pin not used	N/A
17	Pin not used	N/A
18	Pin not used	N/A
19	Pin not used	N/A
20	Pin not used	N/A
21	Receive Negative	RX-
22	Pin not used	N/A
23	Transmit Negative	TX-
24	Pin not used	N/A
25	Carrier Detect Negative	CD-

Table 2-10 DB25 (10Base-2 LAN)

Note: *The LEC01 and LAU01 Ethernet adapters use this pinout to provide 10Base-2 and AUI interfaces respectively.*

Token Ring STP

Table 2-11 lists the DB25 pin assignments for a Token Ring STP physical interface.

PIN	TR STP Pin Assignment	Key
1	Pin not used	N/A
2	Pin not used	N/A
3	Pin not used	N/A
4	Pin not used	N/A
5	Pin not used	N/A
6	Transmit Negative	TX-
7	Ground	GND
8	Ground	GND
9	Receive Negative	RX-
10	Pin not used	N/A
11	Positive Five volts	+5V
12	Pin not used	N/A
13	Pin not used	N/A
14	Pin not used	N/A
15	Pin not used	N/A
16	Pin not used	N/A
17	Pin not used	N/A
18	Pin not used	N/A
19	Transmit Positive	TX+
20	Ground	GND
21	Ground	GND
22	Receive Positive	RCV+
23	Pin not used	N/A
24	Pin not used	N/A
25	Pin not used	N/A

Table 2-11 DB25 (Token Ring STP)

RS485 LAN

Table 2-12 lists the DB25 pin assignments for a RS485 LAN physical interface.

PIN	RS485 LAN Pin Assignment	Key
1	Pin not used	N/A
2	Pin not used	N/A
3	Pin not used	N/A
4	Pin not used	N/A
5	Pin not used	N/A
6	Pin not used	N/A
7	Pin not used	N/A
8	Pin not used	N/A
9	Pin not used	N/A
10	Pin not used	N/A
11	Pin not used	N/A
12	Pin not used	N/A
13	Pin not used	N/A
14	Pin not used	N/A
15	Pin not used	N/A
16	LAN Negative	LAN-
17	Pin not used	N/A
18	LAN Positive	LAN+
19	Pin not used	N/A
20	Pin not used	N/A
21	Pin not used	N/A
22	Pin not used	N/A
23	Pin not used	N/A
24	Pin not used	N/A
25	Pin not used	N/A

Table 2-12 DB25 (RS485 LAN)

Note: *The RS485 LAN interface is only used by the IEN 5000 chassis.*

Port Processors/ Modules

In This Chapter

PORT PROCESSORS

Port processors are self-contained CPU/interface processors incorporating all necessary circuitry required to communicate with the bus and to support the range of interfaces used in modern data communications networks. The port processors contain all memory needed to run the CPU independently. Figure 3-1 illustrates the port interface architecture.

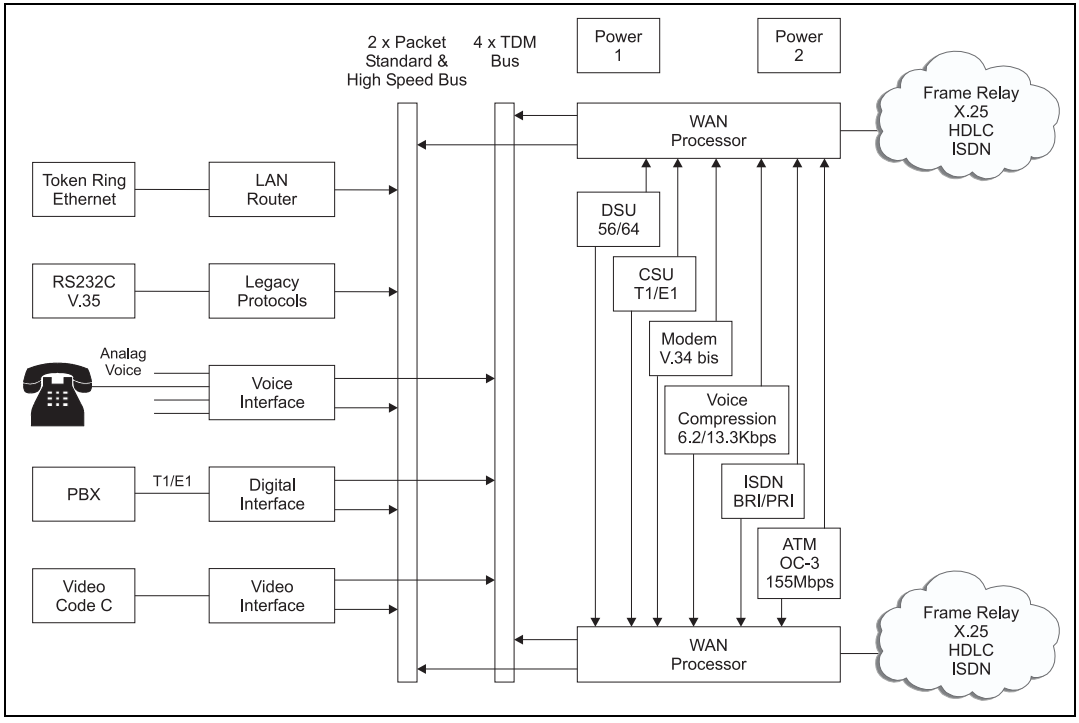

Figure 3-1 Port Interface Architecture

32-bit CPU port processors are used for applications requiring very high throughput or for support of specialized functions such as Token Ring LAN interfacing. Ports are “soft” and can operate from either EPROM-based firmware or downloaded software.

Physical Interfaces

The Hypercom IEN family of port processors support the following interface technologies:

- RS232-C
- V.35
- DDS 56/64K
- Ethernet
  - BNC
  - AUI
  - UTP
- T/R
  - STP (IBM)
  - UTP
- T1/E1/FT1
- Modem (V.34)
  - 2-Wire Dial
  - 2-Wire Leased
  - 4-Wire Leased
- Analog Voice
  - 2-Wire
    - Loop Start
    - FXO
    - FXS
  - 4-Wire
    - E&M
- Bus Extension
  - IEEE
- RS 485
- ISDN
  - BRI
  - PRI

Figure 3-2 illustrates the common features of each type of port processor.

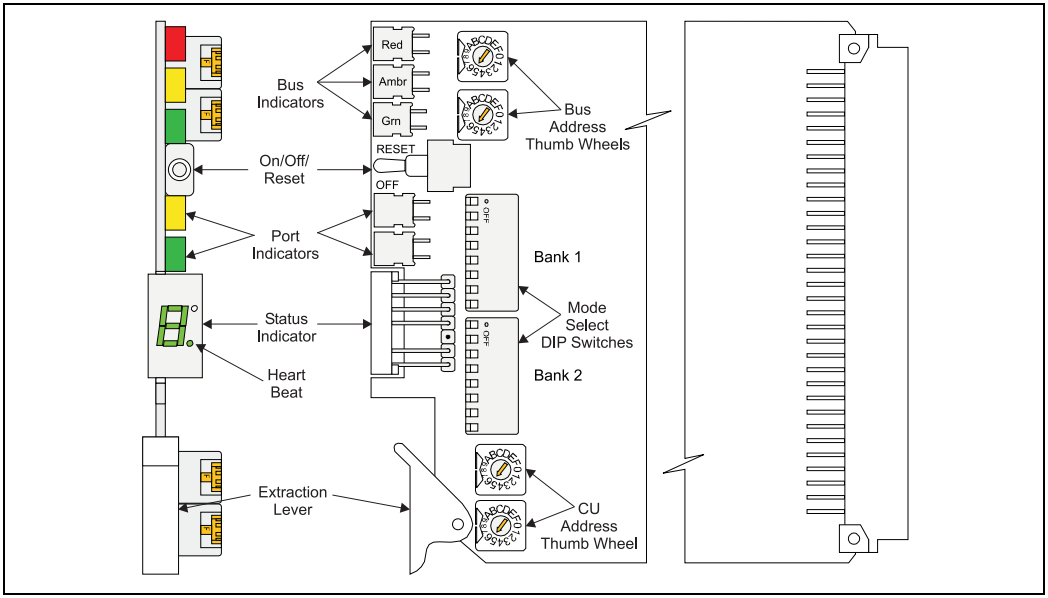

Figure 3-2 Port Processor Features

All Hypercom port processors consists of the following features:

- Two pairs of 16-position rotary switches used to select the high nibble and low nibble of the bus address and CU address.
- On/Off/Reset toggle switch used to enable or disable power to the port processor, and to perform a port processor restart after a modification (usually address changes) is made.
- One pair of Mode Select DIP switches used to configure the port processor and software.
- Bus LEDs that provide transmit, receive, and bus traffic status.
- Seven-segment LED display that provides a current operational status.
- Extractor lever which simplifies removing a port processor from a chassis.

CID15H/CID15H-A

The CID15H port processor (Part #030003-002) is designed to process most legacy applications up to 56Kbps. The CID15H is capable of RS232 (DCE/DTE) or V.35 (DTE). The CID15H-A port processor is only capable of V.35 (DCE). Figure 3-3 illustrates the block diagram for the CID15H port processor.

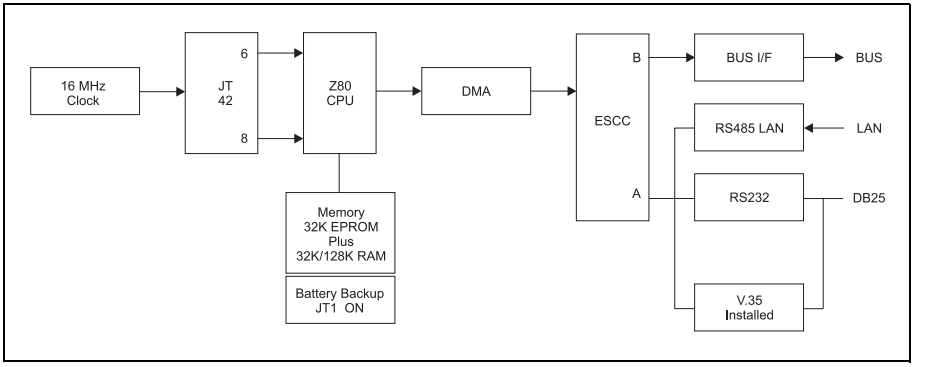

Figure 3-3 CID15H Block Diagram

Figure 3-4 illustrates the block diagram for the CID15H-A port processor.

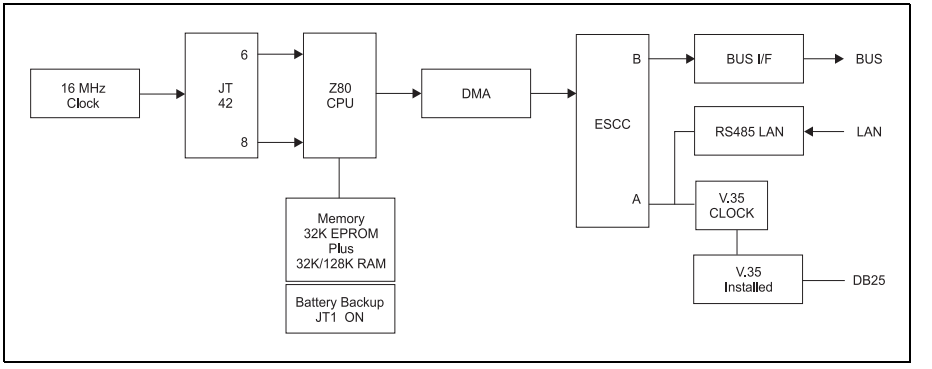

Figure 3-4 CID15H-A Block Diagram

Note: *The optional DES01 encryption and DLZ01 compression modules may be used on the CID15H port processor with software supporting these modules.*

Figure 3-5 illustrates the bus communications for the CID15H/CID15H-A port processor.

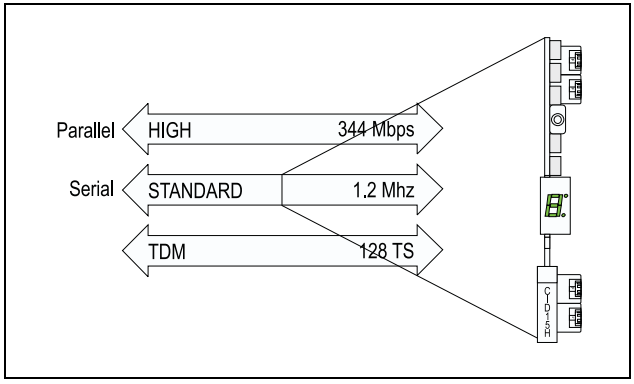

Figure 3-5 CID15H/CID15H-A Bus Communications

Figure 3-6 illustrates the jumper locations on the CID15H/CID15H-A port processor.

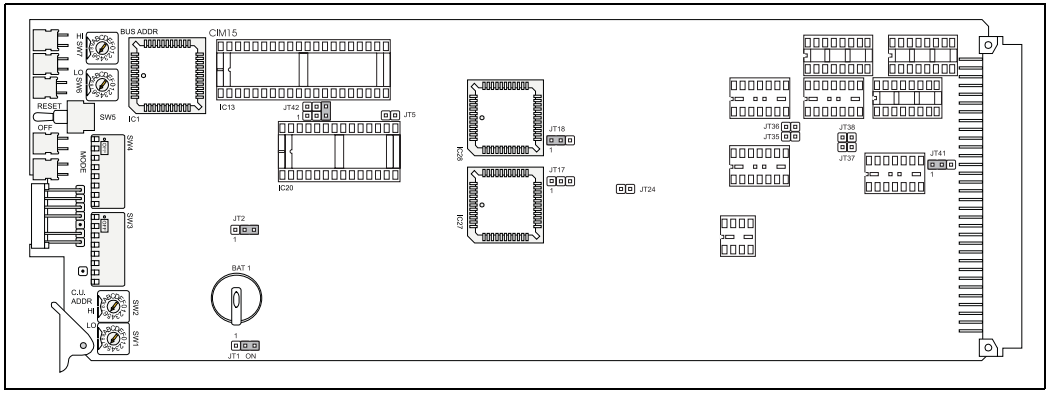

Figure 3-6 CID15H/CID15H-A Jumper Locations

Table 3-1 lists the jumper definitions for the CID15H/CID15H-A port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	Battery On/Off	Battery On: Pins 2 & 3 connected.
JT2	CPU Clock 8/16MHz	16MHz: Pins 2 & 3 connected.
JT5	Memory paging 16/32	Do not connect.
JT17	Modem Output SCC1A/ SCC2A	Do not connect.
JT18	Modem Monitor Normal/On	Normal: Pins 1 & 2 connected.
JT24	Page Memory Enabled/Disabled	Do not connect.
JT35	NAC1A	Do not connect.
JT36	NAC1A	Do not connect.
JT37	NAC1A	Do not connect.
JT38	NAC1A	Do not connect.
JT41	Modem Monitor Normal/On	Normal: Pins 1 & 2 connected.
JT42	ESCC Clock Speed 8/16/19MHz	19MHz: Pins 5 & 6 connected.

Table 3-1 CID15H/CID15H-A Jumper Definitions

CID61

The CID61 port processor (Part # (Part #030005-006) is designed to function as a high-speed WAN or legacy interface port processor, and TDM buses. The CID61 port processor is capable of a single V.35 or three RS232 ports. An optional DSU module may be added to the CID61 port processor to perform a 56/64Kbps DDS WAN connection. The CID61's access to the four TDM buses has various uses, the most common being a combination with a DTC11 port processor for an FT1/T1 interface to the WAN. The CID61 port processor also acts a carrier for the DVF18 voice compression module for packetized voice. Other uses include subrate or channelized legacy protocol termination and clear channel muxing of applications such as video.

A typical application would be the CID61 port processor configured as a Frame Relay WAN port receiving LAN data from the high-speed bus, and legacy data from the standard bus. The CID61 port processor places the data in a frame relay packet and transmits the packet over the TDM bus to the DTC11/T1 port processor located within the same chassis.

Note: *The RS232 and V.35 formats use the same DB25 port on the IEN 2000, IEN 3000, IEN 4000, and IEN 5000 chassis, and are selected by jumpers JT11-20. RS232 or V.35 must also be properly selected in the IENView port configuration.*

Figure 3-7 illustrates the bus communications for the CID61 port processor.

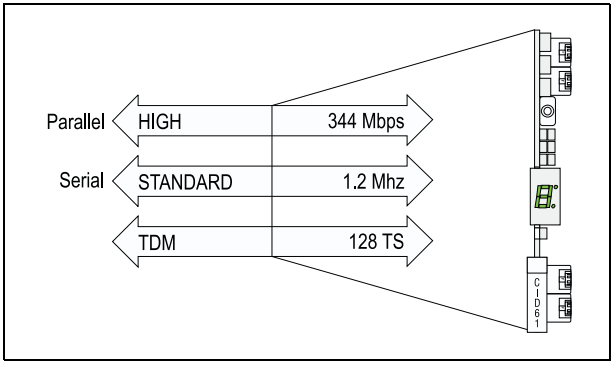

Figure 3-7 CID61 Bus Communications

Figure 3-8 illustrates the block diagram for the CID61 port processor.

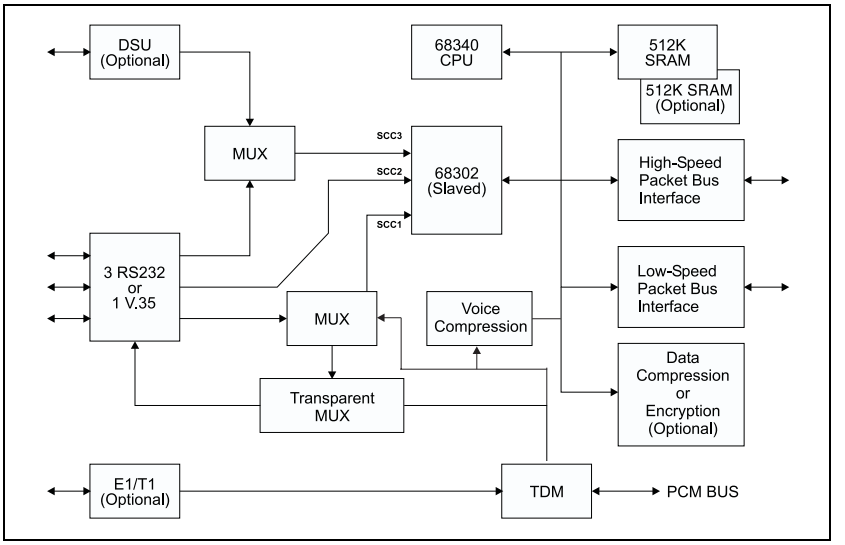

Figure 3-8 CID61 Block Diagram

Figure 3-9 illustrates the jumper locations for the CID61 port processor.

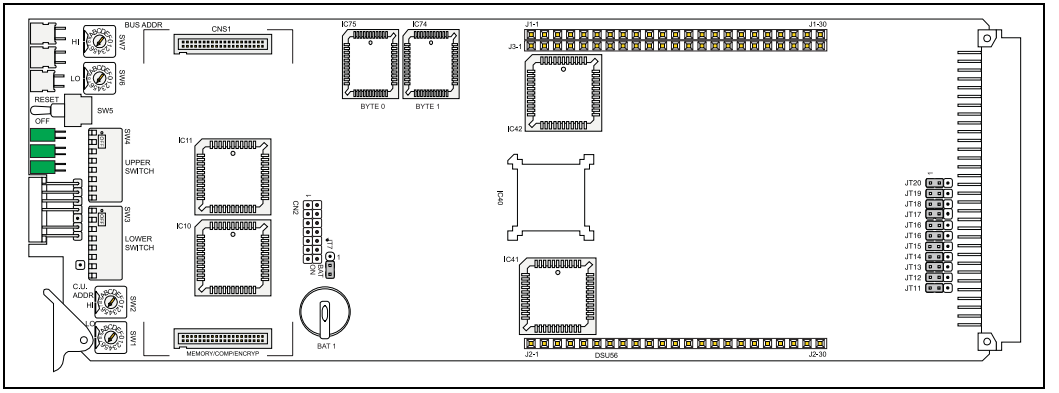

Figure 3-9 CID61 Jumper Locations

Table 3-2 lists the jumper definitions for the CID61 port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT7	Battery On/Off	Battery On: Pins 2 & 3 connected.
JT11-JT20	V.35/RS232	Left = V.35/Right = RS232.

Table 3-2 CID61 Jumper Definitions

CID61-Dual

The CID61-Dual port processor (Part #030005-005) is a special purpose that strictly provides two V.35 DTE interfaces for a dual WAN link between two IEN nodes. The V.35 ports are most commonly attached to external DSUs or ports of a T1 MUX, both links would be attached to another CID61-Dual port processor in another IEN chassis. The dual link provides aggregate bandwidth, and in the event of a failure of one link, the dual link routes all traffic over the remaining link. Each V.35 port may be clocked up to 2Mbps.

A typical application would be the use of the CID61-Dual port processor to provide a dual link connection between a central and regional IEN node.

Notes:

1. *The jumper JT11-20 must be in the left position.*
2. *The CID61-Dual port processor requires a type 2VE cable which attaches to the DB25 connector of the appropriate IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis port. The 2VE cable contains two female DB25 connectors which allow two types of V or VF cables to be attached. The purpose of the 2VE cable is to break out the two ports of the CID61-Dual port processor. The V or VF provide the V.35 Winchester connector which is required by most V.35 devices. Refer to Chapter 4, Type V for more information about Type V and VF connections.*
3. *The CID61 and CID61-Dual port processors are identical except for a port processor that is attached to the face of the dual port processor.*

Figure 3-10 illustrates the CID61-Dual port processor with a CDV01 module.

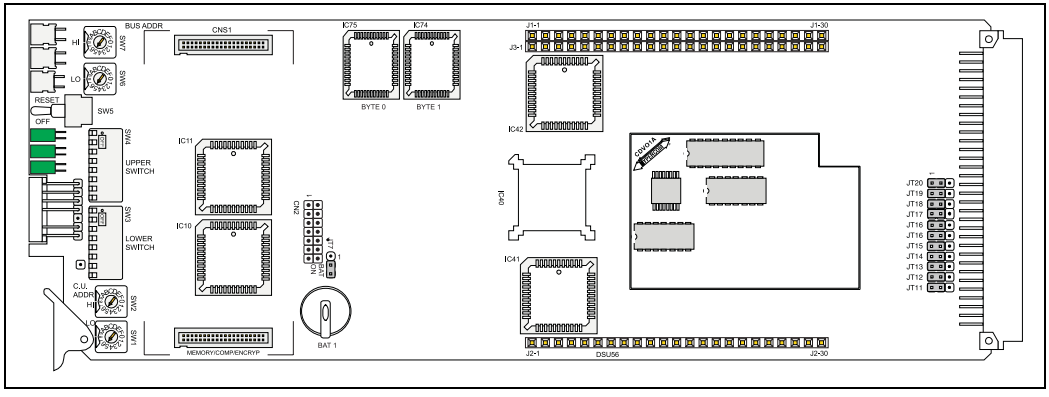

Figure 3-10 CID61-Dual Card

CID63

The CID63 port processor (Part #030146-001) is designed to function as a low-cost WAN or legacy interface port processor, and has access to the high-speed, standard and TDM bus. The CID63 port processor contains two multipurpose sockets that are for modules that provide various combined functions. For example, the CID63 port processor can support two V.35s (using CIV01 modules), two RS232s (using CIR01 modules) or one V.35 and one RS232 interface. The CID63 port processor can accommodate additional modules, including:

- A DSU63 for DSU interface at either 56Kbps or 64Kbps
- An HDM14 or HDM28 analog modem for dial backup at either 14.4Kbps or 28.8Kbps
- An HDM24 analog modem for dial POS at 24Kbps
- A PCM14 or PCM28 TDM modem for dial backup at either 14.4Kbps or 28.8Kbps.
- A PCM24 TDM modem for dial POS at 24Kbps
- An ISD01-U (U interface), ISD01-ST (ST interface), or ISDN BRI interface if ISDN backup is required

Note: *The RS232 and V.35 connections on the CID63 port processor are made through the female DB25 connector on the rear of the chassis using a Type Y(63) cable. The end device connections are brought to two DB25 female connectors at the end of the Type Y(63) cable. Optional crossover or DB25 to V.35 connector cables are available for connections to customer equipment. Two, 2-wire or one, 4-wire and one, 2-wire line connections to a single CID63 port processor require a Type T(63) cable which provides two female RJ11 connectors with one, 4-wire (Port 1) and one, 2-wire (Port 2). The Type T(63) plugs into the female RJ11 line connection on the rear of the chassis.*

Typical CID63 port processor configurations include:

- Dual SDLC interface providing two RS232 or two V.35 connections to the SDLC controllers
- Dual V.35 interface ports
- Single V.35 interface port
- One V.35 interface port and one RS232 interface port
- One DBU modem and one RS232 interface port with encryption and compression
- Two DBU modems with encryption and compression

Figure 3-11 illustrates the bus communications for the CID63 port processor.

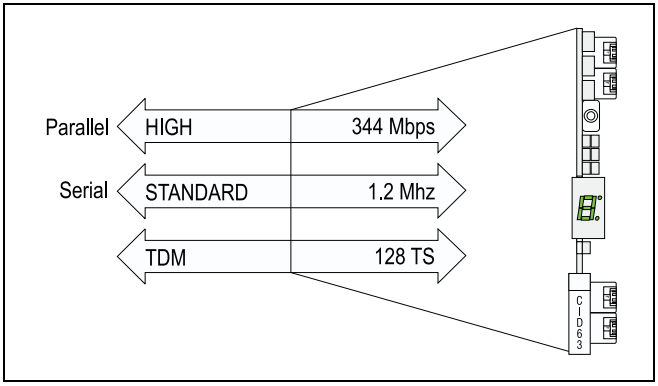

Figure 3-11 CID63 Bus Communications

Figure 3-12 illustrates the jumper and expansion module connections on the component side of the CID63 port processor.

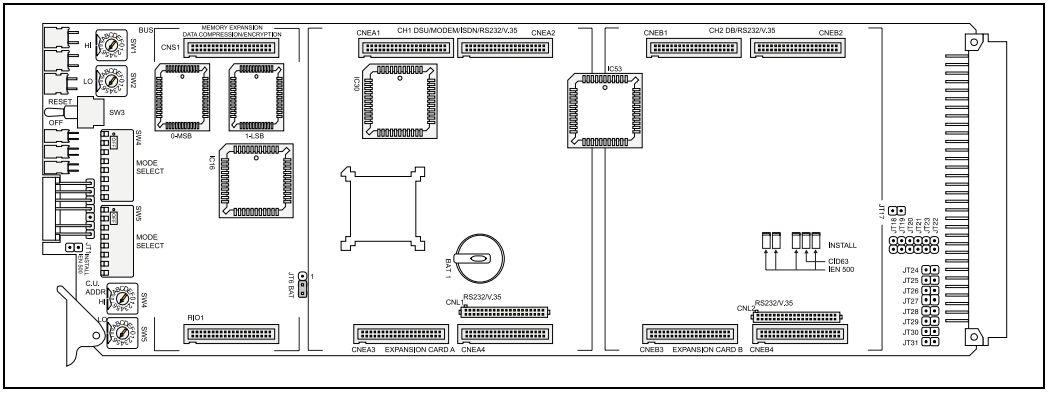

Figure 3-12 CID63 Jumper Locations

Figure 3-13 illustrates the block diagram for the CID63 port processor.

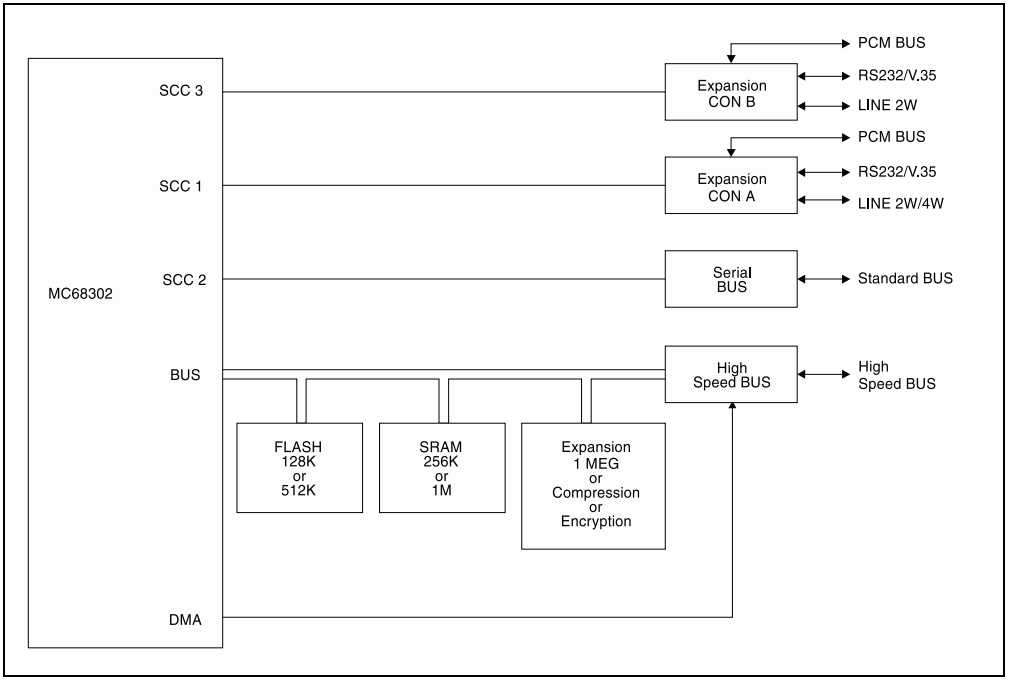

Figure 3-13 CID63 Block Diagram

Table 3-3 lists the jumper definitions for the CID63 port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	IEN 500/CID63 Mode	Not Installed: CID63 - Open, IEN 500 - Closed
JT2	N/A	N/A
JT3	N/A	N/A
JT4	N/A	N/A
JT5	N/A	N/A
JT6	Battery ON/OFF	Battery On: Pins 2 & 3 connected
JT7	N/A	N/A
JT9	N/A	N/A
JT10	N/A	N/A
JT12	N/A	N/A
JT13	N/A	N/A
JT14	Board ID	Pins 1 & 2 open
JT15	N/A	N/A
JT16	Board ID	Pins 1 & 2 open
JT17	Chassis Ground	Not Installed: CID63 - Open, IEN 500 - Closed
JT18	Second 2-wire Telco line	Not Installed: CID63 - Closed, IEN 500 - Closed
JT19	Second 2-wire Telco line	Not Installed: CID63 - Closed, IEN 500 - Closed
JT20	Second 2-wire Telco line	Not Installed: CID63 - Open, IEN 500 - Closed
JT21	Second 2-wire Telco line	Not Installed: CID63 - Open, IEN 500 - Closed
JT22	Telco Ground	Installed: CID63 - Closed, IEN 500 - Open
JT23	Chassis Ground	Not Installed
JT24	Telco Ground to Chassis Ground	Not Installed: CID63 - Closed, IEN 500 - Closed
JT25	Second 2-wire Telco line	Not Installed: CID63 - Open, IEN 500 - Closed
JT26	First Telco line connected to RJ11	Not Installed: CID63 - Closed, IEN 500 - Closed
JT27	First Telco line connected to RJ11	Not Installed: CID63 - Closed, IEN 500 - Closed
JT28	First Telco line connected to RJ11	Not Installed: CID63 - Closed, IEN 500 - Closed
JT29	Second Telco line connected to RJ11	Installed: CID63 - Closed, IEN 500 - Closed
JT30	First Telco line connected to RJ11	Installed: CID63 - Closed, IEN 500 - Closed
JT31	Second Telco Ground to Chassis Ground	Installed: CID63 - Closed, IEN 500 - Closed
JT32	N/A	N/A
JT33	N/A	N/A
JT34	N/A	N/A
JT35	N/A	N/A

Table 3-3 CID63 Jumper Definitions

CIM15H-33

The CIM15H-33 port processor (Part #030003-012) uses the same foundation as the CID15H port processor, but adds a V.32bis modem and supporting circuitry for use as a dial backup module. In addition to the 14.4 dial backup, the CIM15H-33 port processor is capable of all functions performed by the CID15H port processor. The addition of the DLZ01 compression module can normally achieve near 56K throughput.

The CIM15H port processor can be used in a central or remote IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis, and is also can be used to communicate with the dial backup used in the IEN 1000 chassis.

Figure 3-14 illustrates the bus communications for the CIM15H-33 port processor.

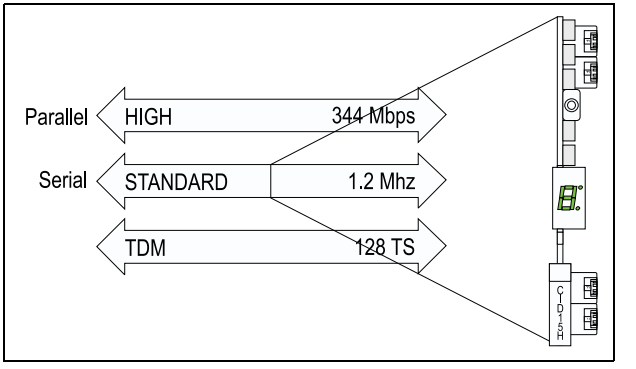

Figure 3-14 CIM15H-33 Bus Communications

Figure 3-15 illustrates the block diagram for the CIM15-33 port processor.

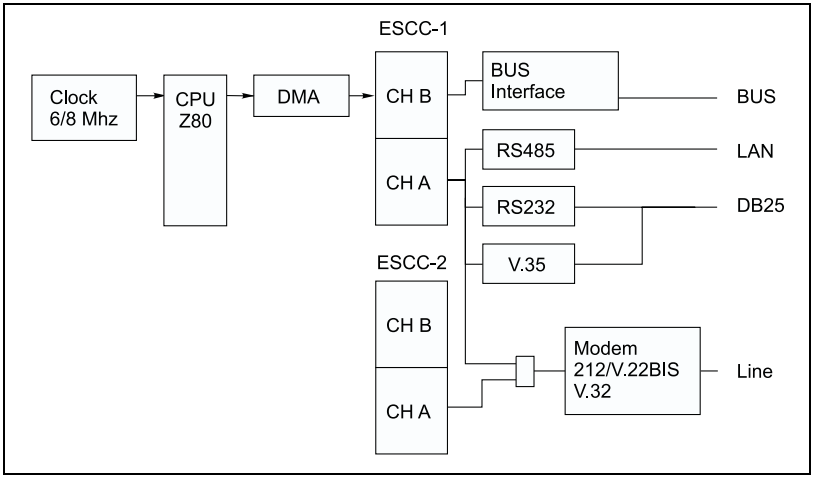

Figure 3-15 CIM15-33 Block Diagram

Figure 3-16 illustrates the jumper locations for the CIM15H-33 port processor.

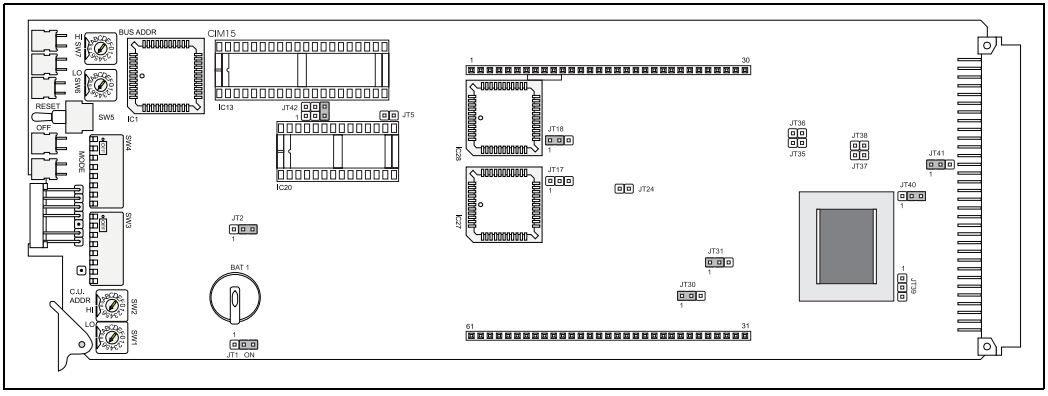

Figure 3-16 CIM15H-33 Jumper Locations

Table 3-4 lists the jumper definitions for the CIM15H-33 port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	Battery On/Off	Battery On: Pins 2 & 3 connected.
JT2	CPU Clock 8/16MHz	16MHz: Pins 2 & 3 connected.
JT5		Do not connect.
JT17		Do not connect.
JT18	Modem Monitor Normal/On	Normal: Pins 1 & 2 connected.
JT24		Do not connect.
JT30	Modem Equalization On/Off	Equalization Off: Pins 1 & 2 connected.
JT31	TX -9dbm/TX -2dbm	TX -9dbm: Pins 2 & 3 connected.
JT35		Do not connect.
JT36		Do not connect.
JT37		Do not connect.
JT38		Do not connect.
JT39		Do not connect.
JT40	Ring Detect Loop/Ground Start	Loop Start: Pins 2 & 3 connected.
JT41	Modem Monitor Normal/On	Normal: Pins 1 & 2 connected.
JT42	ESCC Clock Speed 8/16/19MHz	19MHz: Pins 5 & 6 connected.

Table 3-4 CIM15H-33 Jumper Definitions

DLA14

The DLA14 port processor (Part #030042-002) is a voice interface port processor capable of supporting two, 4-wire or four, 2-wire analog voice circuits. The DLA14 port processor is used to convert each analog voice channel into a 64Kbps DS0 or compressed to 24Kbps using ADPCM. Each channel can then be placed into a time slot (two channels per time slot using ADPCM) on one of the four TDM busses in an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The DLA14 port processor supports PBX, handset and Telco connections using E&M, or loop start signalling. In addition, an optional ring generator may be installed for use with handsets. Figure 3-17 illustrates the bus communications for the DLA14 port processor.

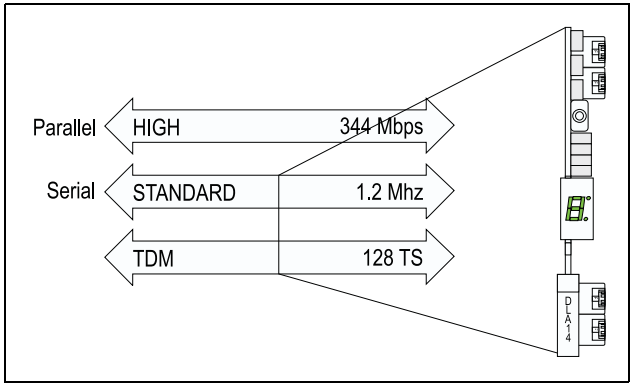

Figure 3-17 DLA14 Bus Communications

Notes:
1. *Compression to 8Kbps packetized voice can be achieved by using a DLA14 port processor, in non-ADPCM mode, and a CID61 port processor with a IDV01 or a DVF08/18 module installed.*
2. *There are two versions of the DLA14 port processor listed in this section. The version indicates a physical change to the port processor.*

WARNING:	The DLA14 port processor can provide 48 volts and receive 48 volts. If DTE devices with non-voice interfaces are plugged into the DLA14 port, severe equipment damage to the DTE device can occur!

Figure 3-18 illustrates the block diagram for the DLA14 port processor.

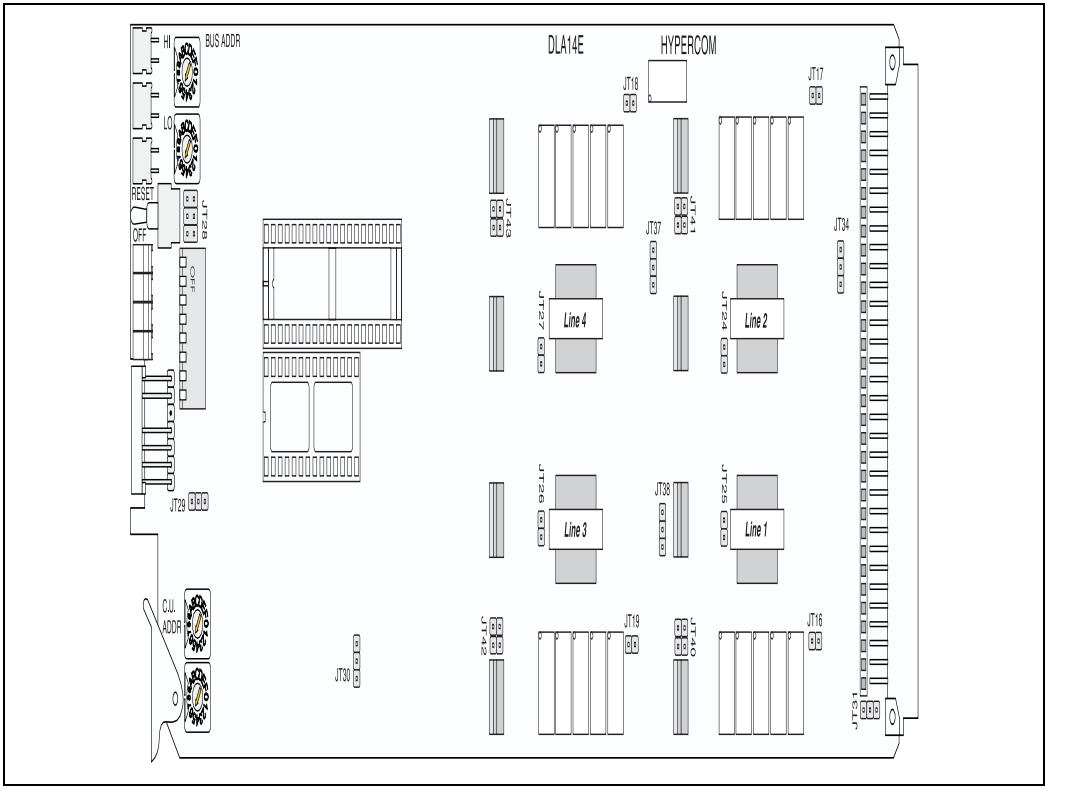

Figure 3-18 DLA14 Block Diagram

Figure 3-19 illustrates the jumper locations for the DLA14 port processor.

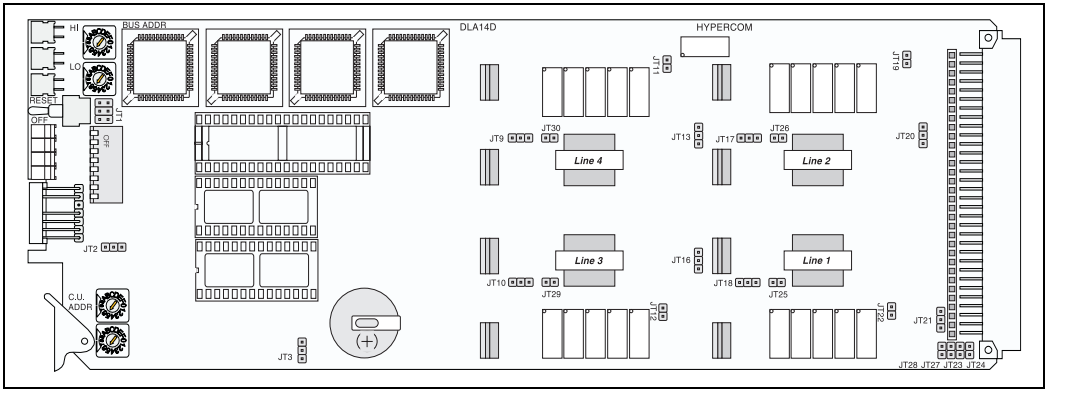

Figure 3-19 DLA14 Jumper Locations

Table 3-5 lists the jumper definitions for the DLA14 (Version D) port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	SCC Clock 8/16/19MHz	19MHz: Pins 5 & 6 connected.
JT2	CPU Clock 8/16MHz	16MHz: Pins 2 & 3 connected.
JT3	Battery Backup On/Off	Battery Backup On: Pins 2 & 3 connected.
JT9	Line 4 M Lead Control System Battery/-48V	Refer to Table 3-6 for the correct jumper settings.
JT10	Line 3 M Lead Control System Battery/-48V	Refer to Table 3-6 for the correct jumper settings.
JT11	Line 4 DC Ring Detect Bypass Enabled/ Disabled	Bypass Enabled: Pins 1 & 2 connected.
JT12	Line 3 DC Ring Detect Bypass Enabled/ Disabled	Bypass Enabled: Pins 1 & 2 connected.
JT13	Line 4 E Lead Control System Battery/-48V	Refer to Table 3-6 for the correct jumper settings.
JT16	Line 3 E Lead Control System Battery/-48V	Refer to Table 3-6 for the correct jumper settings.
JT17	Line 2 DC Ring Detect Bypass Enabled/ Disabled	Bypass Enabled: Pins 1 & 2 connected.
JT18	Line 1 DC Ring Detect Bypass Enabled/ Disabled	Bypass Enabled: Pins 1 & 2 connected.
JT19	Not Used	Not Used
JT20	Line 2 E Lead Control System Battery/-48V	Refer to Table 3-6 for the correct jumper settings.
JT21	Line 1 E Lead Control System Battery/-48V	Refer to Table 3-6 for the correct jumper settings.
JT22	Not Used	Not Used
JT23	Back Plane -48V Enabled/Disabled	-48V Enabled: Pins 1 & 2 connected.
JT24	Back Plane -48V Enabled/Disabled	-48V Enabled: Pins 1 & 2 connected.
JT25	Line 1 System Battery to -48V Enabled/ Disabled	-48V Enabled: Pins 1 & 2 connected.
JT26	Line 2 System Battery to -48V Enabled/ Disabled	-48V Enabled: Pins 1 & 2 connected.
JT27	System Ground to Telco Ground Enabled/ Disabled	Telco Ground Enabled: Pins 1 & 2 connected.
JT28	On Board -48V Enabled/Disabled	-48V Enabled: Pins 1 & 2 connected.
JT29	Line 3 System Battery to -48V Enabled/ Disabled	-48V Enabled: Pins 1 & 2 connected.
JT30	Line 4 System Battery to -48V Enabled/ Disabled	-48V Enabled: Pins 1 & 2 connected.

Table 3-5 DLA14 (Version D) Jumper Definitions

The following jumper definitions are for the DLA14 (Version D) port processor. Table 3-6 lists the jumper definitions for the DLA14 (Version D) port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	SCC Clock 8, 16, 19MHz	19MHz: Pins 5 & 6 connected
JT2	CPU Clock 8, 16MHz	16MHz: Pins 2 & 3 connected
JT3	SRAM Battery Backup ON/OFF	Battery Backup ON: Pins 2 & 3 connected

	E&M					
JUMPER	Type 1 Normal	Type 1 Tandem	Type 2 Normal	Type 2 Tandem	Type 5 Normal	Type 5 Tandem
JT9	_____	2-3	_____	1-2	_____	_____
JT10	_____	2-3	_____	1-2	_____	_____
JT11	(Not Used)	_____	_____	_____	_____	_____
JT12	(Not Used)	_____	_____	_____	_____	_____
JT13	1-2	2-3	_____	2-3	2-3	2-3
JT16	1-2	2-3	_____	2-3	2-3	2-3
JT17	_____	2-3	_____	1-2	_____	_____
JT18	_____	2-3	_____	1-2	_____	_____
JT19	(Not Used)	_____	_____	_____	_____	_____
JT20	1-2	2-3	1-2	2-3	2-3	2-3
JT21	1-2	2-3	1-2	2-3	2-3	2-3
JT22	(Not Used)	_____	_____	_____	_____	_____
JT23	EXT -48V	_____	_____	_____	_____	_____
JT24	EXT -48V	_____	_____	_____	_____	_____
JT25	_____	_____	1-2	_____	_____	_____
JT26	_____	_____	1-2	_____	_____	_____
JT27	1-2	1-2	1-2	1-2	1-2	1-2
JT28	1-2	1-2	1-2	1-2	1-2	1-2
JT29	_____	_____	1-2	_____	_____	_____
JT30	_____	_____	1-2	_____	_____	_____

Table 3-6 DLA14 (Version D) Jumper Definitions

The following jumper information are for the DLA14 (Version F) port processor. Figure 3-20 illustrates the jumper and expansion module locations on the DLA14 (Version F) port processor.

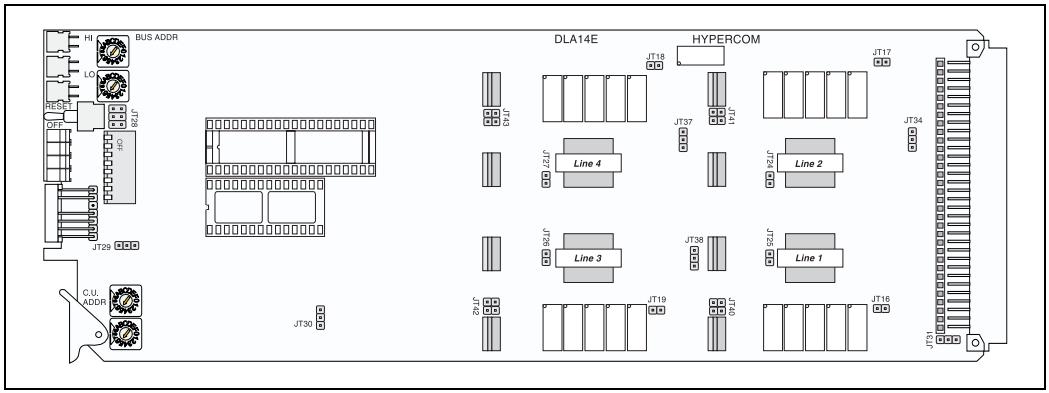

Figure 3-20 DLA14 (Version F) Jumper Locations

Table 3-7 lists the jumper definitions for the DLA14 (Version F) port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT30	SRAM Battery Backup ON/OFF	Battery Backup ON: Pins 2 & 3 connected
JT24, JT25, JT26, JT27	24V 2-Wire Loop FXO	24V Loop: Pins 1 & 2 connected
	48V 2-Wire Loop FXO Only	48V Loop: Jumpers removed
	If the site provides the Loop current, the choice of 24 or 48V becomes available.	
JT28	SCC Clock 8, 16, 19MHz	19MHz: Pins 5 & 6 connected
JT29	CPU Clock 8, 16MHz	16MHz: Pins 2 & 3 connected

E&M						
JUMPER	**Type 1 Normal**	**Type 1 Tandem**	**Type 2 Normal**	**Type 2 Tandem**	**Type 5 Normal**	**Type 5 Tandem**
JT16	(Not Used)	_____	_____	_____	_____	_____
JT17	(Not Used)	_____	_____	_____	_____	_____
JT18	(Not Used)	_____	_____	_____	_____	_____
JT19	(Not Used)	_____	_____	_____	_____	_____
JT31	1-2	2-3	1-2	2-3	2-3	2-3
JT34	1-2	2-3	1-2	2-3	2-3	2-3
JT37	1-2	2-3	1-2	2-3	2-3	2-3
JT38	1-2	2-3	1-2	2-3	2-3	2-3
JT40	_____	3-4	1-3	1-2	_____	_____
JT41	_____	3-4	1-3	1-2	_____	_____
JT42	_____	3-4	1-3	1-2	_____	_____
JT43	_____	3-4	1-3	1-2	_____	_____

Table 3-7 DLA14 (Version F) Jumper Definitions

DSX11

The DSX11 port processor (Part #030012-001) is a single CPU that interfaces with a DSX-1 T1 line to the node PCM bus. The DSX11 port processor contains all circuitry necessary to convert the 4-wire, self-clocked AMI T1 signal to the synchronous TDM PCM highway. The DSX11 port processor contains a high-performance Digital Phase Locked Loop (DPLL) that synchronizes the internal 2.04 and 4.08 MHz PCM highway clocks to the incoming T1 signal.

The reverse is true when the DSX11 port processor is used to provide master clocking. That is, the T1 transmit clock is locked to the PCM highway clock. In addition, the DSX11 port processor contains a 512-channel digital space-time switch used for multiplexing and channel control. The DSX11 port processor supports ISDN PRI when combined with CID61 port processor for D and B channel termination. Figure 3-21 illustrates the bus communications for the DSX11 port processor.

Note: *The DSX11 is a DSX-1 interface and is not intended to be connected to a Telco DEMARC.*

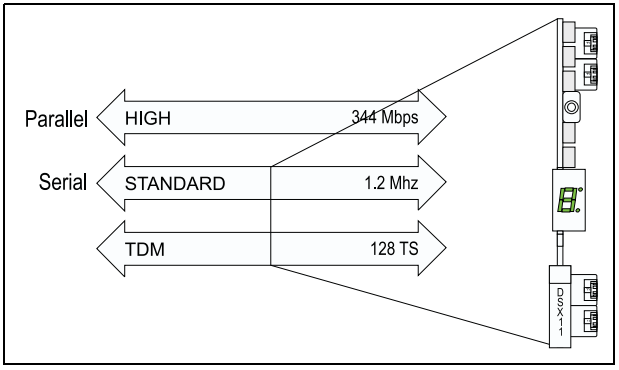

Figure 3-21 DSX11 Bus Communications

Figure 3-22 illustrates the block diagram for the DSX11 port processor.

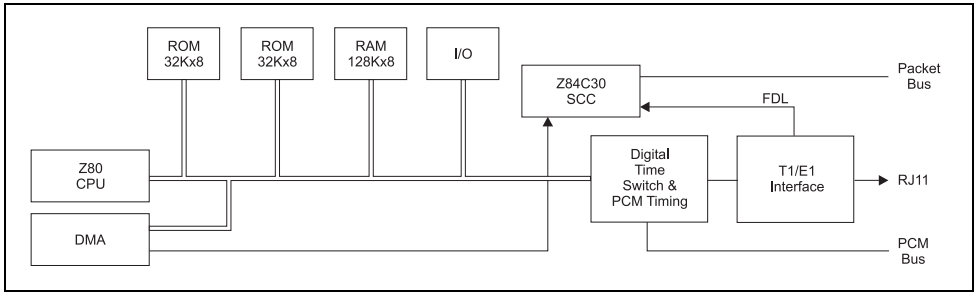

Figure 3-22 DSX11 Block Diagram

Figure 3-23 illustrates the jumper locations for the DSX11 port processor.

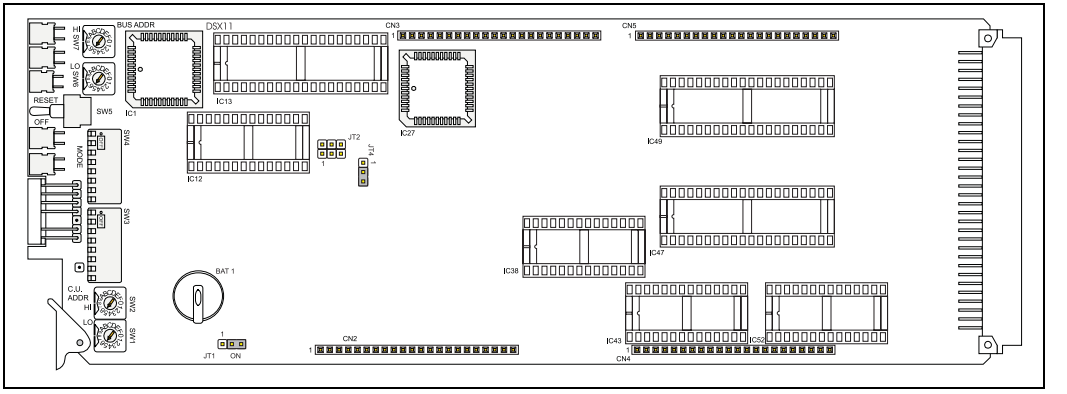

Figure 3-23 DSX11 Jumper Locations

Table 3-8 lists the jumper definitions for the DSX11 port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	Battery On/Off	Battery On: Pins 2 & 3 connected.
JT2	SCC Clock 6/12/19MHz	6MHz: Pins 1 & 2 connected. Do not change setting.
JT3		Do not connect.
JT4	CPU Clock 6/12MHz	6MHz: Pins 1 & 2 connected. Do not change setting.
JT5		Do not connect.

Table 3-8 DSX11 Jumper Definitions

DTC11-E1

The DTC11 port processor (Part #030012-003) is a single CPU that interfaces with a DSX-1 E1 (DTC11-E1 port processor) line to the node PCM bus. The DTC11-E1 port processor contains all circuitry necessary to convert the 4-wire, self-clocked AMI T1 signal to the synchronous TDM PCM highway. The DTC11-E1 port processor contains a high-performance Digital Phase Locked Loop (DPLL) that synchronizes the internal 2.04 and 4.08 MHz PCM highway clocks to the incoming E1 signal.

The reverse is true when the DTC1-E11 port processor is used to provide master clocking. That is, the E1 transmit clock is locked to the PCM highway clock. In addition, the DTC11-E1 port processor contains a 512-channel digital space-time switch used for multiplexing and channel control. The DTC11-E1 port processor supports ISDN PRI when combined with CID61 port processor for D and B channel termination.

DTC11-LHO

The DTC11-LHO port processor (Part #030012-002) is a long haul receiver that is typically designed to fully restore a received signal after transmission though a cable with attenuation of either 0 to 26 dB, or 0 to 36 dB. The smaller range allows for increased noise margin in shorter loop operations. The DTC11-LHO port processor standard features are identical to the DSX11 port processor standard features except for the long haul transceiver receiver capability.

Since there is no DSX-1 reference point in the long haul interface, all pulse amplitudes are referenced at the transmitter output. The long haul transmitter does not have any provision to boost the signal to provide a constant pulse amplitude at the non-existent DSX-1. However, there is a provision to attenuate the output signal in 7.5 dB steps up to 22.5 dB. This attenuation is required by FCC Part 68 Regulations and is required for short line lengths to prevent far-end crosstalk.

Figure 3-24 illustrates the bus communications for the DTC11-LHO/E1 port processor.

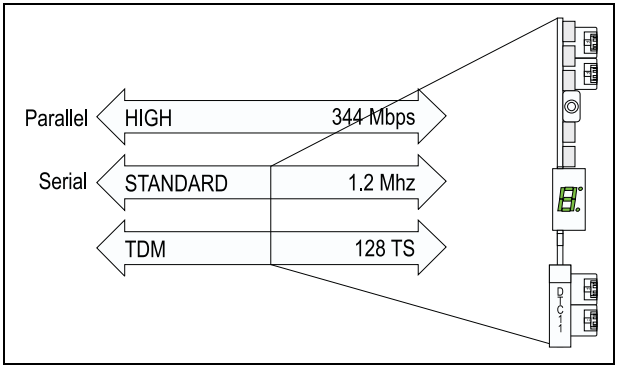

Figure 3-24 DTC11-LHO/E1 Bus Communications

Figure 3-25 illustrates the block diagram for the DTC11-LHO/E1 port processor.

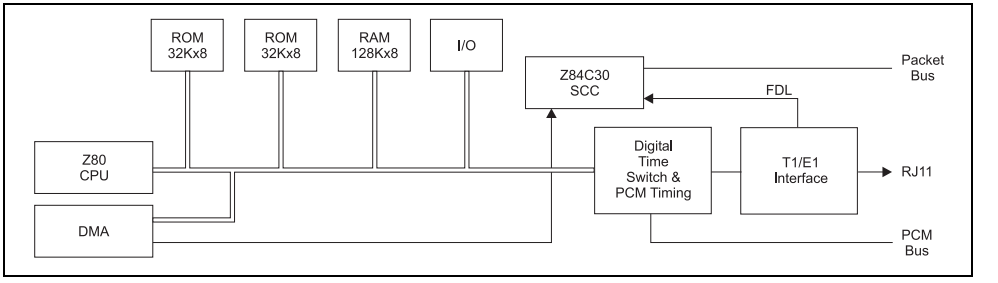

Figure 3-25 DTC11-LHO/E1 Block Diagram

Figure 3-26 illustrates the jumper locations for the DTC11-LHO/E1 port processor.

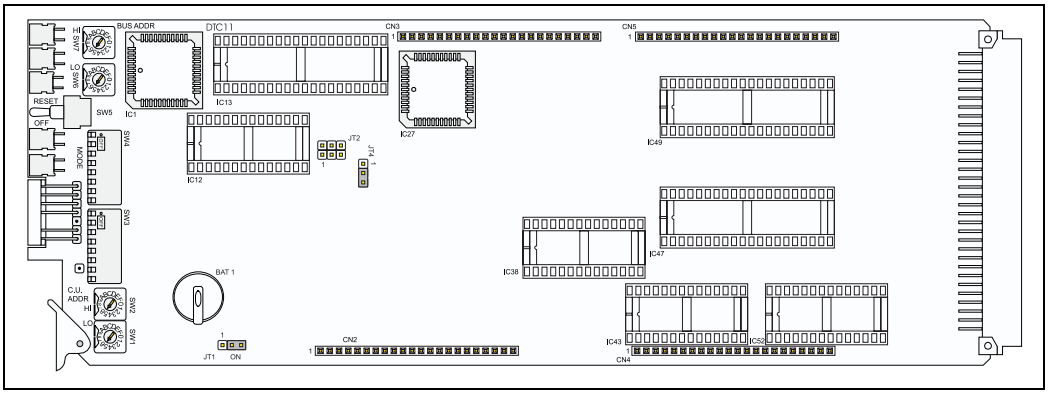

Figure 3-26 DTC11-LHO/E1 Jumper Locations

Table 3-9 lists the jumper definitions for the DTC11-LHO/E1 port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT1	Battery On/Off	Battery On: Pins 2 & 3 connected.
JT2	SCC Clock 6/12/19MHz	6MHz: Pins 1 & 2 connected. Do not change setting.
JT3		Do not connect.
JT4	CPU Clock 6/12MHz	6MHz: Pins 1 & 2 connected. Do not change setting.
JT5		Do not connect.

Table 3-9 DTC11-LHO/E1 Jumper Definitions

LET61

The LET61 port processor (Part #030020-001) is a high performance Ethernet router interface using a Motorola 68340 CPU. The LET61 port processor supports 10Base-T, 10Base-2 (using the LEC01 Thinnet Ethernet adapter), and AUI (using the LAU01 AUI Interface adapter) connections. The LET61 port processor may be used for routing, bridging, and IENView access.

LET61B

The LET61B port processor (Part #030020-004) is a high performance Ethernet interface using a Motorola 68340 CPU. The LET61B port processor is used strictly for IEN bus extension, or as a bus monitor. The LET61B port processor supports 10Base-T, 10Base-2 (using the LEC01 Thinnet Ethernet adapter), and AUI (using the LAU01 AUI Interface adapter) connections.

LET61H

The LET61H port processor (Part #030020-002) is a high performance Ethernet interface with a 1MB memory expansion capability. The LET61H port processor is used for routing, bridging, and IENView access at a central site.

Figure 3-27 illustrates the bus communications for the LET61, LET61B and LET61H port processors.

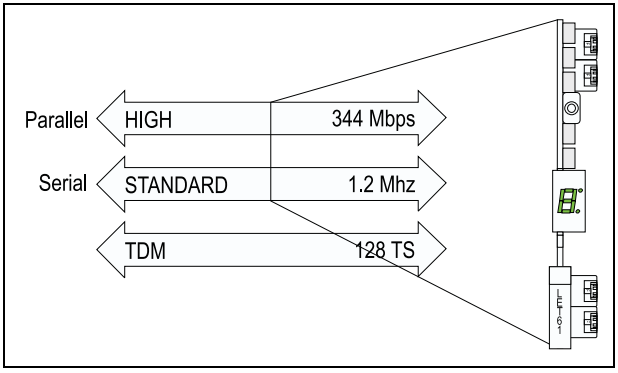

Figure 3-27 LET61, LET61B and LET61H Bus Communications

Figure 3-28 illustrates the block diagram for the LET61, LET61B and LET61H port processor.

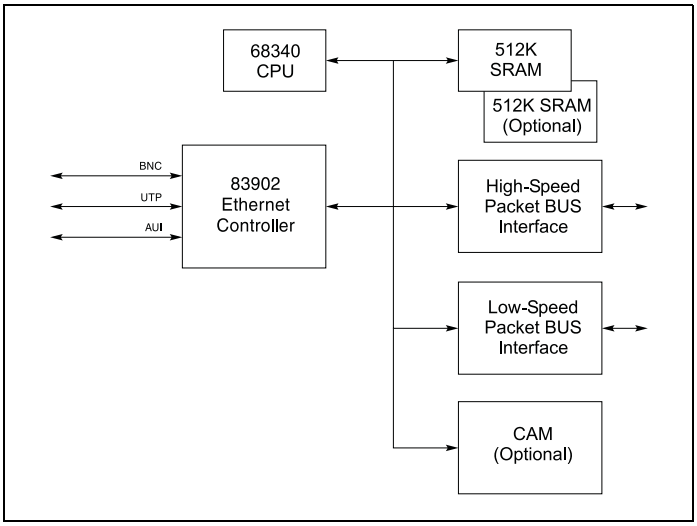

Figure 3-28 LET61, LET61B and LET61H Block Diagram

Figure 3-29 illustrates the jumper location for the LET61, LET61B and LET61H port processors.

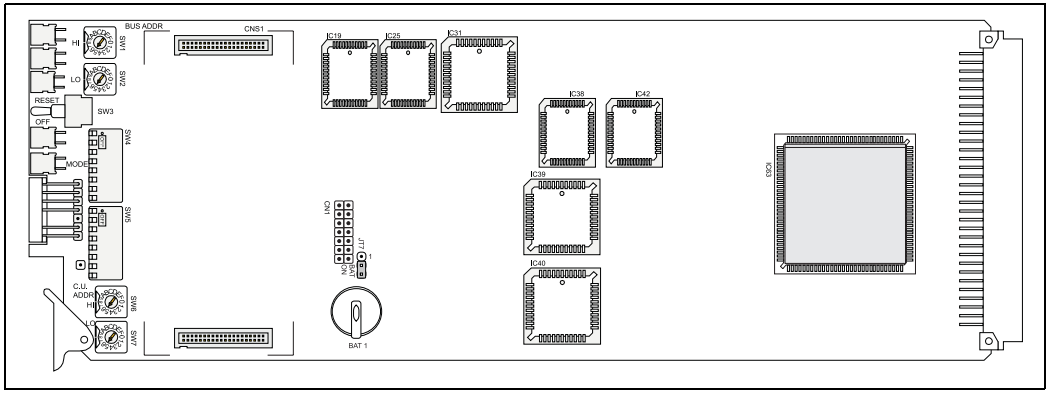

Figure 3-29 LET61, LET61B and LET61H Jumper Locations

Table 3-10 lists the jumper definition for the LET61, LET61B and LET61H port processor.

JUMPER	DESCRIPTION	FACTORY SETTING
JT7	Battery Backup On/Off	Battery On: Pins 2 & 3 connected.

Table 3-10 LET61, LET61B and LET61H Jumper Descriptions

LTR61

The LTR61 port processor (Part #030023-001) is a high performance Token Ring Router interface using a Motorola 68340 CPU. The LTR61 port processor supports STP and UTP connections and 4 to 16 Mbps. The LTR61 port processor may be used for routing, bridging and IENView access.

LTR61B

The LTR61B port processor (Part #030023-004) is a high performance Token Ring interface using a Motorola 68340 CPU. The LTR61B port processor is used strictly for IEN bus extension, or as a bus monitor. The LTR61B port processor supports STP and UTP connections, and 4 to 16Mbps.

LTR61H

The LTR61H port processor (Part #030023-002) is a high performance Ethernet interface with a 1MB memory expansion. The LET61H port processor is used for routing, bridging, and IENView access at a central site.

Figure 3-30 illustrates the bus communications for the LTR61, LTR61B and LTR61H port processors.

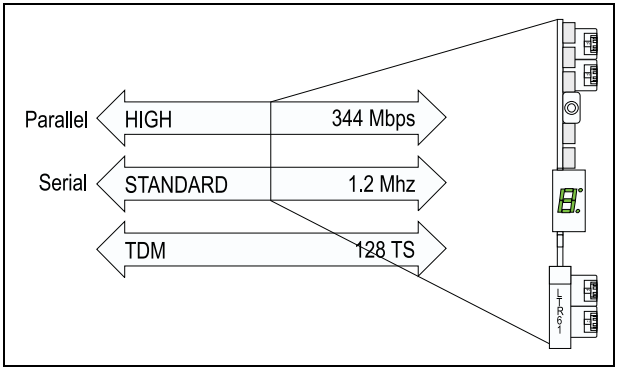

Figure 3-30 LTR61, LTR61B and LTR61H Bus Communications

Figure 3-31 illustrates the block diagram for the LTR61, LTR61B and LTR61H port processors.

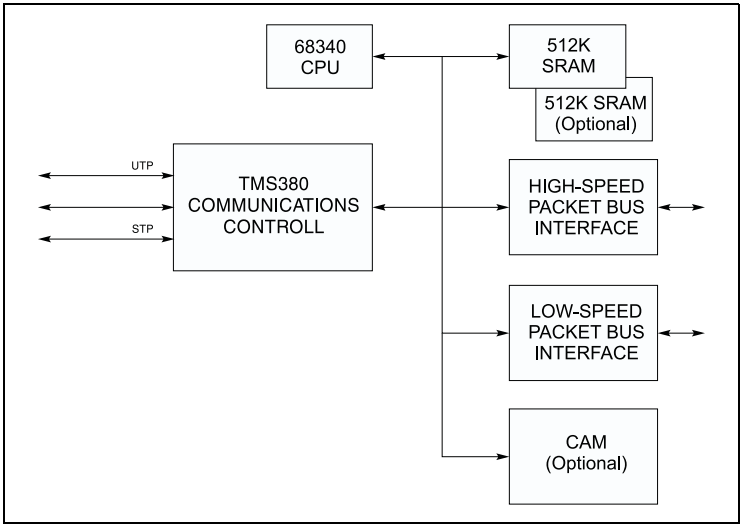

Figure 3-31 LTR61, LTR61B and LTR61H Block Diagram

Figure 3-32 illustrates the jumper locations for the LTR61, LTR61B and LTR61H port processors.

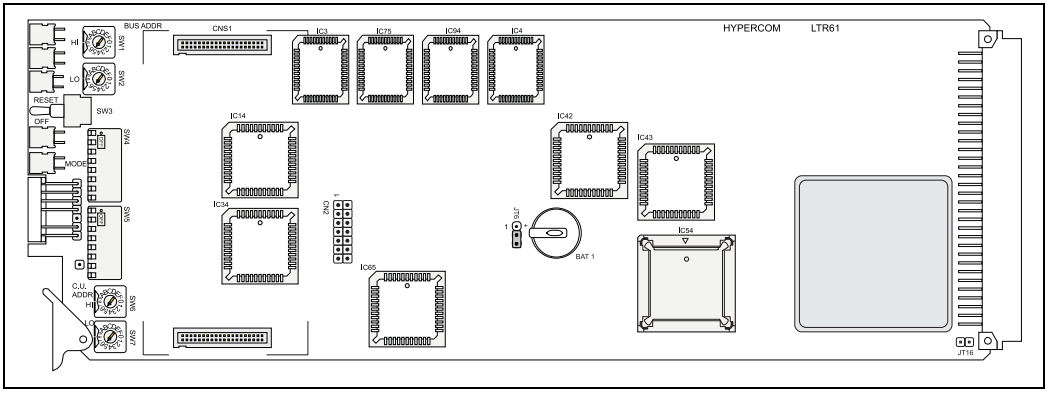

Figure 3-32 LTR61, LTR61B and LTR61H Jumpers

Table 3-11 lists the jumper definitions for the LTR61, LTR61B and LTR61H port processors.

JUMPER	DESCRIPTION	FACTORY SETTING
JT7	Battery Backup On/Off	Battery On: Pins 2 & 3 connected.
JT9	Chassis Ground to TROLI	Do not connect.

Table 3-11 LTR61, LTR61B and LTR61H Jumper Descriptions

MODULES

The modules attach to port processors to support different configurations.

CIR01

The CIR01 module (Part #030149-001) is a single channel plug-in module that provides a single RS232 interface to the CID63 port processor. The CIR01 module plugs into the CNEA2 and CNL1 or CNEB2 and CNL2 sockets on the CID63 port processor. Figure 3-33 illustrates the front and back side of the CIR01 module.

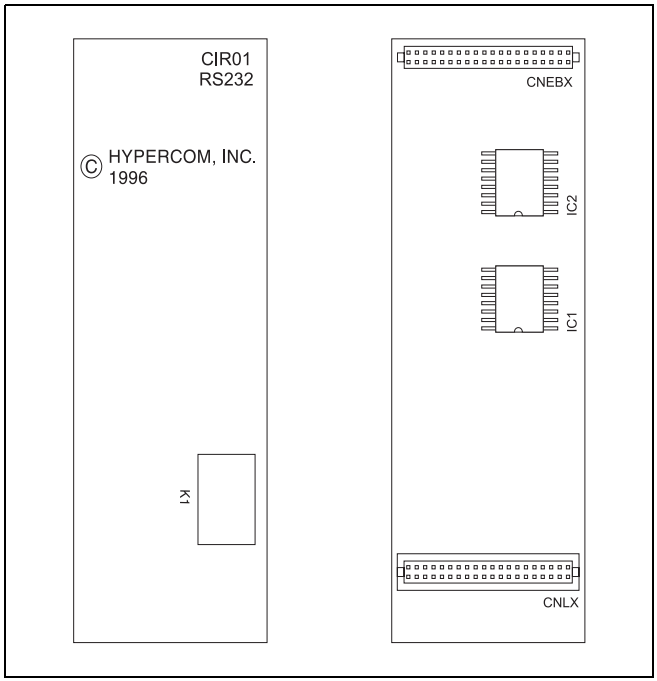

Figure 3-33 CIR01 Module

CIV01

The CIV01 module (Part #030148-001) is a single channel plug-in module that creates a single V.35 interface to the CID63 port processor. The CIV01 module plugs into the CNEA2 and CNL1 or CNEB2 and CNL2 sockets on the CID63 port processor. Figure 3-34 illustrates the front and back side of the CIV01 module.

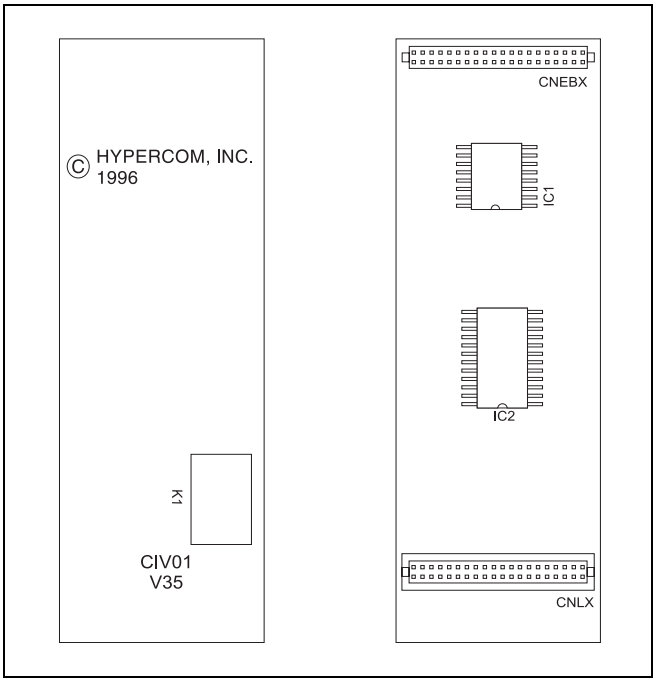

Figure 3-34 CIV01 Module

DES10

The DES10 module (Part #030033-001) is a single channel plug-in module that provides WAN data encryption and compression. The DES10 module plugs into the CNS1 A and B sockets on the CID61 port processor, the CNEA2 and CNL1 or CNEB2 and CNL2 sockets on the CID63 port processor, or CNS2 A and B sockets in the IEN 1000 chassis. Figure 3-35 illustrates the front and back side of the DES10 module.

Figure 3-35 DES10 Module

Note: *The installation of the DES10 module does not enable encryption. The IENView software is required to load the key into the central encryption module.*

DLZ01-C

The DLZ01-C module (Part #030010-001) is a compression module for use with the CID15H, CID15H-A and CIM15H-33 port processors. The compression module replaces the Z80 CPU on the port processor in use. An average 3:1 or 4:1 compression is normal and is frequently used with 14.4 dial backup to achieve near 56K performance. Figure 3-36 illustrates the front and back of the DLZ01-C module.

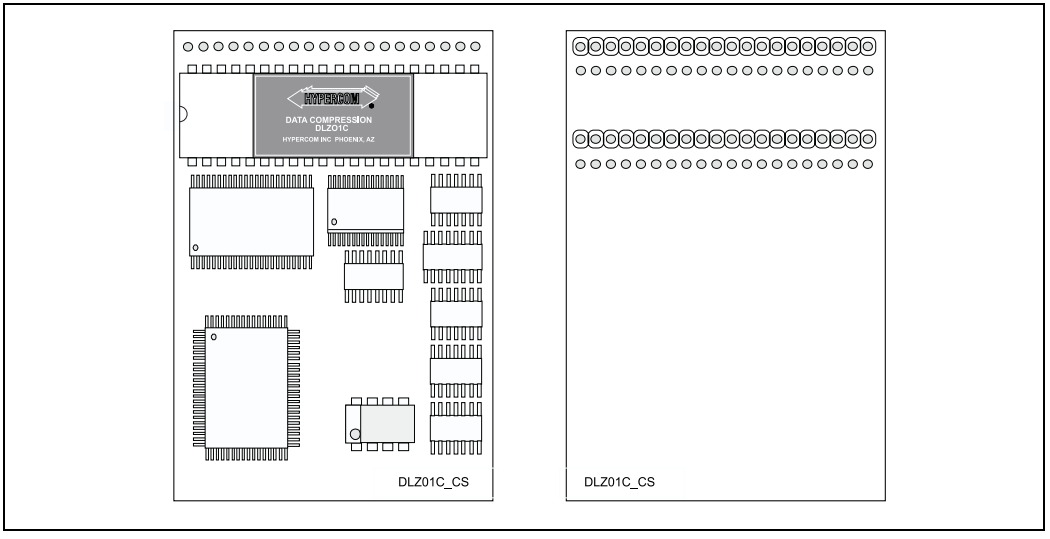

Figure 3-36 DLZ01-C Module

DLZ10

The DLZ10 module (Part #030033-002) is a single plug-in module that provides WAN data compression, and communicates with a CID61 or CID63 port processor, and the IEN 1000 chassis. The DLZ10 module plugs into the CNS1 A and B sockets on the CID61 port processor, the CNEA2 and CNL1 or CNEB2 and CNL2 sockets on the CID63 port processor, or CNS2 A and B sockets in the IEN 1000 chassis. The DLZ10 module averages between 3:1 and 4:1 compression which is dependent on the data being transferred. Figure 3-37 illustrates the front and back side of the DLZ10 module.

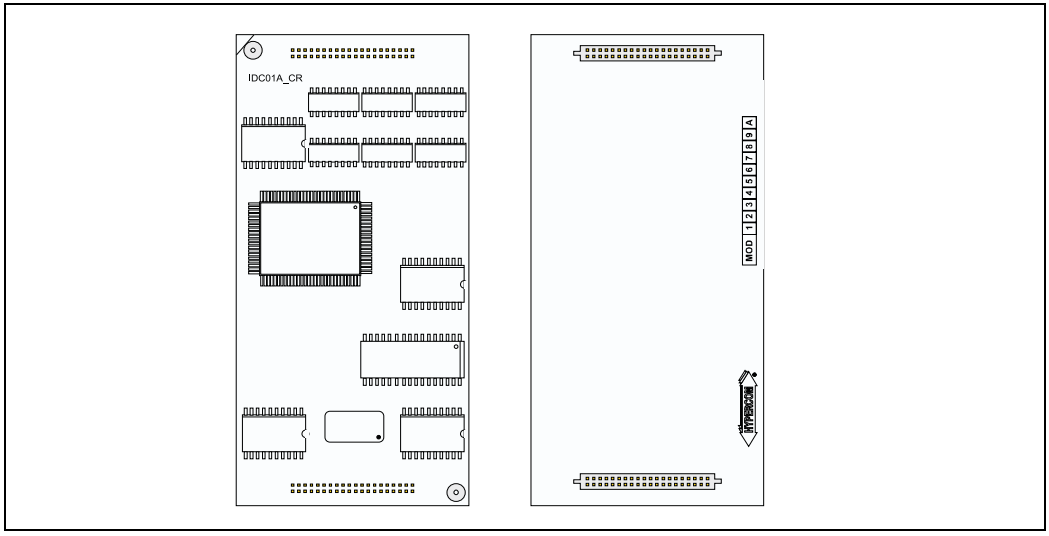

Figure 3-37 DLZ10 Module

DSU63

The DSU63 module (Part #030120-001) provides a DSU interface at either 56Kbps or 64Kbps for the CID63 port processor. The DSU63 module plugs into the Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4 on the CID63 port processor. Figure 3-38 illustrates the front and back side of the DSU63 module.

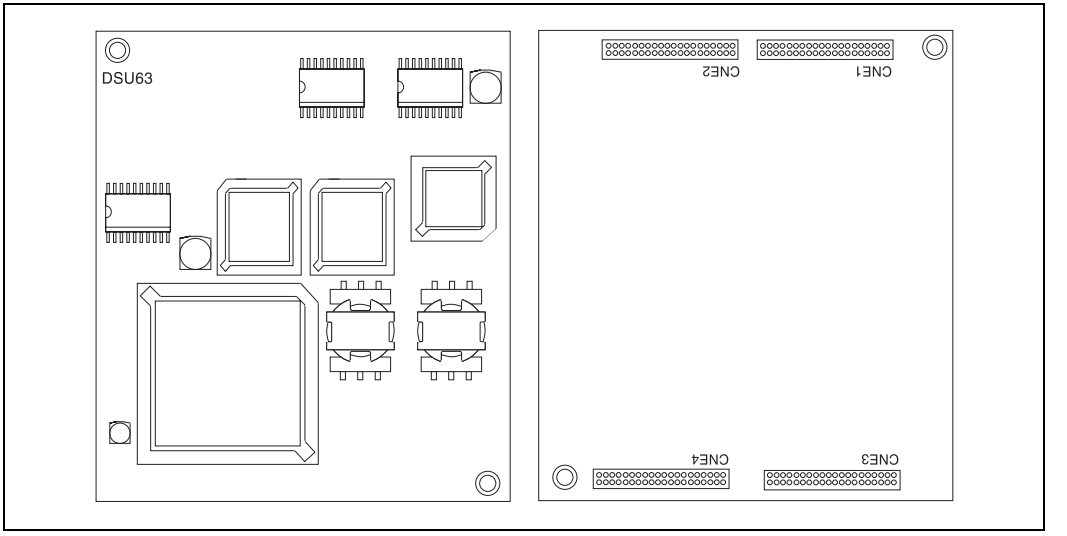

Figure 3-38 DSU63 Module

Note: *The DSU63 module can only be placed on the front mounting location of the CID63 port processor.*

DVF18

The DVF08/18 module is a voice compression module that compresses and packetizes up to eight 64K PCM voice channels to 6.2 or 13.3Kbps data. The compressed voice channels can be transmitted with legacy and LAN data over a WAN connections, such as frame relay. The DVF08/18 module comes in three versions capable of compressing two, four or eight channels:

- DVF08-02 (Part #030182-001) Two voice channels
- DVF08-04 (Part #030182-002) Four voice channels
- DVF08-08 (Part #030182-003) Eight voice channels
- DVF18-02 (Part #TBD) Two voice channels
- DVF18-04 (Part #TBD) Four voice channels
- DVF18-08 (Part #TBD) Eight voice channels

Each version is capable of supporting one fax transmission at a time on any of the voice channels. When a fax transmission is detected on a voice channel, it is shifted to the on-board fax controller for completion. Fax support includes Group 111 up to 9.6Kbps.

The DVF08/18 module is a two, four, or eight channel plug-in that provides voice compression for the CID61 port processor. The DVF08/18 module plugs into the J1, J3, and J2 sockets of the CID61 port processor. In a node requiring only eight voice channels, the DVF08/18 module can be placed on the WAN interface. Configurations requiring more than eight voice channels are configured with each DVF08/18 residing on its own CID61 port processor.

The DVF08/18 uses a vocoder for each channel which is capable of variable data rates using QUALCOMM Codebook Exited Linear Predictive (QCELP) speech coding algorithm. The variable rates are 13.3Kbps or 6.2Kbps which automatically adjusts from 1Kbps to 6.2Kbps or 13.3Kbps. Each vocoder has its own integrated echo canceller which meets CCITT Recommendation G.165.

When planning WAN bandwidth requirements, enough bandwidth should be planned to provide for each channel when active. For example, each channel should have its maximum bandwidth, such as 6.2Kbps, plus 2.0Kbps for routing overhead available. An example would be a site with four voice lines setup to be compressed at 6.2Kbps and their overhead. The requirement would be 4 x lines (6.2Kbps + 2.0Kbps) = 32800bps. In a frame relay environment, the committed information rate (CIR) would require to be greater than the aggregate of the voice channel requirements.

Each DVF08/18 channel is assigned a time slot that communicates with its assigned analog (DLA14) or digital (DSX11) channel. The eight-channel capacity permits the DVF08/18 to support two DLA14 port processors terminating four, 4-wire analog voice or two DLA14s terminating eight, 2-wire analog voice. When used with the DTC11 T1 interface, three DVF08/18/CID61s may be combined to support the 24 DS0s from the T1.

Figure 3-39 illustrates the front of the DVF08/18-2 module.

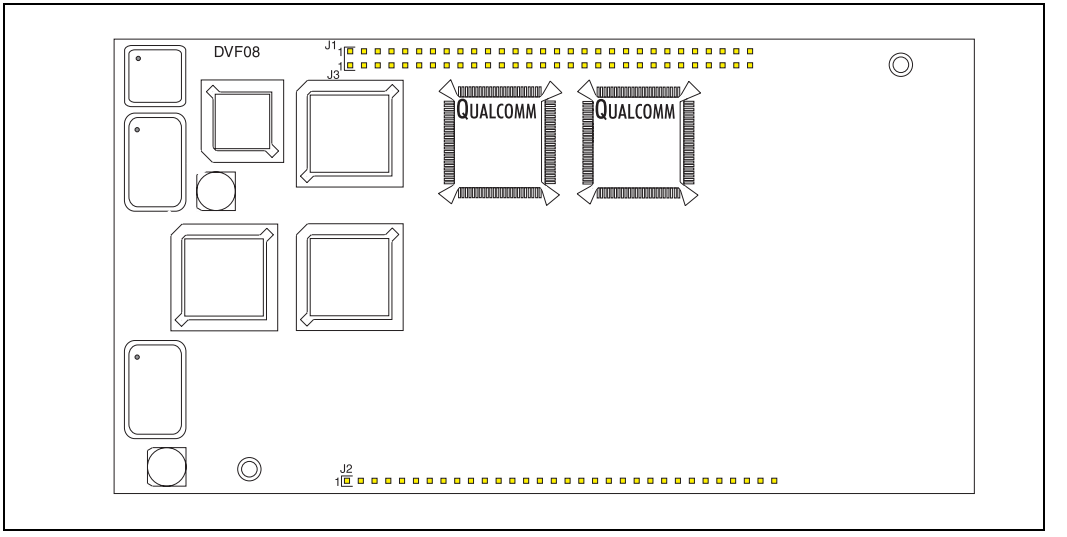

Figure 3-39 DVF08/18-2 Module Front

Figure 3-40 illustrates the front of the DVF08/18-4 module.

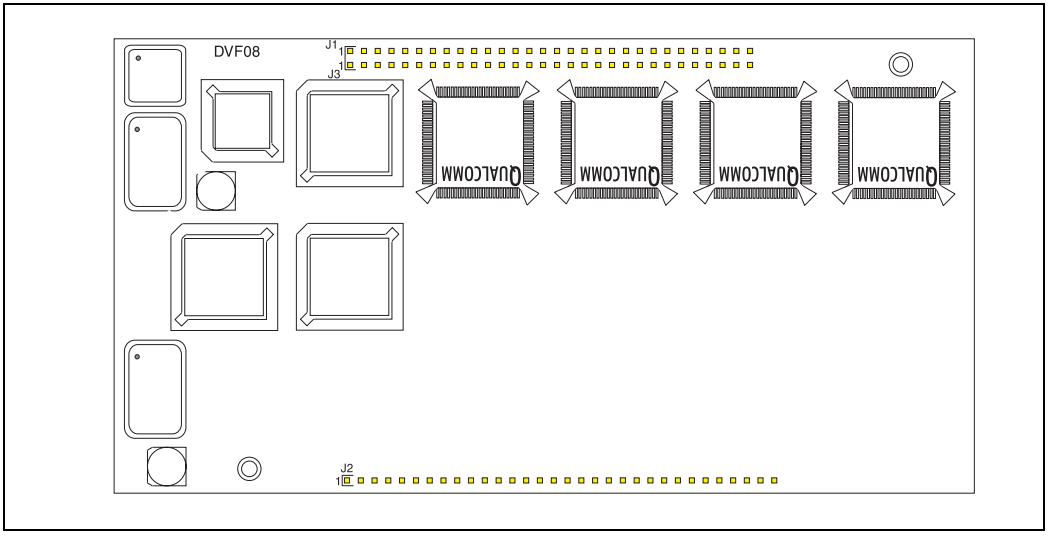

Figure 3-40 DVF08/18-4 Module Front

Figure 3-41 illustrates the front of the DVF08/18-8 module.

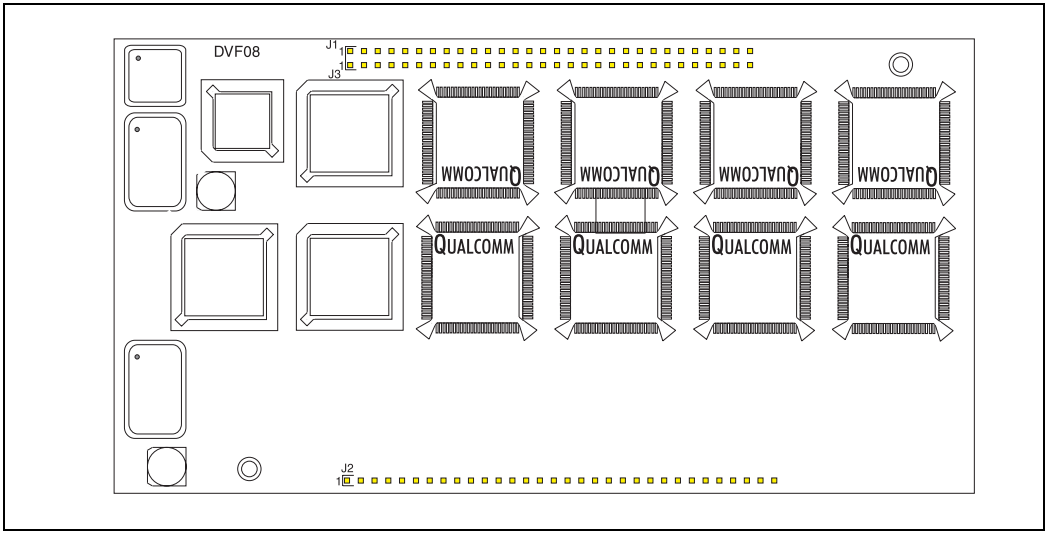

Figure 3-41 DVF08/18-8 Module Front

HDM14

The HDM14 module (Part #030113-001) is a single 14.4Kbps modem that provides an analog line interface to the CID63 port processor. The HDM14 module plugs into the Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4, or Expansion Card B, sockets CNEB1, CNEB2, CNEB3, and CNEB4 on the CID63 port processor. In Expansion A of the CID63, the two or four-wire option is provided. Expansion B is strictly two-wire. Figure 3-42 illustrates the front and back side of the HDM14 module.

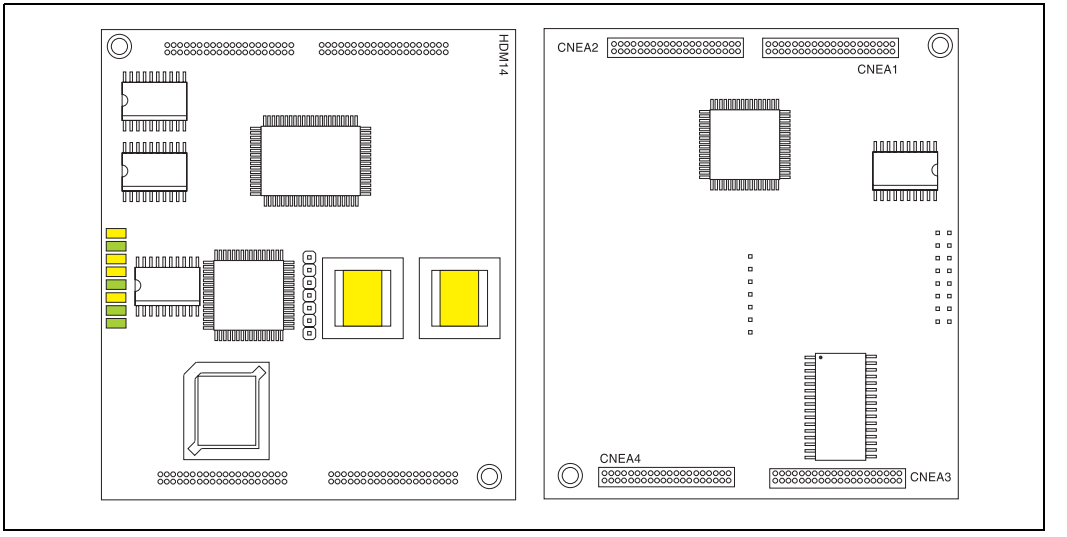

Figure 3-42 HDM14 Module

HDM28

The HDM28 module (Part #030113-002) is a single 28.8Kbps modem with a two-wire analog line interface to the CID63 port processor. The HDM28 module plugs into the Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4, or Expansion Card B, sockets CNEB1, CNEB2, CNEB3, and CNEB4 on the CID63 port processor. In expansion A of the CID63 port processor, the two or four-wire option is provided. Expansion B is strictly two-wire. Figure 3-43 illustrates the front and back side of the HDM28 module.

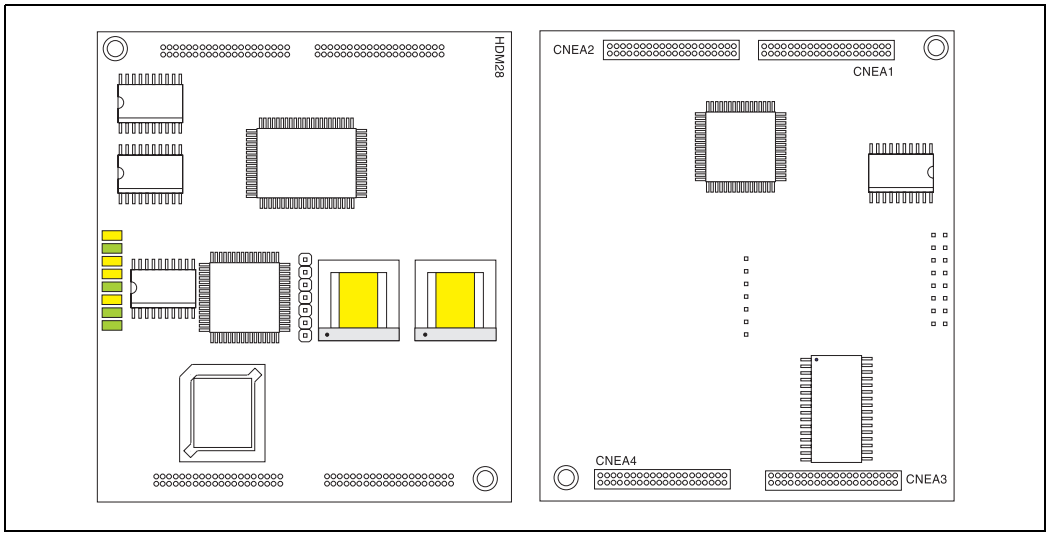

Figure 3-43 HDM28 Module

Note: *There is a physical difference between the HDM14 and the HDM28 module. The HDM28 module has yellow stripes on the transformers and different processor chips.*

ISD01-ST

The ISD01-ST module (Part #030117-001) provides a single ISDN BRI ST interface t0 the CID63 port processor. The ISD01-ST module plugs into the Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4, or Expansion Card B, sockets CNEB1, CNEB2, CNEB3, and CNEB4 on the CID63 port processor. Figure 3-44 illustrates the front and back of the ISD01-ST module.

Note: *The ISD01-ST can only be installed in the first port.*

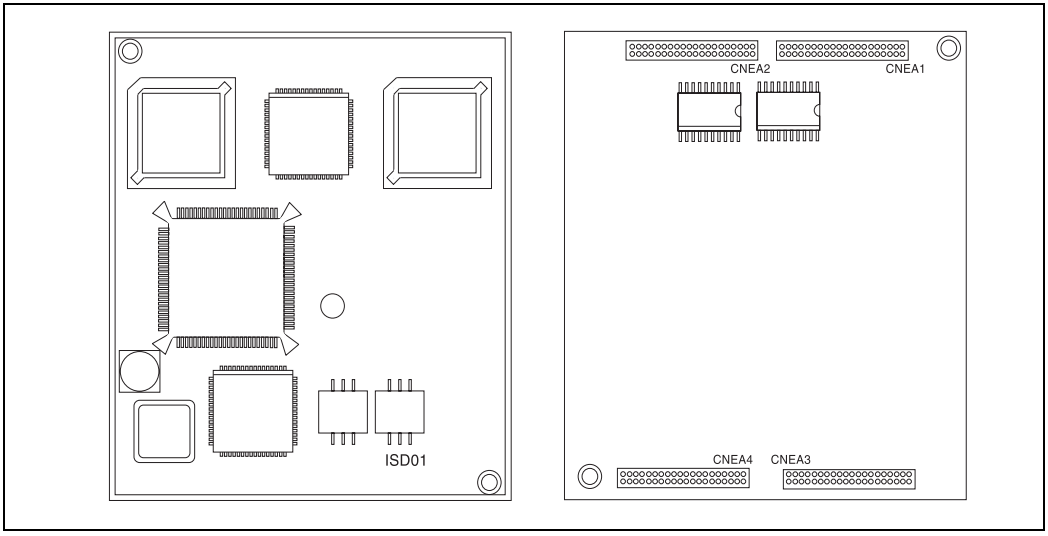

Figure 3-44 ISD01-ST Module

ISD01-U

The ISD01-U module (Part #030117-002) provides a single ISDN BRI U interface to the CID63 port processor. The ISD01-U module plugs into the Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4, or Expansion Card B, sockets CNEB1, CNEB2, CNEB3, and CNEB4 on the CID63 port processor. Figure 3-45 illustrates the front and back side of the ISD01-U module.

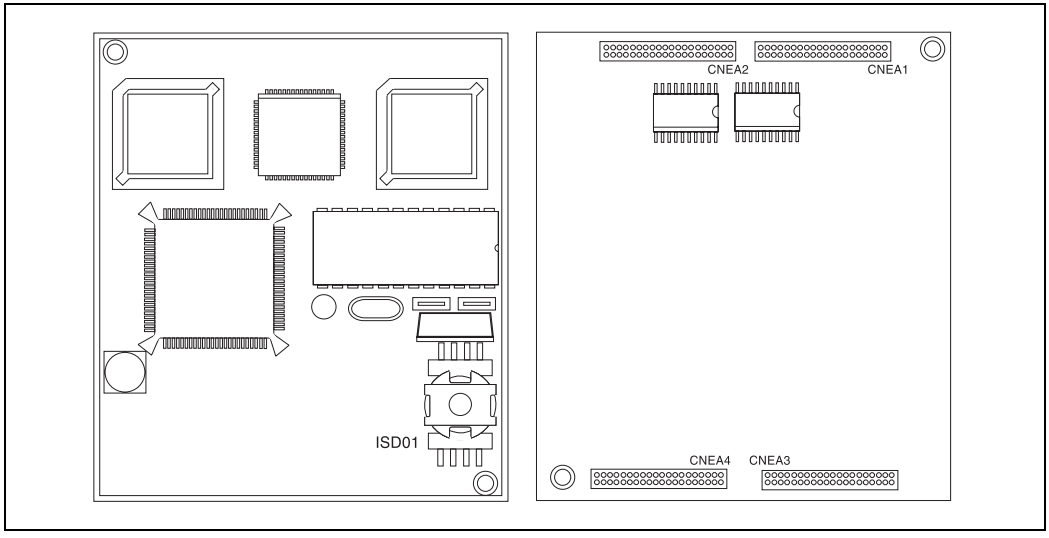

Figure 3-45 ISD01-U Module

PCM14

The PCM14 module (Part #030149-001) is a single 14.4 modem with TDM interface for use with T1 or E1, and is used with the CID63 port processor. The functionality of this module is to provide dial backup. The PCM14 module can be installed in Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4, or Expansion Card B, sockets CNEB1, CNEB2, CNEB3, and CNEB4 on the CID63 port processor. Figure 3-46 illustrates the front and back of the PCM14 module.

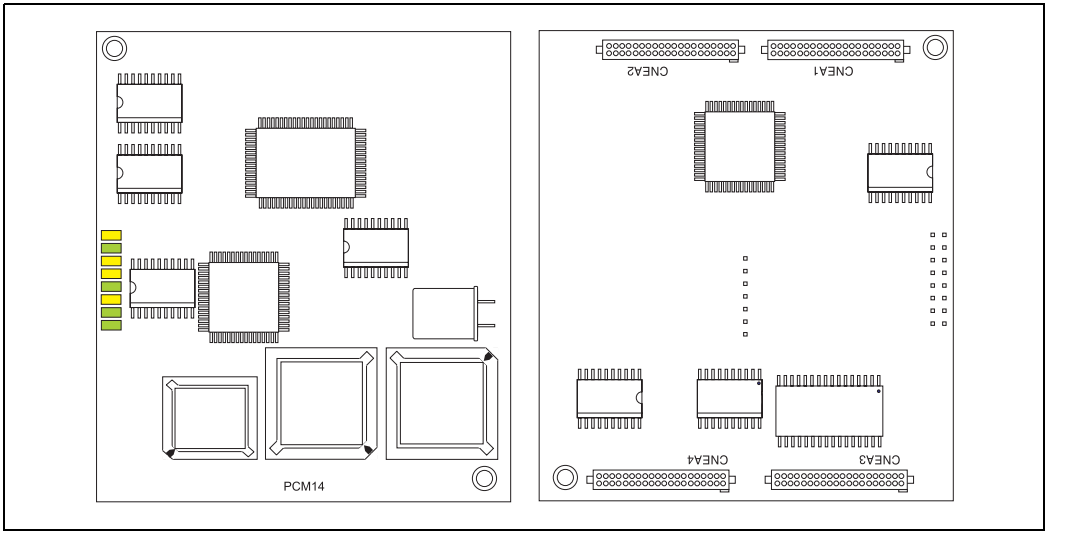

Figure 3-46 PCM14 Module

PCM28

The PCM28 module (Part #030149-001) is a single 28.8 modem with TDM interface for use with T1 or E1, and is used with the CID63 port processor. The functionality of this module is to provide dial backup. The PCM28 module can be installed in Expansion Card A, sockets CNEA1, CNEA2, CNEA3 and CNEA4, or Expansion Card B, sockets CNEB1, CNEB2, CNEB3, and CNEB4 on the CID63 port processor. Figure 3-47 illustrates the front and back of the PCM28 module.

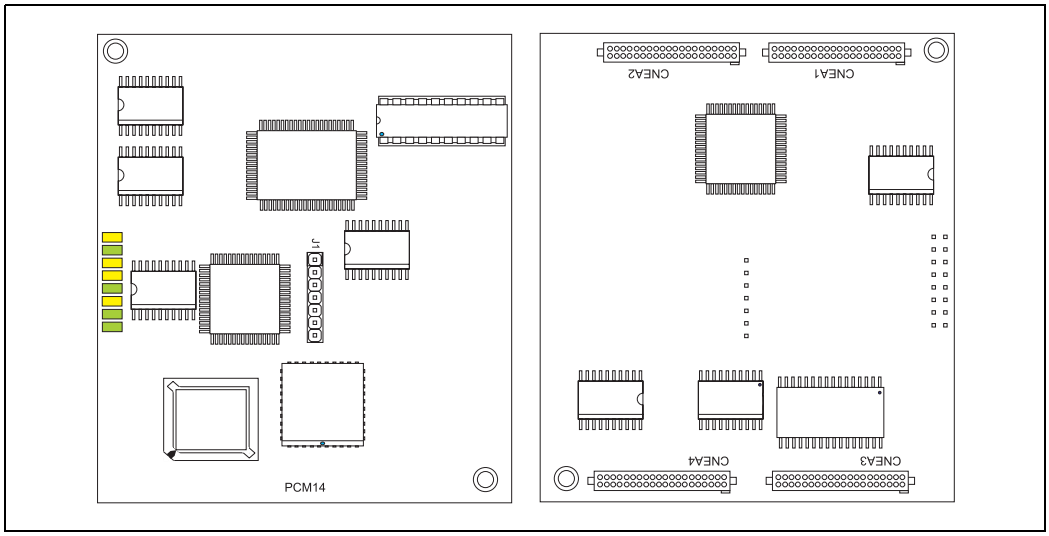

Figure 3-47 PCM28 Module

MEM61

The MEM61 module (Part #030036-001) is a 1MB memory upgrade used on the LET61, LTR61, CID61, CID63, and in the IEN 1000 chassis. The module plugs into CNS1 A and B sockets on the LET61 or LTR61 port processor, CNS1 A and B sockets on the CID61 port processsor, CNEA2 and CNL1 or CNEB2 and CNL2 sockets on the CID63 port processor, or CNS2 A and B sockets in the IEN 1000 chassis. The MEM61 is also required with router interfaces LET10/11 and LTR10/11. Figure 3-48 illustrates the component sides of the MEM61 memory upgrade module.

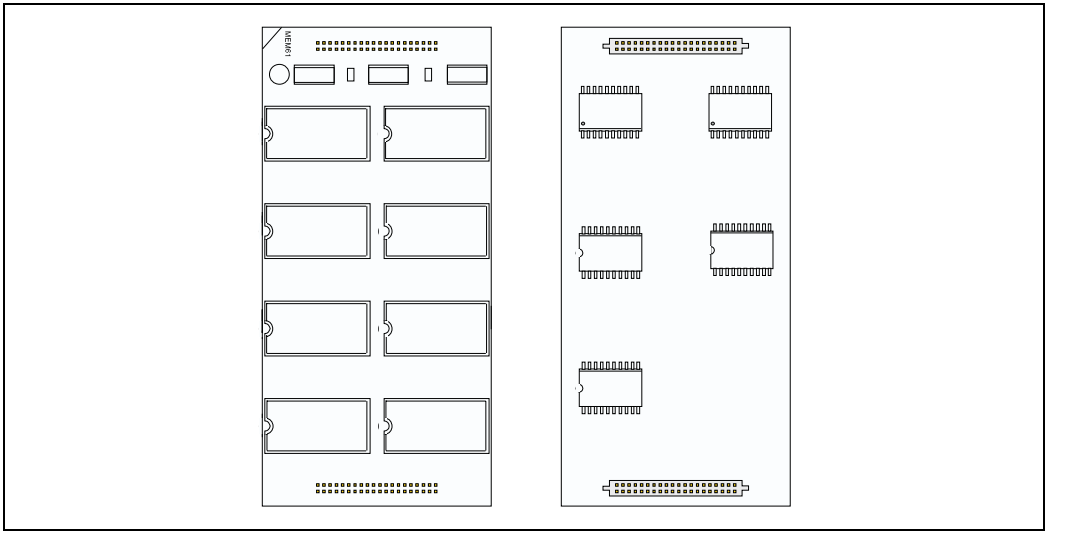

Figure 3-48 MEM61 Memory Upgrade Module

IEN 1000

The IEN 1000 chassis comes equipped with one RS232/V.35 WAN port, one RS232 serial port, 1MB of SRAM, and a V.22bis modem for dial-up configuration. Expanding the capabilities of the IEN 1000 chassis is accomplished through the integration of optional upgrade modules. Figure 3-49 illustrates the IEN 1000 block diagram.

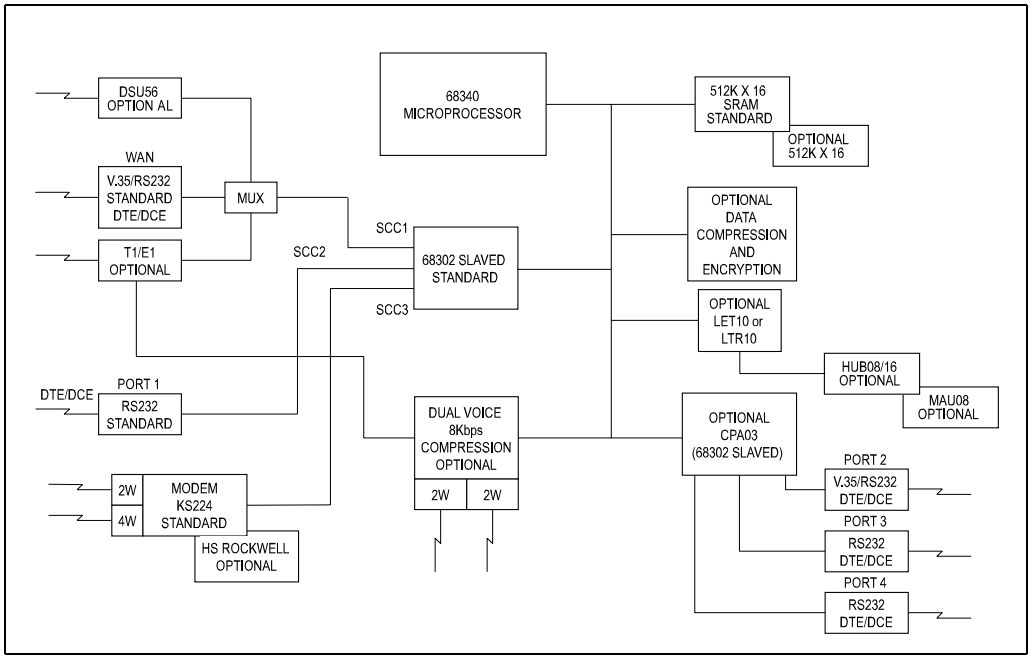

Figure 3-49 IEN 1000 Block Diagram

The protocol priority algorithm provides allocation of WAN resources for different LAN and legacy protocols. High priority traffic queues ensure timely delivery of time sensitive protocols. The protocol priority system not only identifies high priority protocols, but also identifies interactive high priority applications (Tinet, 3270).

Table 3-12 lists the base IEN1000 WAN port specifications.

WAN Port	V.35 (2 Mbps max). or RS232/V.24 (56K max.).
Protocols	▪ Frame relay (RFC 1294, RFC 1490) ▪ HDLC LAP-B (Point-to-point and multipoint)
Cables	▪ Type D cross cable used to provide RS232 DCE female interface from IEN 1000 ▪ Type A straight male-to-male RS232 cable used to attach the IEN 1000 to external devices ▪ Type VX cross cable used to provide V.35 DCE male interface from the IEN 1000 ▪ Type V adapter cable used to provide V.35 DTE male interface from the IEN 1000 ▪ Type VF adapter cable used to provide V.35 DTE female interface from the IEN 1000

Table 3-12 Base IEN 1000 WAN Port Specifications

Table 3-13 lists the base IEN 1000 RS232 port 1 specifications.

RS232 Port 1	RS232/V.24 (56 Kbps Max.) DTE interface.
Protocols	SDLC/SNA SDLC SDLC group poll / full duplex SDLC to LLC2 conversion X.25 BSC 3270 and BSC 2780/3780 Burroughs Poll Select BISYNC/ASYNC NCR/ISO ASYNC X.3 PAD/X.28
Cables	▪ Type D cross cable used to provide RS232 DCE female interface from IEN 1000 ▪ Type A straight male-to-male RS232 cable used to attach the IEN 1000 to external devices

Table 3-13 Base IEN 1000 RS232 Port 1 Specifications

Table 3-14 lists the base IEN 1000 V.22bis port specifications.

V.22bis Port	One RJ11 and one RJ45 port
Cables	▪ RJ11 straight cable used for 2-wire dial-up configuration ▪ RJ45 straight cable used for 4-wire dial-up configuration

Table 3-14 Base IEN 1000 V.22bis Port Specifications

Notes:
1. *Some upgrade modules are mutually exclusive. For example, you can install either the Token Ring interface or the Ethernet interface.*
2. *Refer to Chapter 4, Cable Specifications & Adapters for more information about these and other Hypercom cables.*

CPA03

The CPA03 module (Part #030031-001) provides one RS232/V.35 and two RS232 serial port interfaces. The CPA03 module is installed only in the IEN 1000 chassis. Each port is capable of running a different protocol. Figure 3-50 illustrates both sides of the CPA03 module.

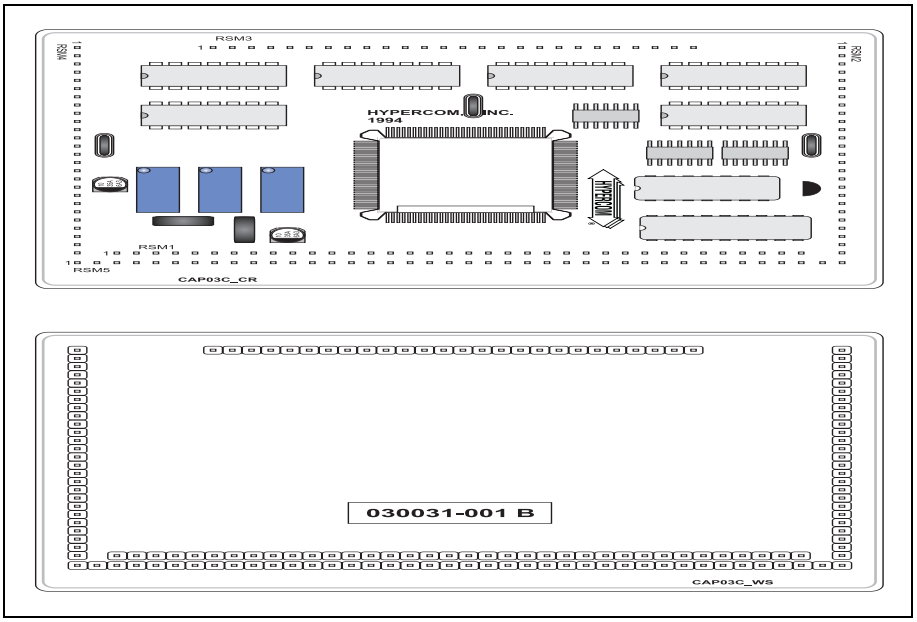

Figure 3-50 CPA03 Module

Table 3-15 lists the IEN1000 CPA03 upgrade module's interface specifications:

Local Ports (3)	Three RS232/V.24 (56Kbps Max) or one V.35 (2048Kbps) and two RS232/V.24 ports.
Protocols	SDLC/SNA SDLC SDLC group poll / full duplex SDLC to LLC2 conversion X.25 BSC 3270 and BSC 2780/3780 Burroughs Poll Select ASYNC X.3 PAD/X.28
Cables	▪ Type D cross cable used to provide RS232 DCE female interface from IEN 1000 ▪ Type A straight male-to-male RS232 cable used to attach the IEN 1000 to external devices ▪ Type VX cross cable used to provide V.35 DCE male interface from the IEN 1000 ▪ Type VE adapter cable used to provide V.35 DTE male interface from the IEN 1000 ▪ Type VF adapter cable used to provide V.35 DTE female interface from the IEN 1000

Table 3-15 CPA03 Interface Specifications

Note: *Refer to Chapter 4, Cable Specifications & Adapters for more information about these and other Hypercom cables.*

DSU56

The DSU56 module (Part #030039-001) provides a 9.6/19.2/56Kbps 4-wire DDS interface for use as the WAN connection. The DSU56 module is installed only in the IEN 1000 chassis. Figure 3-51 illustrates the DSU56 module installed in the IEN 1000 chassis.

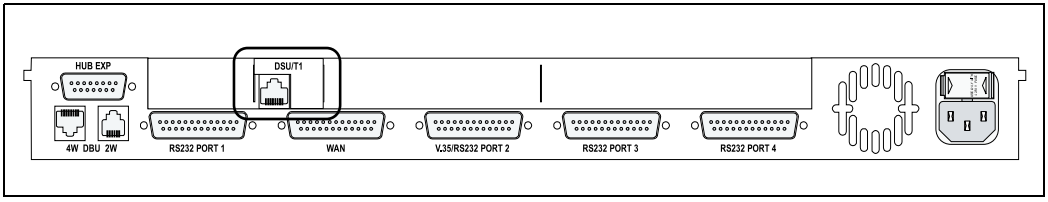

Figure 3-51 Installed DSU56 Module

Note: *The RS232/V.35 WAN port is disabled when the DSU is enabled.*

Table 3-16 lists the interface specifications for the DSU56 module.

DSU56	One RJ45 port
Cables	RJ45 straight cable used to connect RJ48S

Table 3-16 DSU56 Interface Specifications

Note: *Refer to Chapter 4, Cable Specifications & Adapters for more information about the RJ45 straight cable.*

LET10

The LET10 module (Part #020042-001) provides an Ethernet 10Base-2, 10Base-T, and AUI Router interface. The LET10 module is installed only in the IEN 1000 chassis. Figure 3-52 illustrates the LET10 module installed in the IEN 1000 chassis.

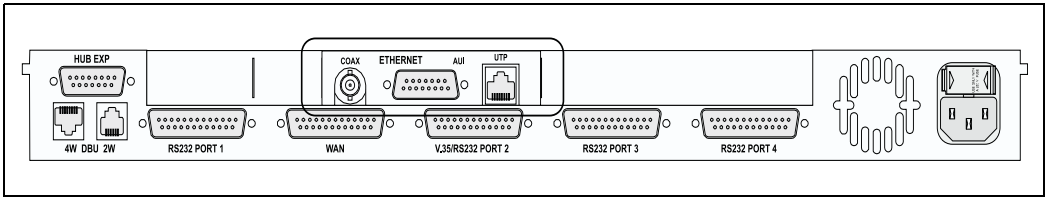

Figure 3-52 Installed LET10 Module

Note: *The Ethernet and Token Ring interfaces are mutually exclusive.*

Table 3-18 lists the interface specifications for the LET10 module.

LET10	One BNC, one AUI, and one UTP port
Protocols	IP IPX Bridging Translational bridging RIP RIP2 OSPF
Cables	▪ BNC and AUI cables provided by customer ▪ RJ45 straight cable used to connect UTP HUB

Table 3-17 LET10 Interface Specifications

Note: *Refer to Chapter 4, Cable Specifications & Adapters for more information about these and other Hypercom cables.*

LTR10

The LTR10 module (Part #020043-001) provides a Token Ring UTP/STP Router interface for the IEN 1000 chassis. Figure 3-53 illustrates the LTR10 installed in the IEN 1000 chassis.

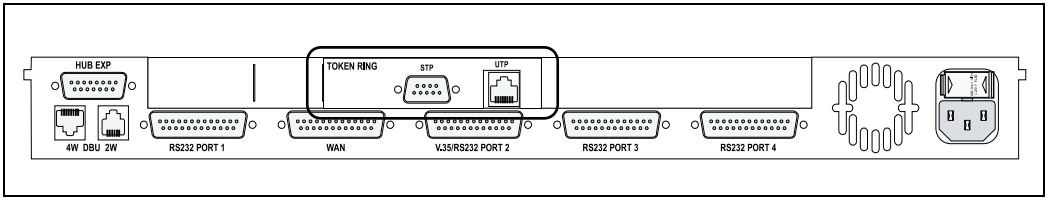

Figure 3-53 Installed LTR10 Module

Note: *The Ethernet and Token Ring interfaces are mutually exclusive.*

Table 3-18 lists the interface specification for the LTR10 module.

LTR10	One STP and one UTP port.
Protocols	IP IPX Bridging SRB RIP RIP2 OSPF.
Cables	▪ Type IBM adapter cable used to attach to an STP MAU. ▪ RJ45 straight cable used to connect UTP MAU.

Table 3-18 LTR10 Interface Specifications

Note: *Refer to Chapter 4, Cable Specifications & Adapters for more information about these and other Hypercom cables.*

HUB08

The HUB08 module (Part #030032-001) is an integrated Ethernet UTP hub supporting eight RJ45 connections. The HUB08 module is used with the LET10 module to provide an 8 port 10Base-T manageable hub. The HUB08 is installed only in the IEN 1000 chassis. Figure 3-54 illustrates the interface connections for the HUB08 module.

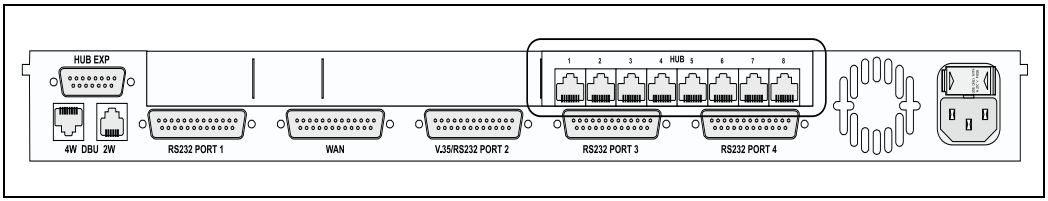

Figure 3-54 HUB08 Interface

With the HUB08 and LET10 combination, the AUI and BNC ports of the LET10 belong to the HUB08. The LET10 router defaults to the UTP port for network access. The LET10 UTP port must be connected to one of the eight RJ45 hub ports. Hypercom provides an RJ45 straight cable for use with the HUB08 and LET10 upgrade modules.

Table 3-19 lists the interface specifications for the HUB08 module.

HUB08	Eight RJ45 ports.
Cables	RJ45 straight cable used to connect UTP devices.

Table 3-19 HUB08 Interface Specifications

Notes:
1. *The RJ45 straight cable is included with the HUB08 upgrade module.*
2. *The LET10 upgrade module must be installed to use the HUB08.*
3. *Refer to Chapter 4, Cable Specifications & Adapters for more information about these and other Hypercom cables.*

MAU08

The MAU08 module (Part #030116-001) is used with the LTR11 to provides an eight-port manageable UTP MUA. The Ring In/Ring Out (RI/RO) of the MAU08 is accessed using the HUB expansion port on the IEN 1000 using an RIRO cable. Figure 3-55 illustrates the interface connections for the MAU08 module.

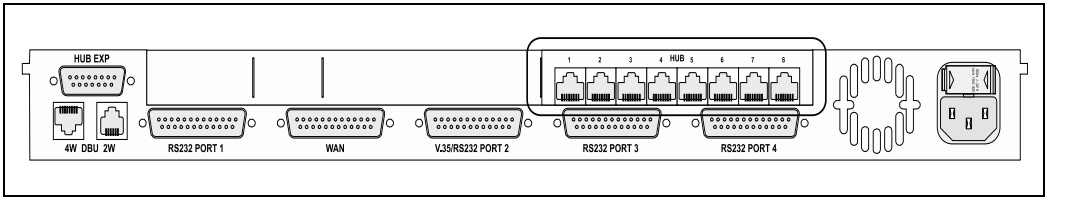

Figure 3-55 MAU08 Module

Note: *The LTR10 may not be used with the MAU08. The LTR11 must be used.*

IDT10

The IDT10 module (Part #030084-001) is a small module with an RJ45 that plugs into the IEN 1000 motherboard when a DSU is installed. The ITD10 is an RJ45 jack and a protective circuitry that allows access to the optional DSU. The ITD10 is provided with each DSU.

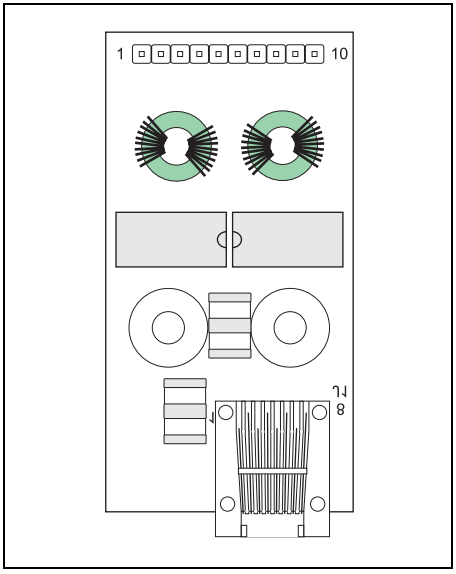

Figure 3-56 IDT10 Module

Cable Specifications & Adapters

In This Chapter

INTRODUCTION

The Hypercom IEN chassis may be configured for many different networks, each network requiring several physical interfaces. The following section provides a detailed illustration of each cable pin connection, pin description and identifies the type of connector used.

In addition, a sample configuration is provided to help you correctly attach the specific cable to the appropriate IEN chassis connector. The connection on the back of each IEN chassis corresponds to a port processor. The IEN 1000 connections depend upon whether your network specifications require use an optional upgrade module. See Chapter 5, System Configuration for more information about the IEN chassis configurations.

SELECTING CABLES

Hypercom provides two cable matrices that are designed to help you quickly determine the cable types for your network requirements. The matrices are based upon the chassis requirements of each network site. That is, whether a specific network node contains an IEN 1000, IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis.

Step-By-Step

To select the appropriate cable:

1. Locate the desired port processor or chassis in the Port Processor/Chassis column.

2. Read across the top row to locate the desired physical interface.

3. The intersecting cell between the port processor or chassis and physical interface contains a cable reference letter.

   Note: *If a cell does not contain a cable designation letter, your configuration is not correct. Repeat the process starting with Step 1.*

4. Read down the Cable Reference column until you locate the cable designation reference letter. The Cable Type column to the right of the cable reference letter indicates the cable type that meets the network interface requirements.

After determining the cable type for each port processor and physical interface, refer to the following sections to learn more about the use of each cable.

The cable matrix assumes that you are starting from a DTE device. Table 4-1 is a cable matrix for selecting the appropriate cable(s).

	Physical Interface	V.35 DTE + RS232 DTE	Analog Voice		RS232		RS232 X 3		V.35		2 x DB25 DTE	INTERNAL DSU 56/64Kbps	T1 Connect Network Digital/Voice				Token Ring		Ethernet			Backplane Extension	2 x RJ11	RJ11	ISDN-ST
			4 x RJ11	Punch Down	DTE	DCE	DTE	DCE	DTE	DCE			DB15 PBX	Telco Network	DB15 CSU/DSU	RJ45 PBX	STP	UTP	UTP	BNC	AUI				
PORT PROCESSOR/CHASSIS	CID15H				A	E			U/V																
	CID15H-A									Y															
	CID61	W			A	F	AA	Z	U/V	Y		G													
	CID61 Dual								U/V		CC														
	CID63				A	E			U/V	Y	BB	G											Q	K	I
	CIM15H-22B				A	E																		K	
	CIM15H-33				A	E																		K	
	DLA14		B	C																					
	DSX11 DTC11/LHO/E1												O	N	M	P									
	LET61/B/H																		S	EE	DD				
	LTR61/B/H																R	T							
	IEN 2000																					H			
	IEN 3000																					D			
	IEN 4000																					H			
	IEN 5000																					D			

Ref.	Cable Type
A	Type A Straight RS232
B	Type ALG-2W 2-Wire Analog
C	Type ALG-PD Punch Down
D	Type B IEEE Bus Cable
E	Type D RS232 Cross
F	Type D6 RS232 Cross
G	Type DDS DSU connection
H	Type HB2 Backplane
I	Type ISDN
J	Type P PC Connection
K	Type RJ11
L	Type T1 RJ11-DB15 CSU
M	Type T1-K RJ11-DB15 CSU
N	Type T1-45-M RJ45 T1 interface
O	Type T1-15-XF 15-pin PBX
P	Type T1-45-XF RJ45 PBX interface
Q	Type T(63) 2 x RJ11
R	Type TR STP Token Ring
S	Type UET UTP Ethernet
T	Type UTR UTB Token Ring
U	Type V V.35 DTE (Male)
V	Type VF V.35 DTE (Male
W	Type VM V.35 and RS232
X	Type VNN DB25-DB25
Y	Type VX V.35 DCE Cross
Z	Type Y 3 x RS232 Cross
AA	Type YA 3 x RS232
BB	Type Y(63) Dual DB25 DTE
CC	Type 2VE DB25 DTE
DD	LAU01 Adapter AUI Ethernet
EE	LEC01 Adapter Thinnet Ethernet
FF	Type RJ45

Table 4-1 Cable Cross Reference Matrix

Table 4-2 is a cable matrix for selecting the appropriate cable(s) for the IEN 1000 chassis.

	PHYSICAL INTERFACE	RS232		V.35		INTERNAL DSU	TOKEN RING		ETHERNET			V.35 IEN NODE TO IEN NODE	RJ11
		DTE	DCE	DTE	DCE		STP	UTP	UTP	BNC	AUI		
PORT PROCESSOR	BASE UNIT	**A**	**B**	**C/D**	**F**							**E**	
	CPA03	**A**	**B**	**C/D**	**F**								
	Dial Backup												**G**
	DSU56/DSU01					**H**							
	HUB08								**H**				
	LET10								**H**				
	LTR10						**K**	**H**					
	MAU08							**H**					

Hypercom does not provide cabling for the Ethernet BNC and AUI connections.
*The RJ45 Straight cable, Cable Reference letter L is included with the HUB08 upgrade module.

CABLE Ref.	TYPE
A	Type A Straight RS232
B	Type D RS232 Cross
C	Type V V.35 DTE (male)
D	Type VF V.35 to DCE
E	Type VNN
F	Type VX V.35 DCE Cross
G	Type RJ11 Straight*
H	Type RJ45 Straight*
J	Type RIRO Ring In Ring Out
K	Type TR1
L	HUB08/LET10 Patch

Table 4-2 IEN 1000 Cable Cross Reference Matrix

CABLE TYPES

This section contains Hypercom cable that are currently available.

Type A

The Hypercom Type A cable (#810009-001) is a male DB25 to male DB25 straight-through RS232 cable. The cable is used to connect an IEN device to a user device. The length of the cable is 10'. Figure 4-1 illustrates the pinout for the Type A cable.

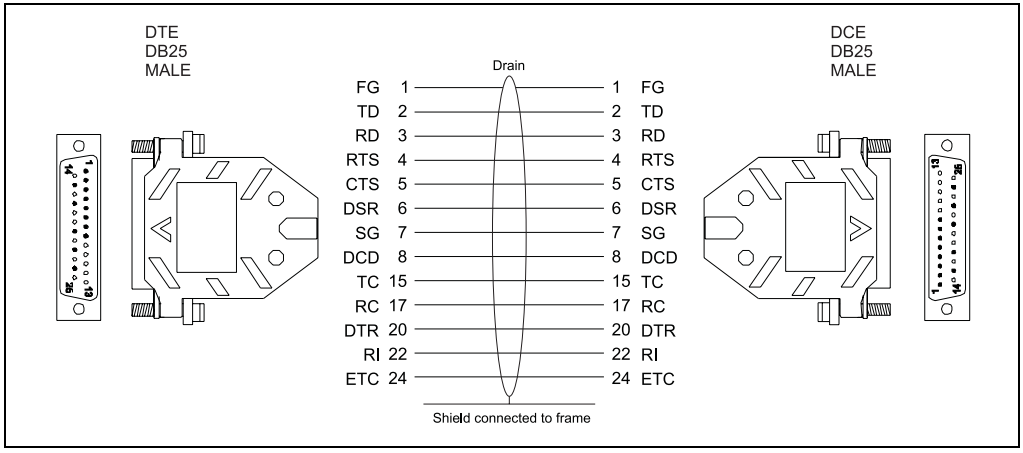

Figure 4-1 Type A Cable Pinouts

The Type A cable is used to connect an IEN RS232C DTE port to an RS232C DCE port. The cable is also used with the Hypercom Type D cross cable to enable the IEN device to appear as a DCE device. Figure 4-2 illustrates the IEN device setup as a DCE and DTE device.

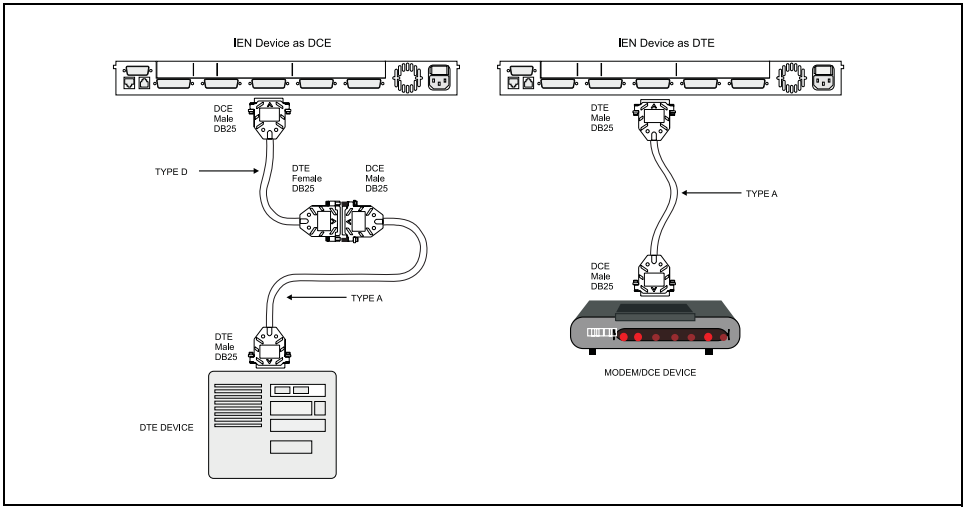

Figure 4-2 IEN Device as DCE and DTE

Type ALG-2W

The Hypercom Type ALG-2W cable (#810132-001) is a male DB25 to four female RJ11 cable. The cable is used to connect a DLA14 port processor to two-wire analog handsets or PBX termination using female RJ11 modular connectors. The length of the cable is 3'. Figure 4-3 illustrates the pinout for the Type ALG-2W cable.

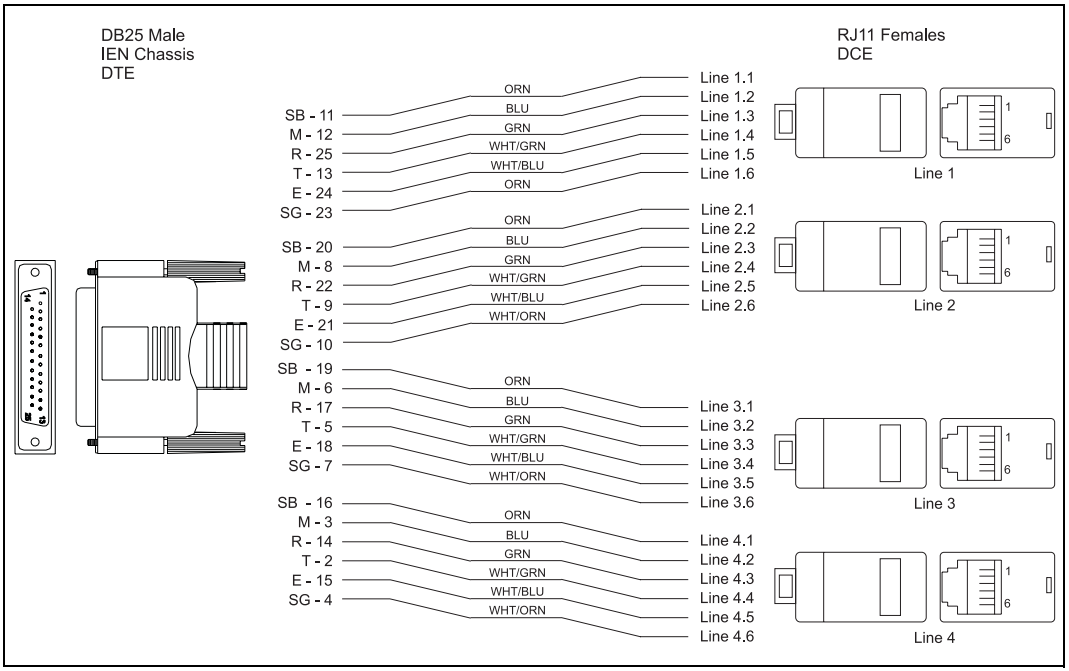

Figure 4-3 Type ALG-2W Cable Pinout

The Type ALG-2W male DB25 connector is attached to the appropriate line port on the IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds to the slot containing the DLA14 port processor. The Type ALG-2W female RJ11 connectors are attached to male RJ11s.

Figure 4-4 illustrates the cable connection for the Type ALG-2W cable.

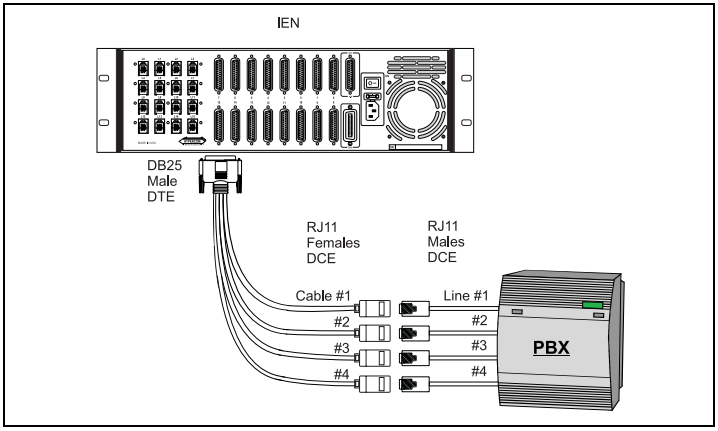

Figure 4-4 Type ALG-2W Cable Connection

Type ALG-PD

The Hypercom Type ALG-PD cable (#810142-001) is a male DB25 to punch-down cable. The cable is used to connect a DLA14 port processor to a PBX using a punch-down block termination. The cable provides four, 2-wire or two, 4-wire analog voice terminations including E&M signalling leads. Figure 4-5 illustrates the pinout for the Type ALG-PD (four two-wire) cable.

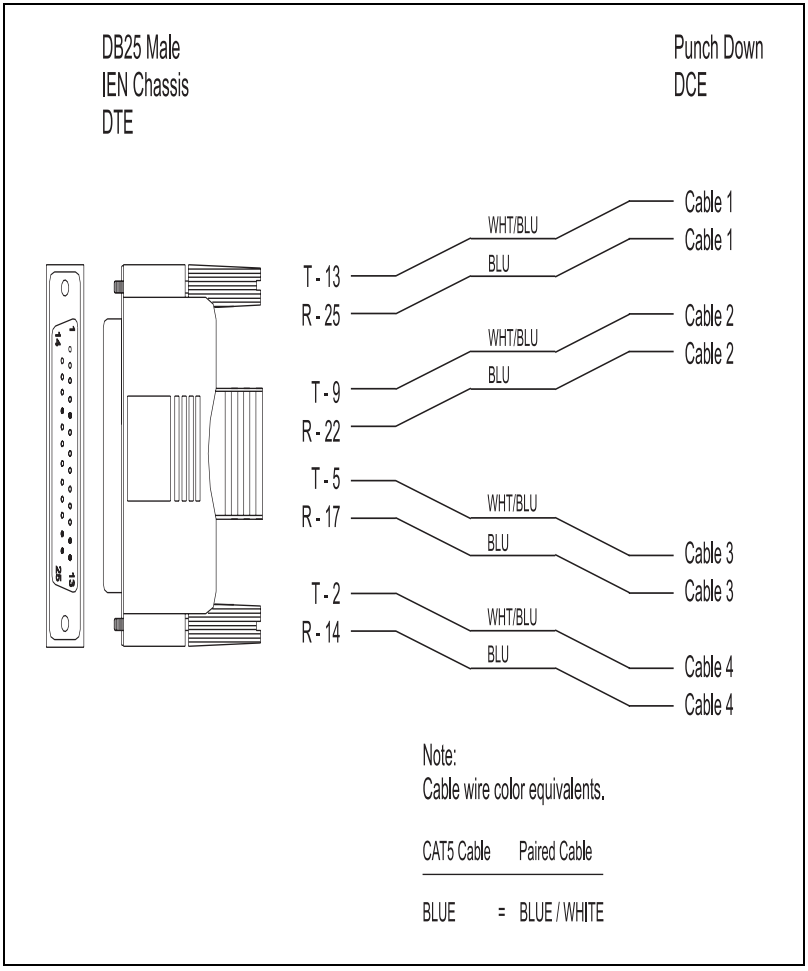

Figure 4-5 Type ALG-PD (Four 2-Wire) Cable Pinout

Figure 4-8 illustrates the cable connection for the Type ALG-PD (four 2-wire) cable.

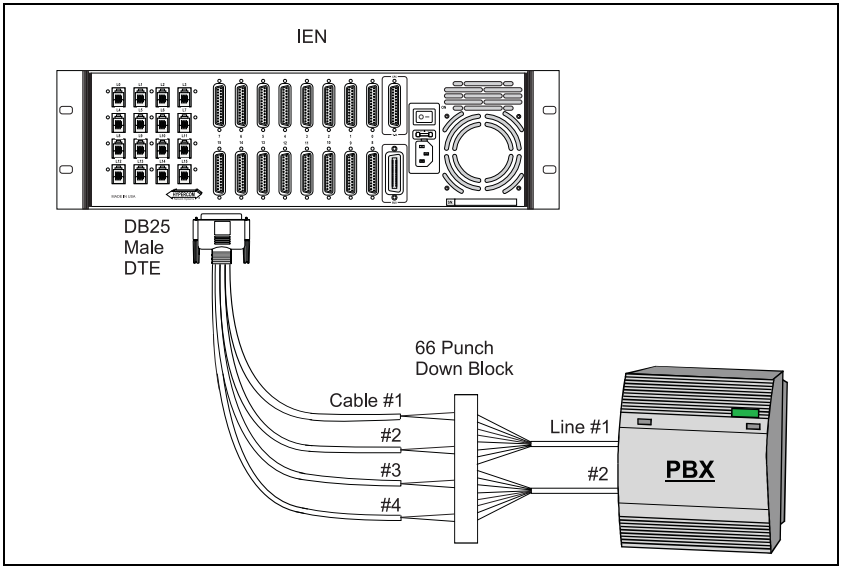

Figure 4-6 Type ALG-PD Cable Connection (Four 2-Wire)

The Type ALG-PD male DB25 connector attaches to the line port on the IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis slot that contains the DLA14 port processor. The cable is then punched down to an 66-Block using the color codes in the Figure below to identify the correct connections to a PBX. Figure 4-5 illustrates the pinout for the Type ALG-PD (two 4-wire) cable.

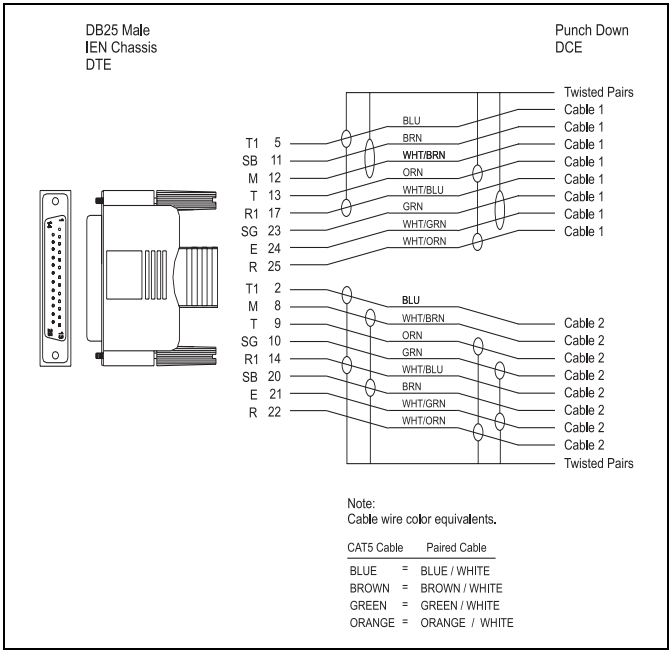

Figure 4-7 Type ALG-PD (Two 4-Wire) Cable Pinout

Figure 4-8 illustrates the cable connection for the Type ALG-PD (two 4-wire) cable.

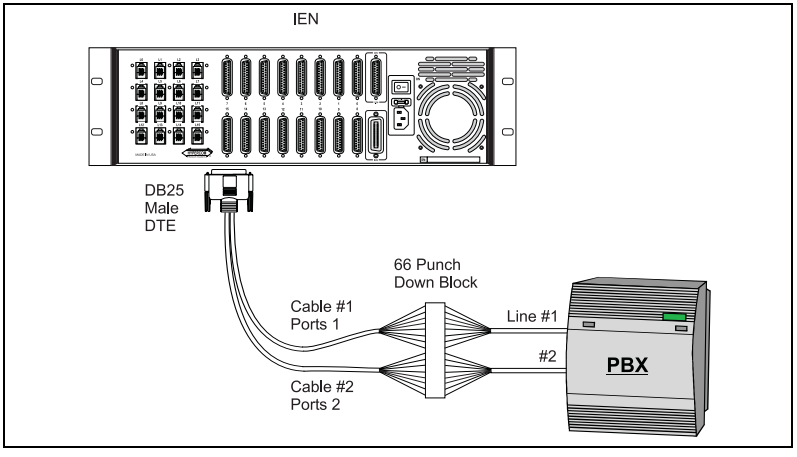

Figure 4-8 Type ALG-PD Cable Connection (Two, 4-Wire)

Type B

The Hypercom Type B cable (#810010-001) is a male to male bus extension cable. This cable is a modified IEEE488 cable used to connect two or three IEN chassis at the bus extension port. The cable only extends the standard bus. Pins 1, 2, 11, and 23 are removed. The length of the cable is 3.5'. Figure 4-9 illustrates the pinout for the Type B cable.

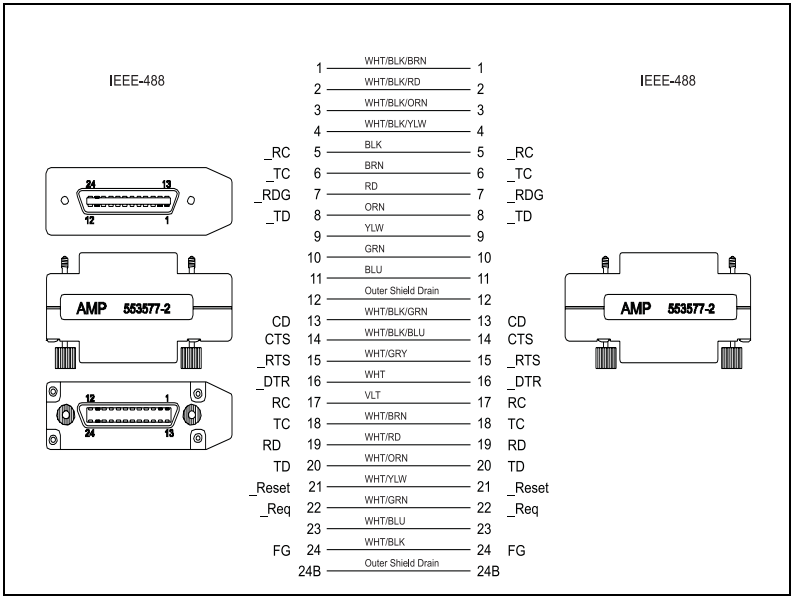

Figure 4-9 Type B Cable Pinouts

The Hypercom Type B cable connects up to three IEN 3000 or IEN 5000 bus extension ports to create a single node. The end points of an extended bus (master and redundant chassis) require terminators attached to the Type B cable connectors. Figure 4-10 illustrates the two-chassis bus extension termination.

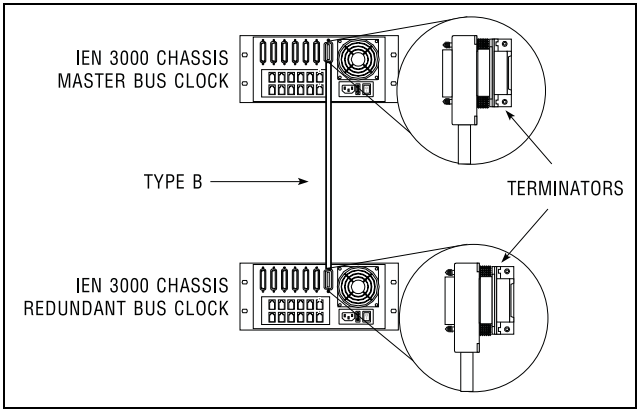

Figure 4-10 Chassis Bus Extension Termination

The Type B cable can be piggybacked to connect three IEN 3000 or IEN 5000 chassis. The slave chassis does not require a terminator. Figure 4-11 illustrates the three-chassis bus extension termination.

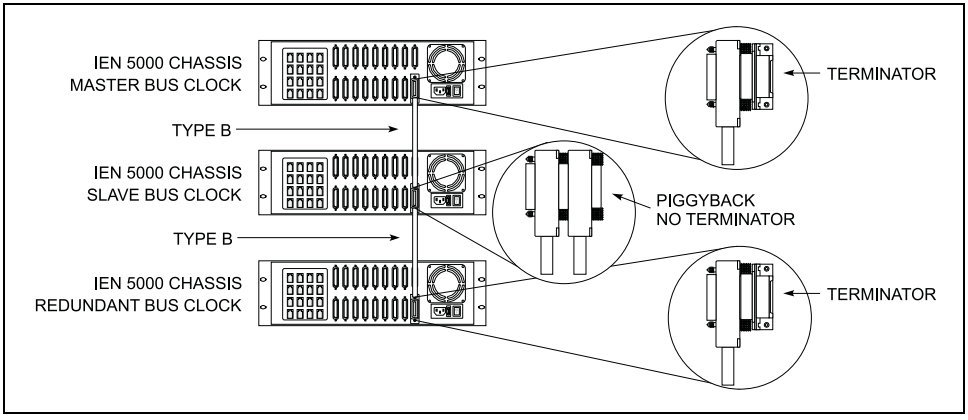

Figure 4-11 Bus Extension Termination

Type D

The Hypercom Type D cable (#810012-001) is a male DB25 to female DB25 cross cable. The Type D cable is used with a Type A cable as a DCE connection to a DTE device. The IEN chassis provides clocking. The length of the cable is 1'. Figure 4-12 illustrates the pinout for the Type D cable.

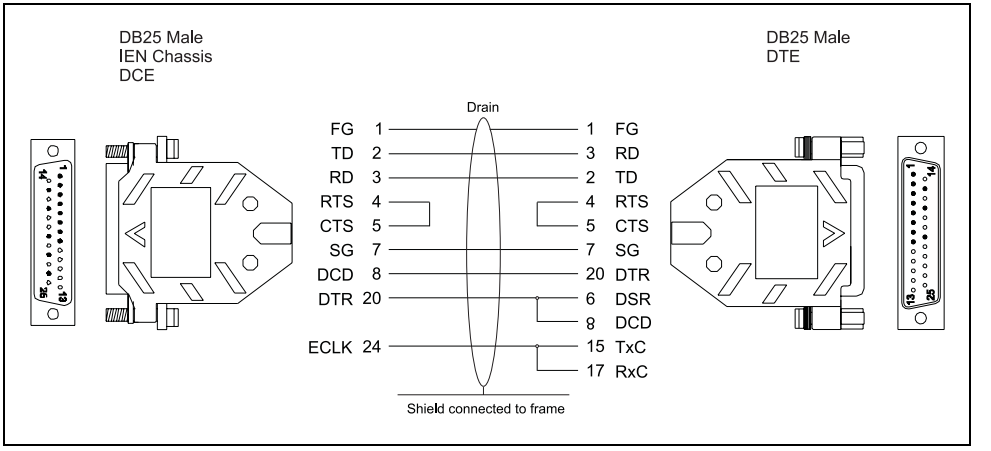

Figure 4-12 Type D Cable Pinouts

The Type D male DB25 connector is attached to the appropriate port of an IEN 1000, IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type D female DB25 connector attaches to the Type A male DB25 connector. Figure 4-13 illustrates the use of the Type D cable.

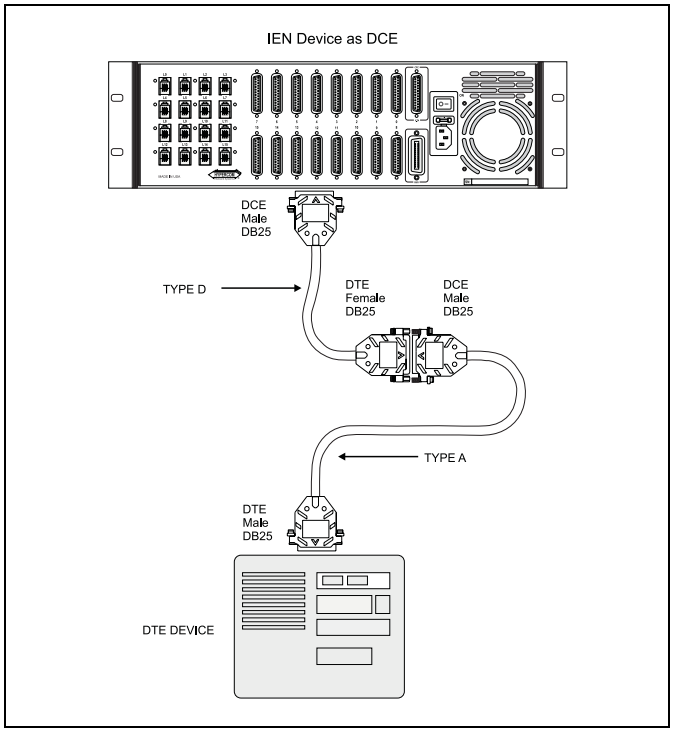

Figure 4-13 IEN Device as DCE

Type D6

The Hypercom Type D6 cable (#810127-001) is a male DB25 to female DB25 cross cable. The cable is used only with a CID61 port processor, and with a Type A cable as a DCE connection to a DTE device. The DTE equipment provides clocking. The length of the cable is 1'. Figure 4-14 illustrates the pinout for the Type D6 cable.

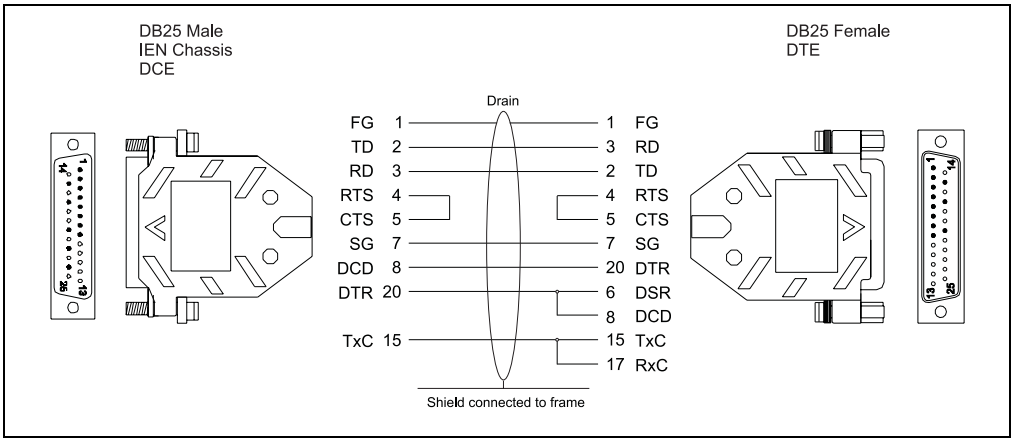

Figure 4-14 Type D6 Cable Pinouts

The Type D6 male DB25 connector is attached to the appropriate port of an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type D6 female DB25 connector attaches to the Type A male DB25 connector. Figure 4-15 illustrates the use of the Type D6 cable.

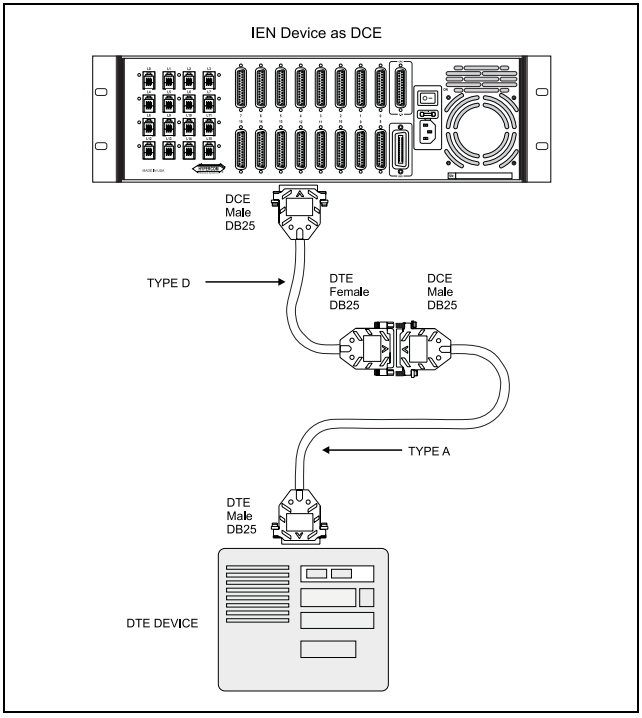

Figure 4-15 IEN Device as DCE

Type DDS

The Hypercom Type DDS cable (#810024-002) is a male RJ11 to male RJ45 cable. The cable is used to connect a CID61 or CID63 port processor with an internal DSU, to the Telco adapter. The length of the cable is 10'. Figure 4-16 illustrates the pinout for the Type DDS cable.

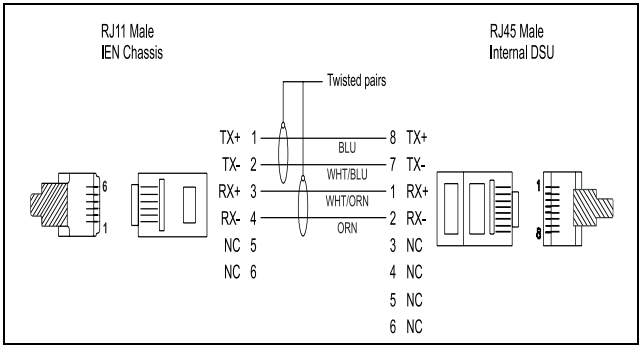

Figure 4-16 Type DDS Cable Pinouts

The Type DDS male RJ11 connector is attached to an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis port that corresponds to the slot occupied by the CID61 or CID63 port processor. When using the Type DDS cable with a CID63 port processor, the Type T(63) cable is required. The male RJ45 connector is attached to the Telco connector. Figure 4-17 illustrates the use of a Type DDS cable.

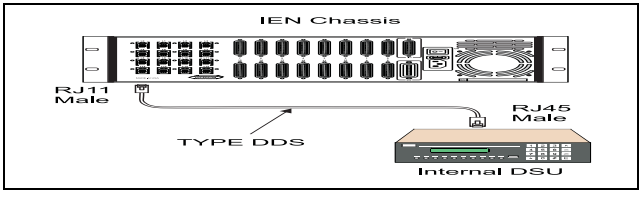

Figure 4-17 Type DDS Cable

Type HB2

The Hypercom Type HB2 cable (#810130-001) is a male to male bus expansion cable. The cable is used to bus connect the IEN 2000 or IEN 4000 chassis. The length of the cable is 8". Figure 4-18 illustrates the Type HB2 cable.

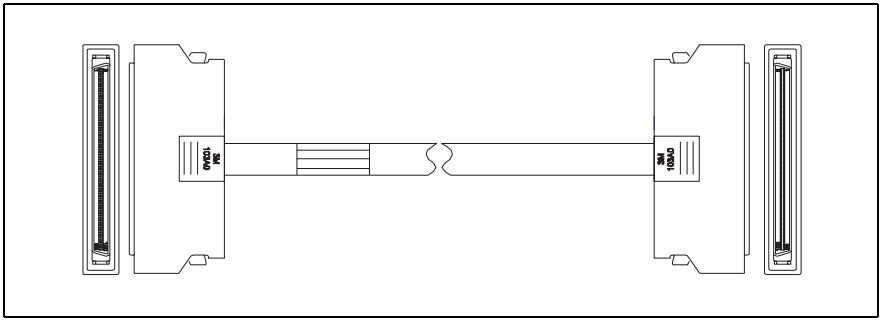

Figure 4-18 Type HB2 Cable

Note: *Cable pinout information for the Type HB2 cable is not available.*

One end of the Type HB2 cable must be plugged into the Bus OUT port of an IEN 2000 or IEN 4000 chassis. The other end must be plugged into the Bus IN port of the additional IEN 2000 or IEN 4000 chassis. Figure 4-19 illustrates the cable connection for the Type HB2 cable.

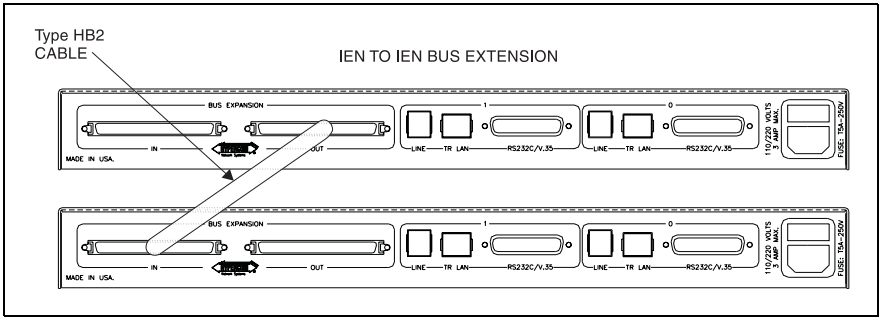

Figure 4-19 Type HB2 Cable Connection

Type HB3

The Hypercom Type HB3 cable (#810130-002) is a male to male bus expansion cable. The cable is used to bus connect the IEN 2000 or IEN 4000 chassis. The length of the cable is 16". Figure 4-18 illustrates the Type HB3 cable.

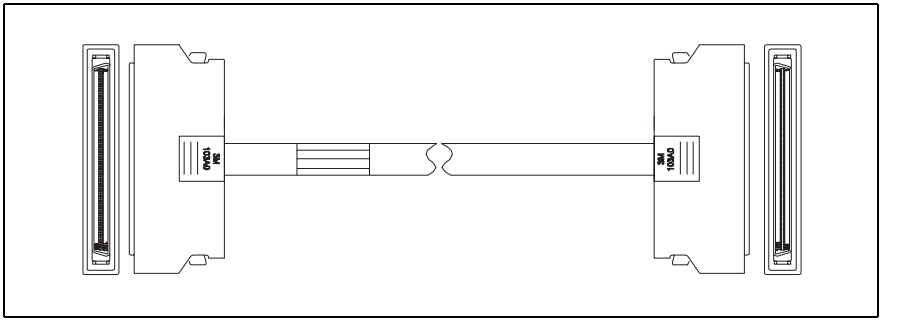

Figure 4-20 Type HB3 Cable

Note: *Cable pinout information for the Type HB3 cable is not available.*

One end of the Type HB3 cable must be plugged into the Bus OUT port of an IEN 2000 or IEN 4000 chassis. The other end must be plugged into the Bus IN port of the additional IEN 2000 or IEN 4000 chassis. Figure 4-19 illustrates the cable connection for the Type HB3 cable.

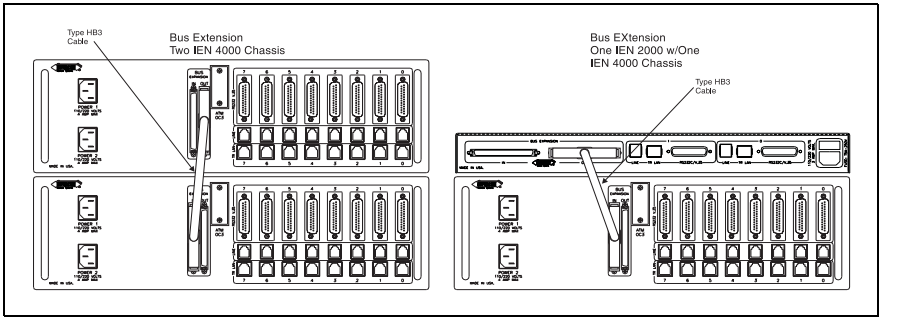

Figure 4-21 Type HB3 Cable Connection

Type ISDN

The Hypercom Type ISDN cable (#810111-002) is a male RJ11 to male RJ45 cable. The cable is used to interface the ISDN-ST to Telco DEMARC or NT. The length of the cable is 10'. Figure 4-22 illustrates the pinout for the Type ISDN cable.

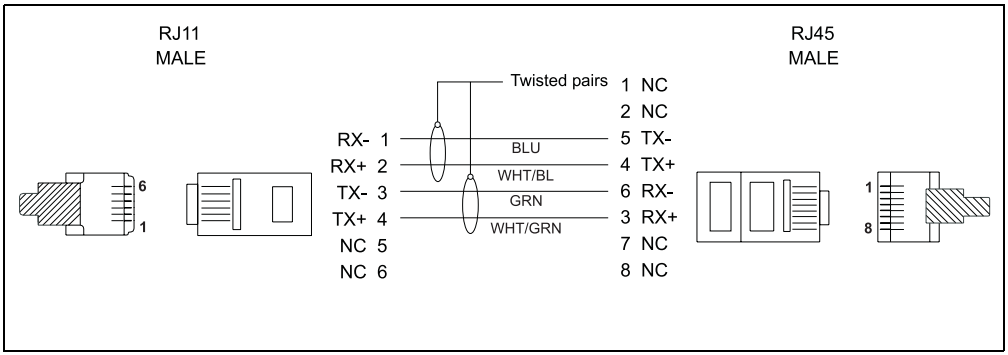

Figure 4-22 Type ISDN Cable Pinout

The Type ISDN male RJ45 connector plugs into the line port on the IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type ISDN male RJ45 connector is connected to the Network Terminator. The Type T(63) cable can be used with the Type ISDN cable. Figure 4-23 illustrates the cable connection for the Type ISDN cable.

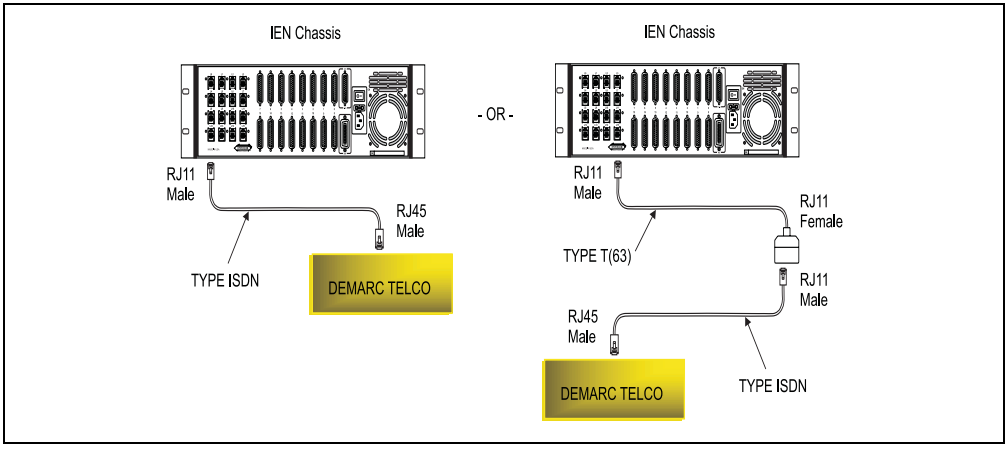

Figure 4-23 Type ISDN Cable Connection

Type P

The Hypercom Type P cable (#810015-001) is a male DB25 to female DB9 cable. The cable is commonly used for asynchronous communication between a PC running IENView and the CID15H port processor at the IEN Node. The length of the cable is 10'. Figure 4-24 illustrates the pinout for the Type P cable.

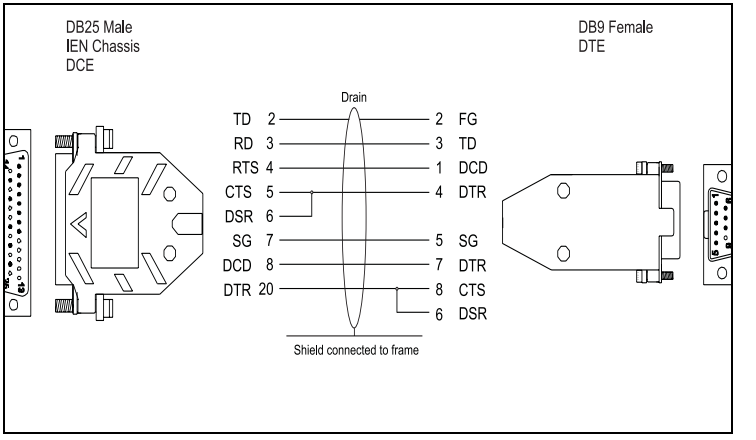

Figure 4-24 Type P Cable Pinouts

The Type P male DB25 connector is attached to an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis port that corresponds to the slot occupied by the CID15H port processor. The DB9 connector is attached to a PC COM port. Figure 4-25 illustrates the use of a Type P cable.

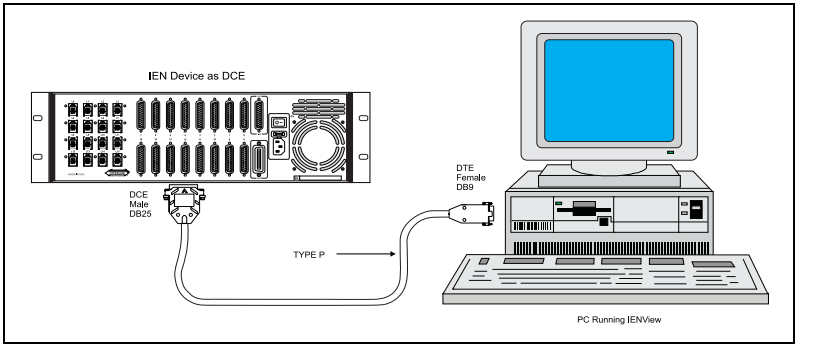

Figure 4-25 Type P Cable

Type RIRO

The Hypercom Type RIRO cable is used to provide a UTP Ring In and Ring Out port for the MAU08 in an IEN 1000 chassis. Figure 4-26 illustrates the Hypercom Type RIRO cable pin connections and pin descriptions and identifies the cable connectors.

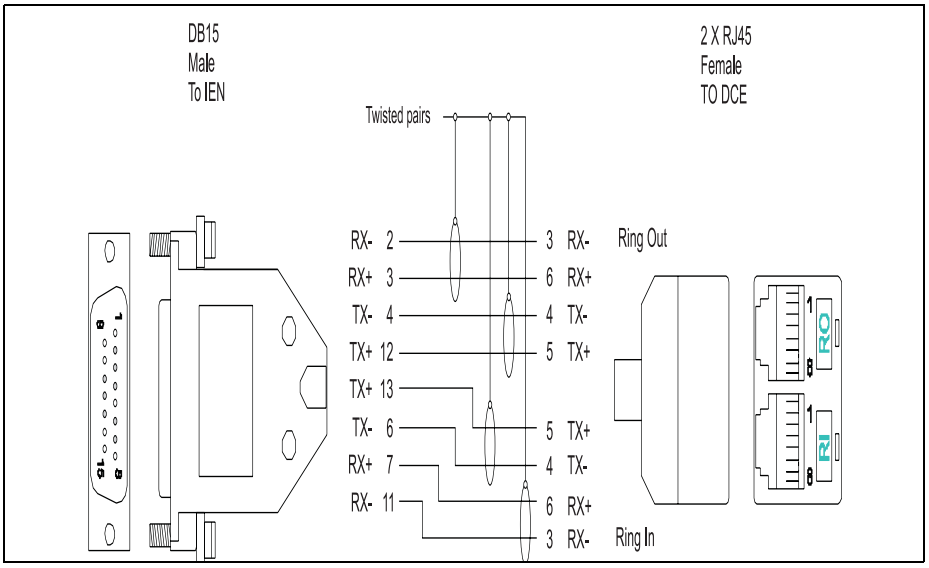

Figure 4-26 Type RIRO Cable

The Type RIRO male DB15 connector is attached to an IEN 1000 HUB expansion port. The Type RIRO female RJ45 connectors are plugged into Ring In and Ring Out of a Token Ring. Figure 4-27 illustrates the use of the Type RIRO cable.

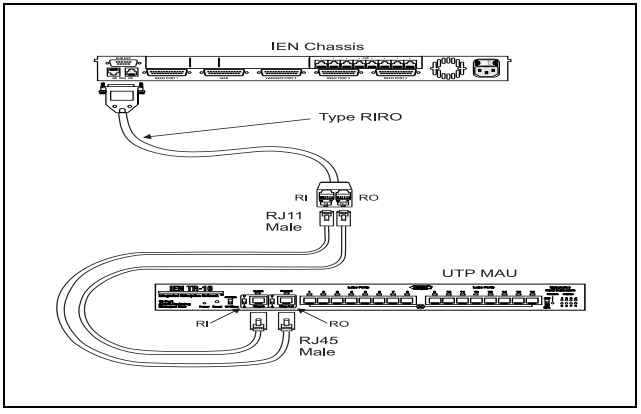

Figure 4-27 Type RIRO Cable Connection

Type RJ11

The Hypercom Type RJ11 cable (#810004-001 or #810004-002) is a male RJ11 to male RJ11 cable. The cable is used to connect the IEN chassis with a ISDN-U or HDM14/28 module on a CID63 port processor, or a 2-wire DLA14 port processor. The length of the cable is 1' for -001 and 10' for -002. Figure 4-28 illustrates the pinout for the Type RJ11 cable.

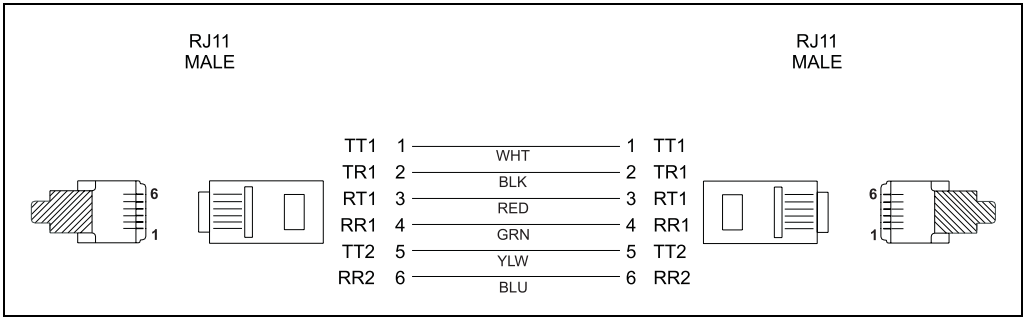

Figure 4-28 Type RJ11 Cable Pinout

The Type RJ11 male connector is plugged into the back of the IEN chassis. The other RJ11 male connector is plugged into the ISDN jack. The Type RJ11 is also used for DBU connections. Figure 4-29 illustrates the cable connection for the Type RJ11 cable.

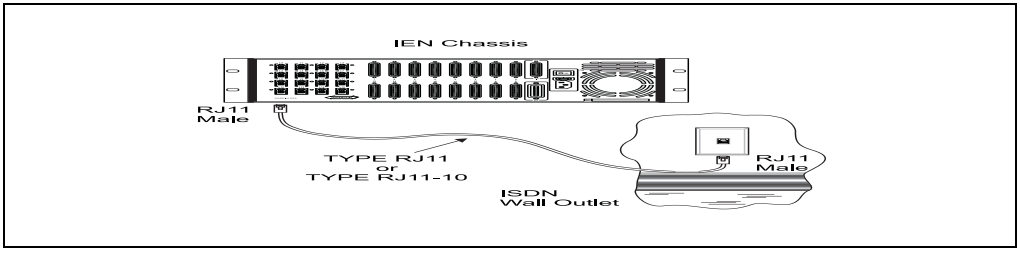

Figure 4-29 Type RJ11 Cable Connection

Type T1

The Hypercom Type T1 cable (#810035-001) is a male DB15 to male RJ11 cable. The cable is used to connect an IEN chassis to a T1 CSU device. The length of the cable is 10'. Figure 4-30 illustrates the pinout for the Type T1 cable.

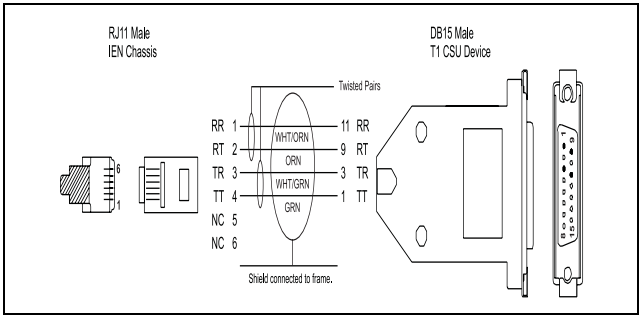

Figure 4-30 Type T1 Cable Pinouts

Note: *Some CSU pinouts may differ. Refer to the CSU documentation for the DB15 pinout designations.*

The Type T1 male RJ11 connector is attached to the RJ11 port on an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds to the slot occupied by the DSX11 or DTC11-LHO port processor. The Type T1 male DB15 connector is attached to a CSU. Figure 4-31 illustrates the use of the Type T1 cable.

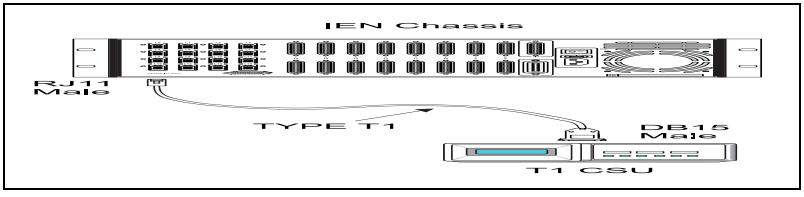

Figure 4-31 Type T1 Cable Connection

Type T1K

The Hypercom Type T1K cable (#810099-001)is a male RJ11 to male DB15 cable. The cable is used with the DSX11 or DTC11-LHO port processors to attach specifically to the DSX-1 interface jack of a T1 CSU. The length of the cable is 10'. Figure 4-32 illustrates the pinout for the Type T1K cable.

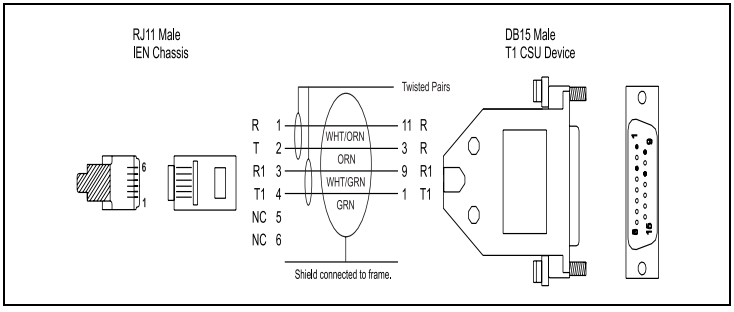

Figure 4-32 Type T1K Cable

Note: *Some CSU pinouts may differ. Refer to the CSU documentation for the DB15 pinout designations.*

The Type T1K male RJ11 connector is attached to the appropriate line port on an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds to the slot containing the DSX11 or DTC11-LHO port processors. The Type T1K male DB15 connector is plugged into the Kentrox CSU DB15 T1 connector. Figure 4-34 illustrates the cable connection for the Type T1-K cable.

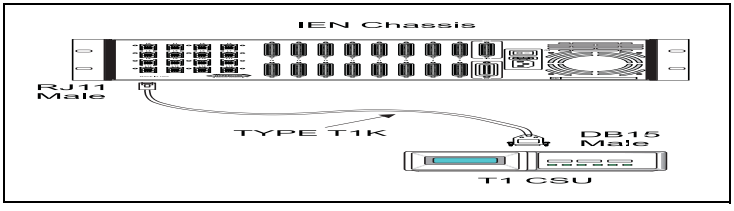

Figure 4-33 Type T1-K Cable Connection

Type T1-45-M

The Hypercom Type T1-45-M cable (#810074-001) is a male RJ11 to male RJ45 cable. The cable is used to connect a DSX11 or DTC11-LHO port processors to an RJ45 Telco termination. The length of the cable is 15'. Figure 4-34 illustrates the pinout for the Type T1-45-M cable.

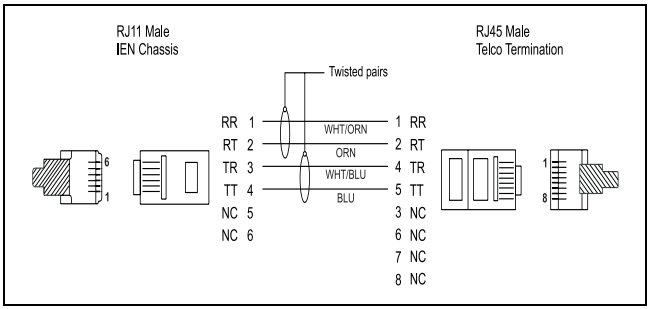

Figure 4-34 Type T1-45-M Cable Pinouts

The Type T1-45-M male RJ11 connector is attached to the appropriate line port on the IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds to the slot containing the DSX11 or DTC11-LHO port processors. The Type T1-45-M male RJ45 connector is attached to the Telco RJ45 termination.

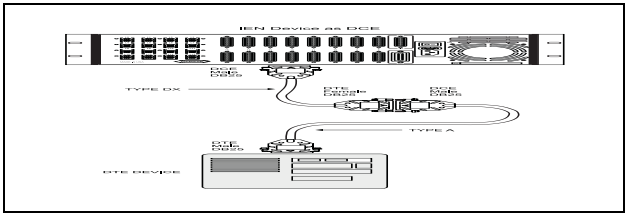

Figure 4-35 Type T1-45-M Cable

Type T1-15-XF

The Hypercom Type T1-15-XF cable (#810099-001) connects a DSX11 or DTC11-LHO port processor to a male DB15 T1 interface cable with a slip connector from a PBX. The cable provides the crossover required between an IEN chassis and a PBX. The length of the cable is 15'. Figure 4-34 illustrates the pinout for the Type T1-15-XF cable.

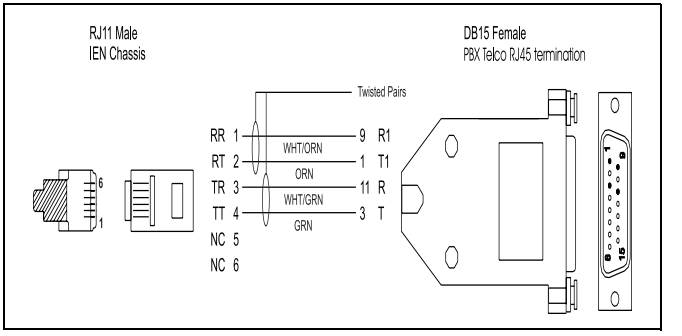

Figure 4-36 Type T1-15-XF Cable Pinout

The Type T1-15-XF male RJ11 connector attaches to the line port on the IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds to the slot containing the DSX11 or DTC11-LHO port processors. The Type T1-15-XF female DB15 connector is attached to the male DB15 T1 termination from a PBX Telco RJ45 termination.

Note: *The Type T1-15-XF cable is used with the DSX11 or DTC11-LHO port processor.*

Figure 4-37 illustrates the cable connection for the Type T1-15-XF cable.

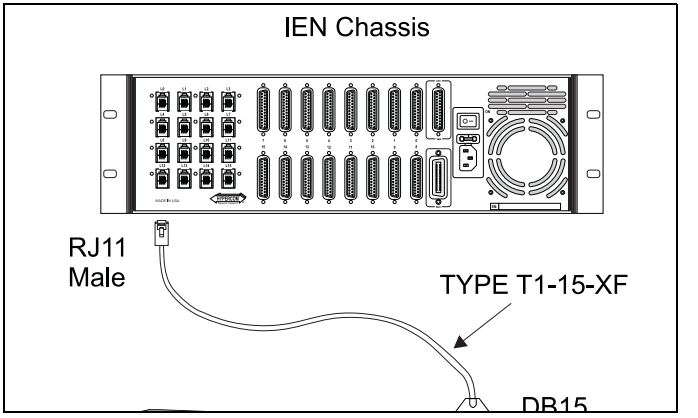

Figure 4-37 Type T1-15-XF Cable Connection

Type T1-45-XF

The Hypercom Type T1-45-XF cable (#810128-001) is a male RJ11 to female RJ45 cable. The cable is used to connect a DSX11 or DTC11-LHO port processor to a male RJ45 T1 interface cable from a PBX. The cable provides the crossover required between an IEN chassis and a PBX. The length of the cable is 15'. Figure 4-38 illustrates the pinout for the Type T1-45-XF cable.

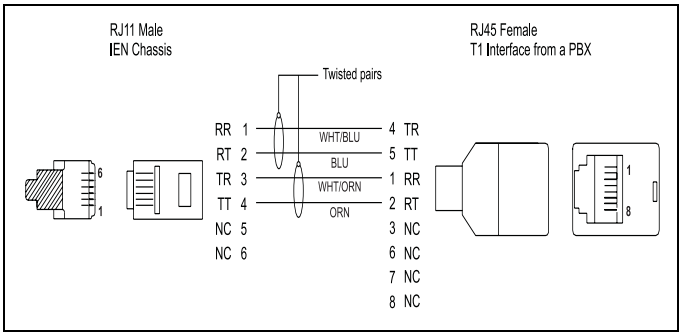

Figure 4-38 Type T1-45-XF Cable Pinout

The Type T1-45-XF male RJ11 connector attaches to the line port on the IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds to the slot containing the DSX11 or DTC11-LHO port processor. The Type T1-45-XF female RJ45 connector is attached to the male RJ45 T1 termination from a PBX. Figure 4-39 illustrates the cable connection for the Type T1-45-XF cable.

Note: *The Type T1-45-XF cable is used with the DSX11 or DTC11-LHO port processors.*

Figure 4-39 illustrates the cable connection for the Type T1-45-XF cable.

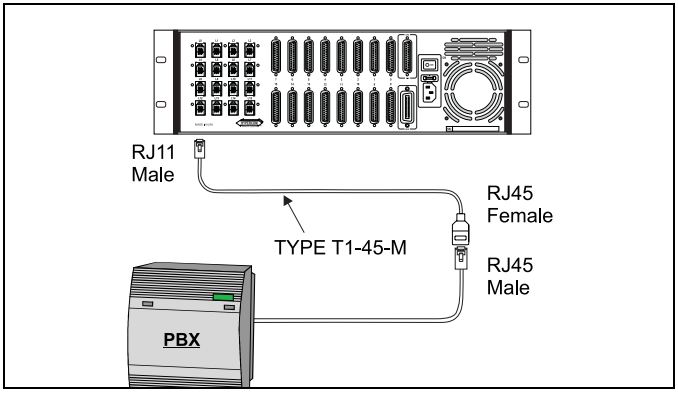

Figure 4-39 Type T1-45-XF Cable Connection

Type T(63)

The Hypercom Type T(63) cable (#810123-001) is a male RJ11 to two female RJ11 cable. The cable provides two female RJ11 connectors that come off of a CID63 port processor. This cable can be connected to other Hypercom RJ11 type cables. The cable splits out the two line ports of a CID63 port processor. The length of the cable is 3'. Figure 4-32 illustrates the pinout for the Type T(63) cable.

Note: *The second connector only supports a two-wire connection.*

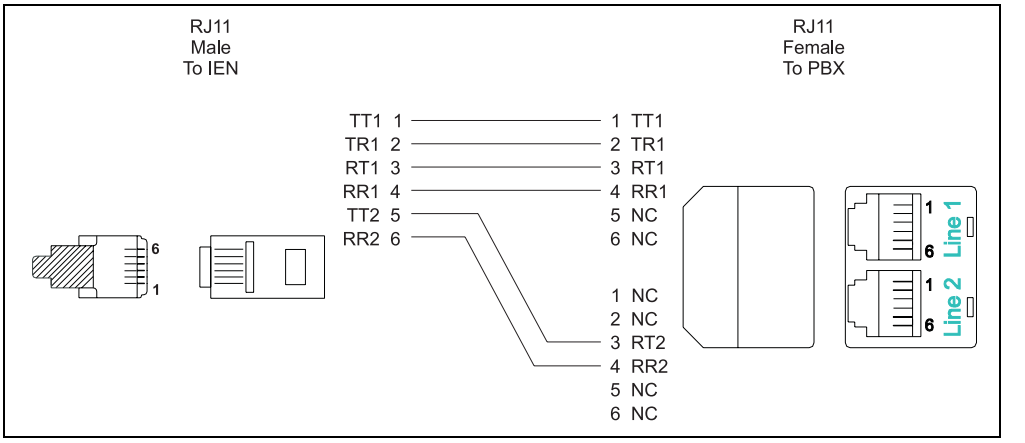

Figure 4-40 Type T(63) Cable Pinout

Figure 4-41 illustrates the cable connection for the Type T(63) cable.

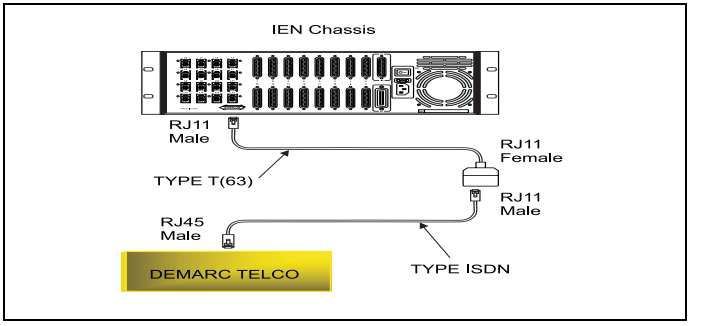

Figure 4-41 Type T(63) Cable Connection

Type TR

The Hypercom Type TR cable (#810016-001) is a male DB25 to male AMP 55400-1 cable. The cable is used to connect an IEN chassis to a Token Ring STP multiple access unit (MAU). The length of the cable is 10'. Figure 4-42 illustrates the pinout for the Type TR cable.

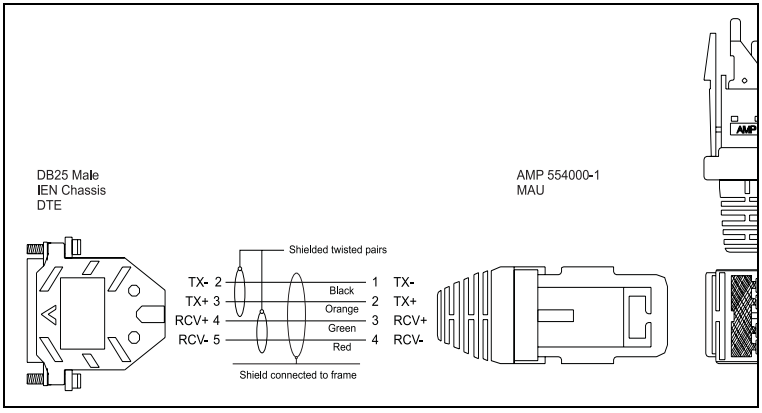

Figure 4-42 Type TR Cable Pinouts

The Type TR cable is used to provide a standard Token Ring STP connection. The Type TR male DB25 connector is attached to the appropriate line port of an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The STP data connector is attached to an STP MAU. Figure 4-43 illustrates the cable connection for the Type TR cable.

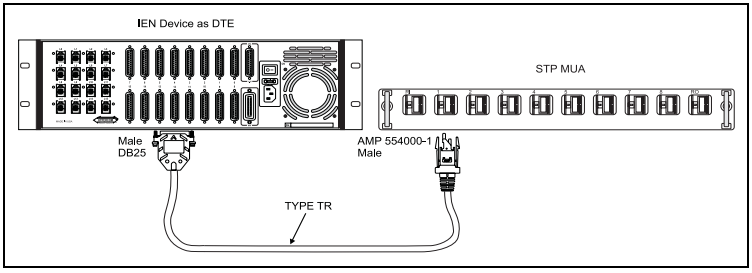

Figure 4-43 Type TR Cable Connection

Type UET

The Hypercom Type UET cable (#810017-002)is a male RJ45 to male RJ11 cable. The cable is used with the Hypercom Ethernet port processors to provide a standard male RJ45 connector. The length of the cable is 10'. Figure 4-44 illustrates the pinout for the Type UET cable.

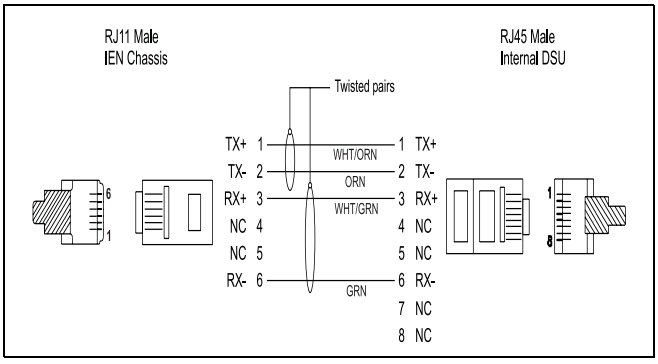

Figure 4-44 Type UET Cable Pinouts

The Type UET male RJ11 connector is attached to the appropriate line port of an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds the slot containing the LET61 port processor. The Type UET male RJ45 connector is then plugged into the appropriate female RJ45 UTP hub port. Figure 4-45 illustrates the use of the Type UET Cable.

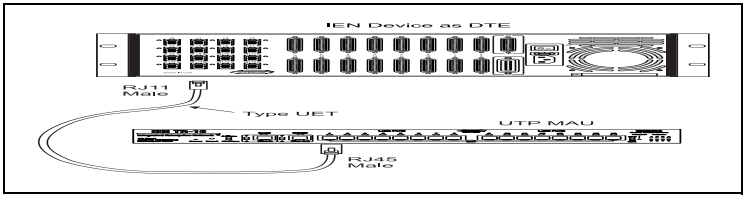

Figure 4-45 Type UET Cable

Notes:

1. *The Type UET cable must be attached to an RJ11 line port on the IEN 3000. Do not attach the Type UET cable to the RJ11 LAN port.*
2. *Do not use RJ45 cables that do not incorporate twisted pairs (the flat silver-satin cables). Cables without twisted pairs do not offer the same noise protection as UTP cables.*

Type UTR-45-M

The Hypercom Type UTR-45-M cable (#810049-002) is a male RJ11 to male RJ45 cable. The cable is used with the LTR61 port processor to provide a standard Token Ring RJ45 UTP connection. The length of the cable is 15'. Figure 4-46 illustrates the pinout for the Type UTR-45-M cable.

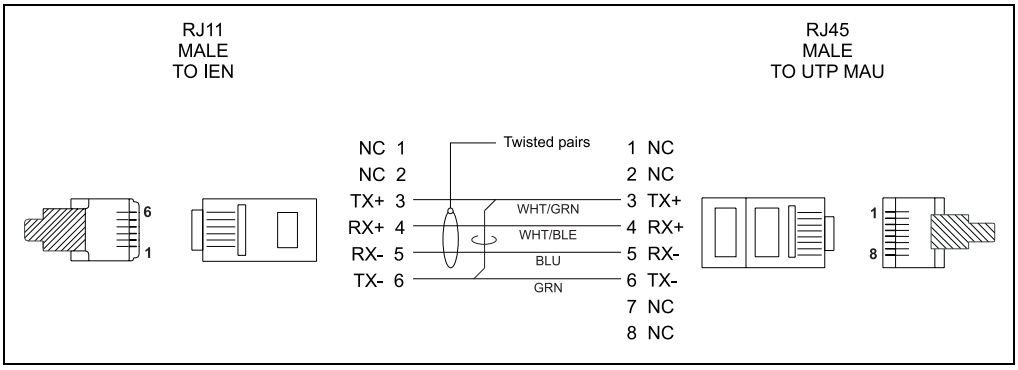

Figure 4-46 Type UTR-45-M Cable Pinouts

The Type UTR male RJ11 connector is attached to the appropriate line port of an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis that corresponds with the slot containing the LTR61 port processor. The Type UTR male RJ45 connector is attached to a UTP MAU. Figure 4-47 illustrates the use of the Type UTR-45-M cable.

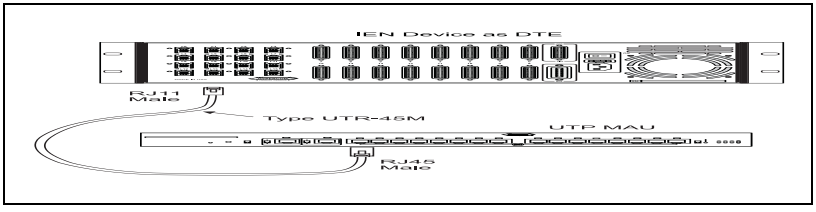

Figure 4-47 Type UTR-45-M Cable

Notes:

1. *The Type UTR-45-M cable must be attached to an RJ11 line port on the IEN 3000. Do not attach the Type UTR-45-M cable to the RJ11 LAN port.*
2. *Do not use RJ45 cables that do not incorporate twisted pairs (the flat silver-satin cables). Cables without twisted pairs do not offer the same noise protection as UTP cables.*
3. *The IEN 2000 and IEN 4000 chassis have T/R UTP ports that can be used with straight RS45 cables, voiding the need for the UTR adapter cable.*

Type V

The Hypercom Type V cable (#810018-001) is a male DB25 to male V.35 cable. The cable is used to connect an IEN chassis to a V.35 DCE device. The length of the cable is 10'. Figure 4-48 illustrates the pinout for the Type V cable.

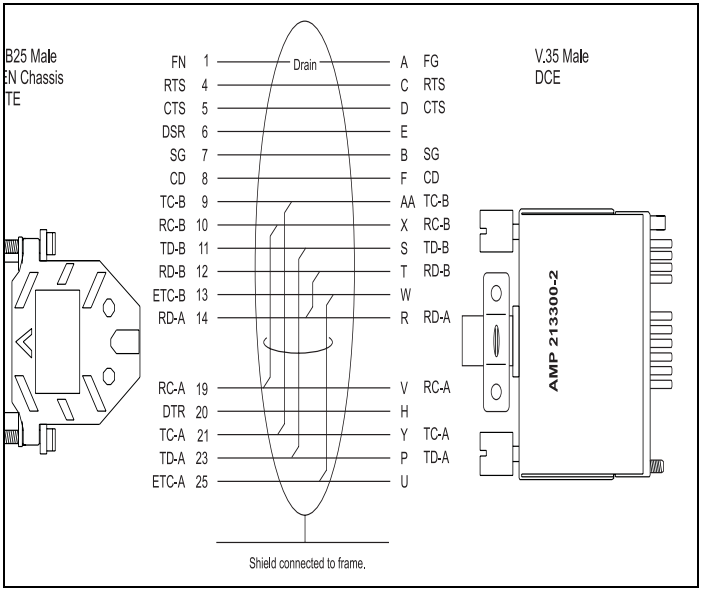

Figure 4-48 Type V Cable Pinouts

The Type V male DB25 connector is attached to the appropriate port of an IEN 1000, IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type V male V.35 connector is attached to a V.35 DCE serial device. Figure 4-49 illustrates the use of the Hypercom Type V cable.

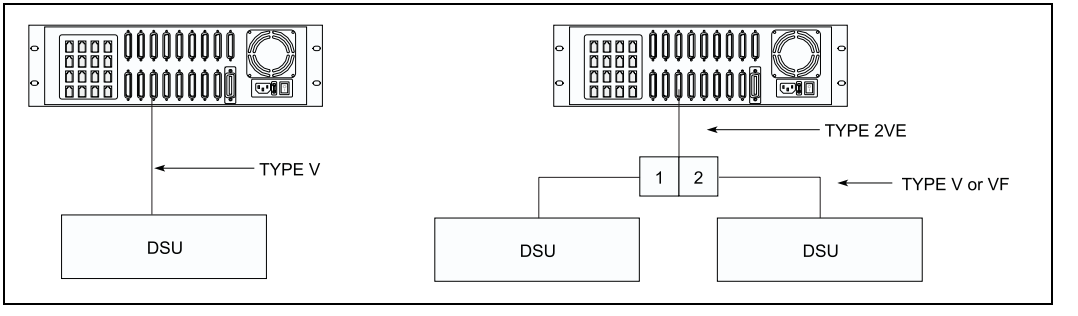

Figure 4-49 Type V Cable

Type VF

The Hypercom Type VF cable (#810019-001) is a male DB25 to female V.35 cable. The cable is similar to the Type V cable, except this cable is terminated with a female V.35 connector. The length of the cable is 10'. Figure 4-50 illustrates the pinout for the Type VF cable.

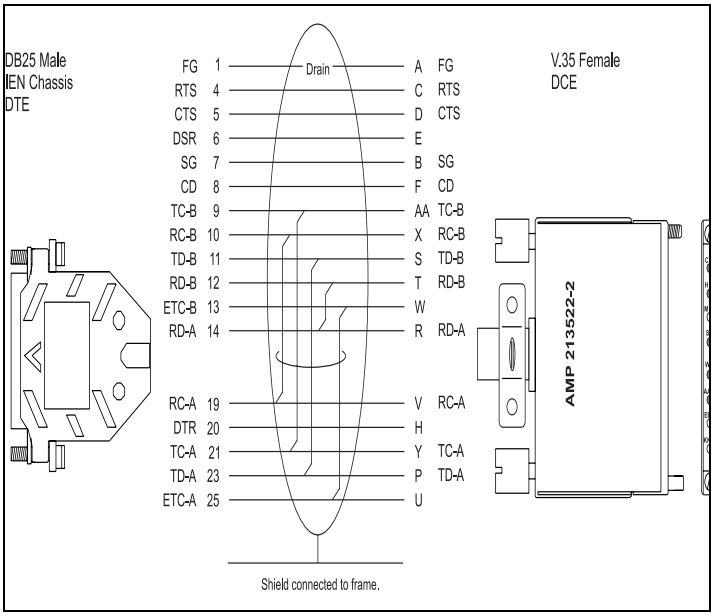

Figure 4-50 Type VF Cable Pinouts

The Type VF male DB25 connector is attached to the appropriate port of an IEN 1000, IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type VF female V.35 connector is attached to a male V.35 DCE serial device or cable. Figure 4-51 illustrates the use of the Type VF cable.

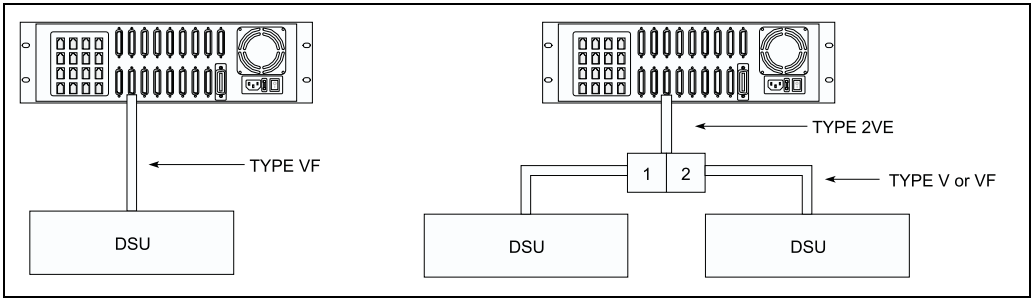

Figure 4-51 Type VF Cable Connection

Type VM

The Hypercom Type VM cable (#810099-001) is a male DB25 to a male DB25 and male V.35 cable. The cable is used with a CID61 port processor to provide an RS232 IENView connection simultaneously with a connection to a V.35 DCE user device. The V.35 interface is identical to Hypercom's Type V cable and is typically connects to an external DSU or CSU. The RS232 IENView interface is for an asynchronous connection to an external modem for IENView dialup, or a direct IENView connection when used with a Type P cable. The length of both cables are 10'. Figure 4-54 illustrates the pinout for the Type VM cable.

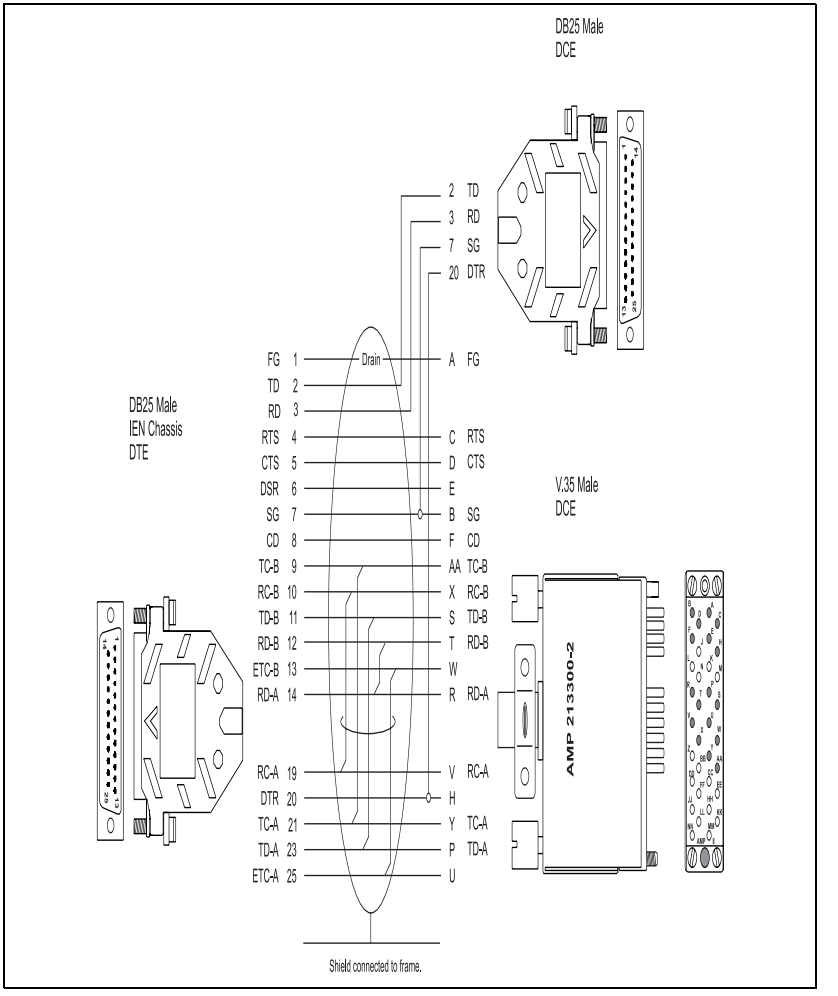

Figure 4-52 Type VM Cable Pinout

Note: *The Type VM cable is used only with a CID61 WAN interface.*

The Type VM male DB25 connector attaches to the port of an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type VM male V.35 connector is attached to a V.35 serial device. The Type VM RS232 connector is attached to an RS232 asynchronous modem or cross cable to an IENView PC. Figure 4-55 illustrates the cable connections for the Type VM cable.

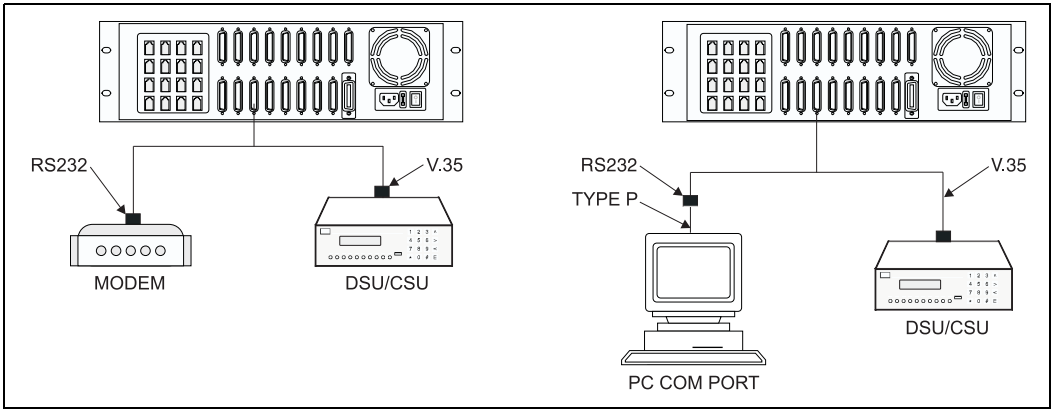

Figure 4-53 Type VM Cable Connections

Note: *A female gender changer is required to attach the male DB25 connector of the Type VM to the male DB25 connector of the Type P cable.*

Type VNN

The Hypercom Type VNN cable (#810020-002) is a male DB25 to male DB25 cable. The cable is used exclusively to connect two IEN chassis back-to-back using a V.35 physical level connection. The length of the cable is 10'. Figure 4-54 illustrates the pinout for the Type VNN cable.

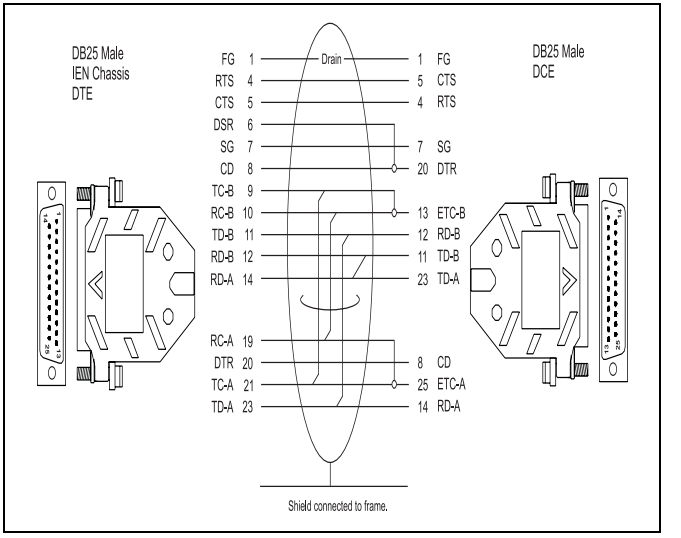

Figure 4-54 Type VNN Cable Pinouts

The Type VNN male DB25 connector marked as DCE must be attached to the IEN 1000, IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis port that corresponds to the slot providing the clock. The Type VNN male DB25 connector marked as DTE is attached to the desired chassis line port corresponding to the slot configured as the slave. Figure 4-55 illustrates the use of the Type VNN cable.

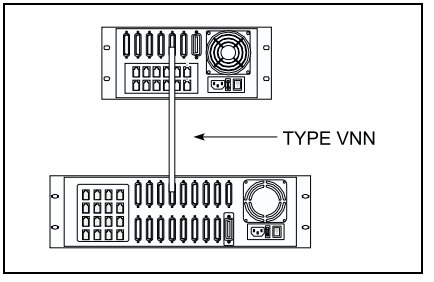

Figure 4-55 Type VNN Cable

Type VX

The Hypercom Type VX Cable (#810050-002) is a male DB25 to female V.35 cable. The cable is used to connect a V.35 DTE user device to an IEN chassis. The IEN 1000 chassis, the CID61, CID63 or CID15HA port processors provide a clock to the DTE. The length of the cable is 10'. Figure 4-56 illustrates the pinout for the Type VX cable.

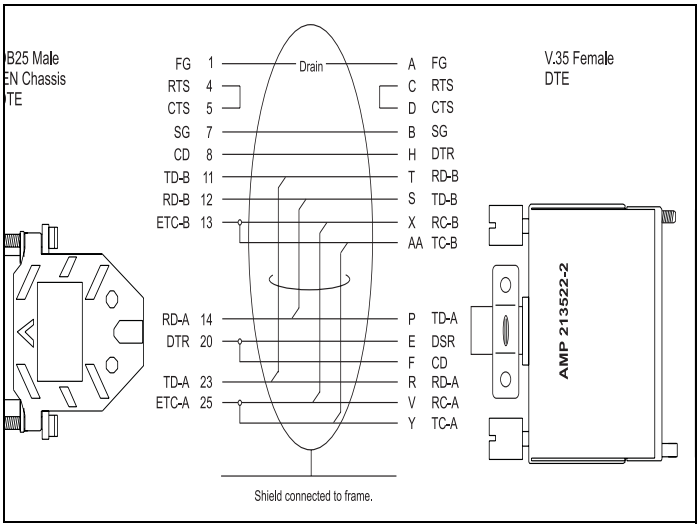

Figure 4-56 Type VX Cable Pinouts

The Type VX male DB25 connector is attached to the appropriate line port of an IEN 1000, IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis. The Type VX female V.35 connector is attached to a V.35 DTE serial device. Figure 4-57 illustrates the use of the Type VX cable.

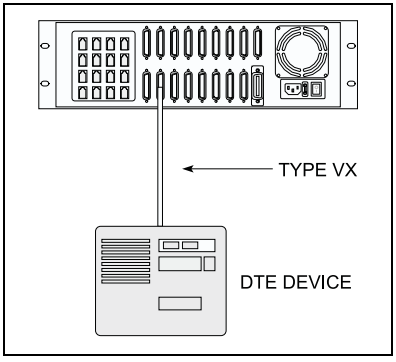

Figure 4-57 Type VX Cable

Type Y

The Hypercom Type Y cable (#810021-001)is a male DB25 to three female DB25 cable. The cable is used to connect a CID61 port processor to three RS232 DTE ports. The CID61 port processor provides clocking. The length of the cable is 3'. Figure 4-58 illustrates the pinout for the Type Y cable.

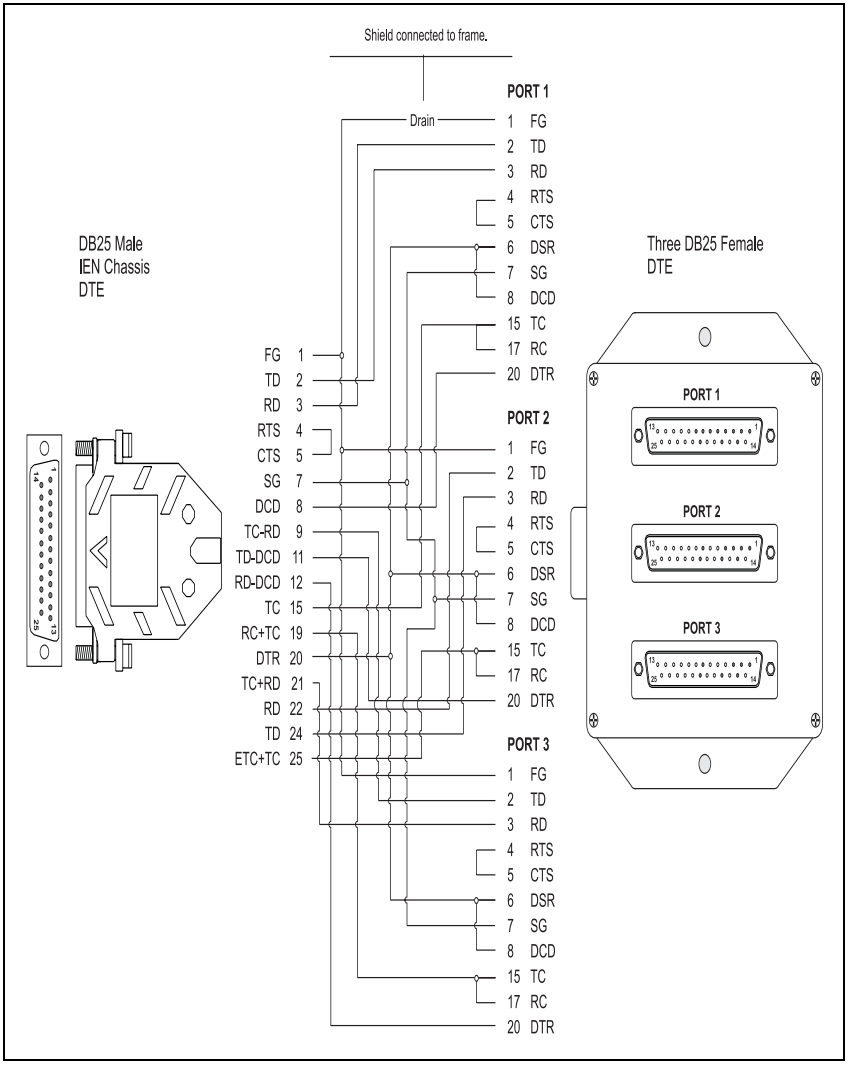

Figure 4-58 Type Y Cable Pinouts

Figure 4-59 illustrates the use of the Type Y cable.

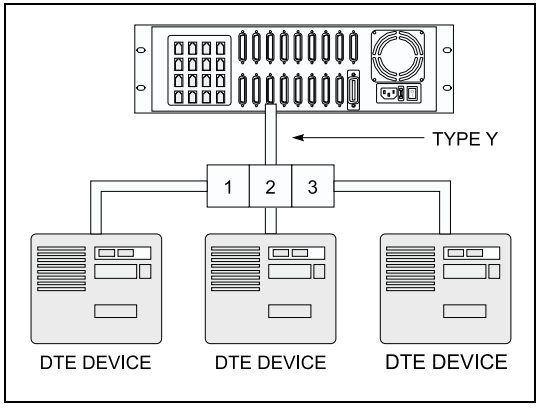

Figure 4-59 Type Y Cable

Type YA

The Hypercom Type YA cable (#810025-001) is a male DB25 to three female DB25 cable. The cable is used to connect a CID61 port processor to three RS232 DCE ports. The length of the cable is 3'. Figure 4-60 illustrates the pinout for the Type YA cable.

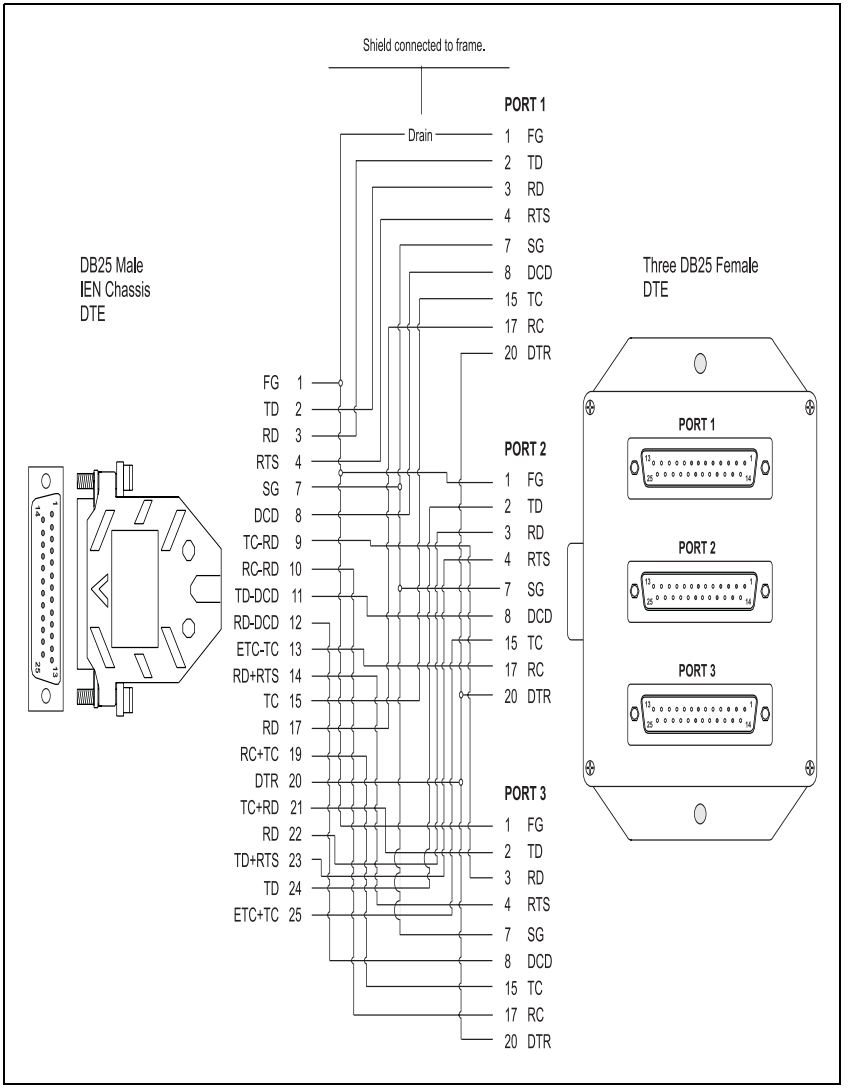

Figure 4-60 Type YA Cable Pinouts

Figure 4-61 illustrates the use of the Type YA cable.

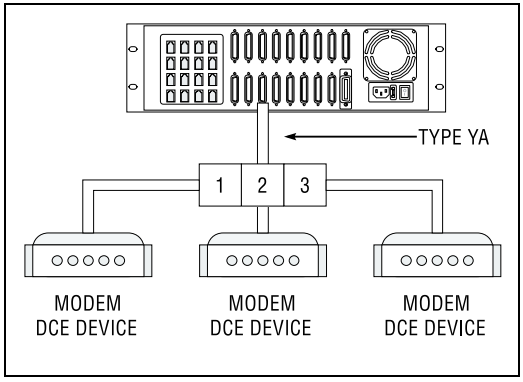

Figure 4-61 Type YA Cable

Type Y(63)

The Hypercom Type Y(63) cable (#810117-001) is a male DB25 to two female DB25 cable. The cable provides two DB25 DTE connectors that come off of a CID63 port processor. The length of the cable is 3'. This cable can be connected to the Type V, VF, VX, A and D cables. Figure 4-64 illustrates the pinout for the Type Y(63) cable.

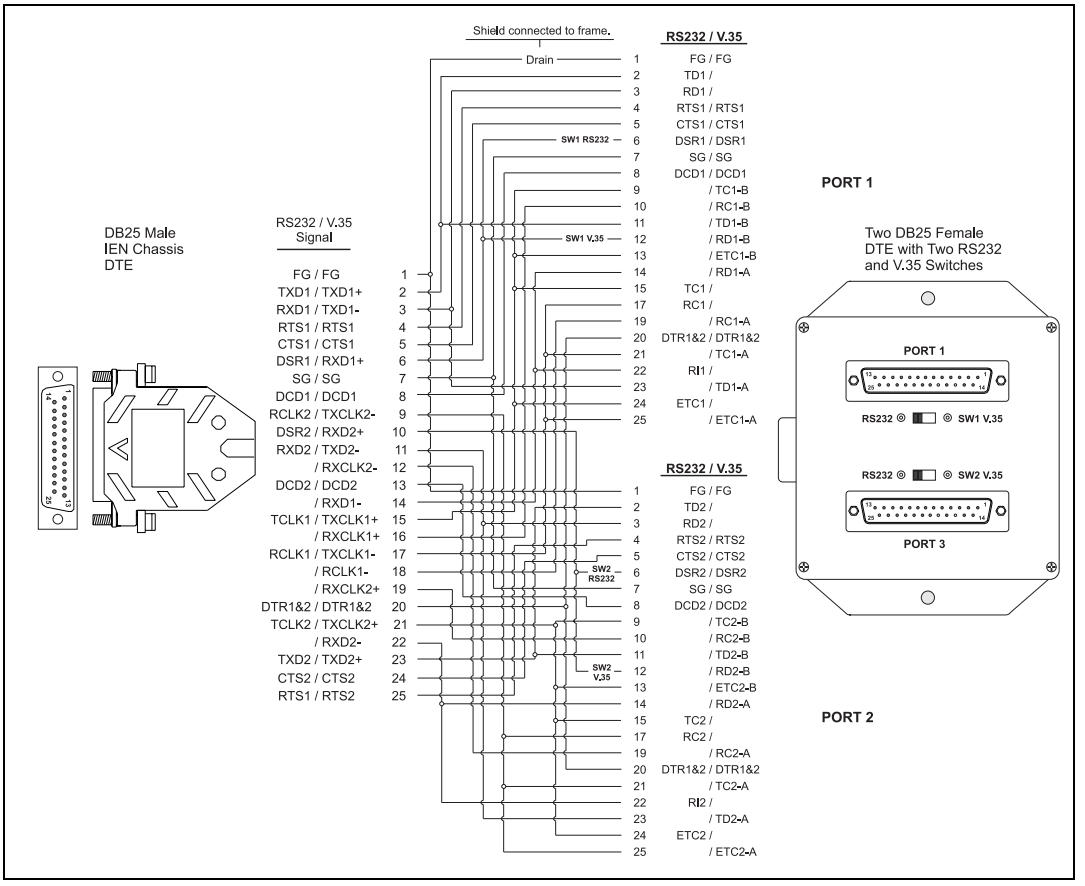

Figure 4-62 Type Y(63) Cable Pinout

Figure 4-65 illustrates the cable connections for the Type Y(63) cable.

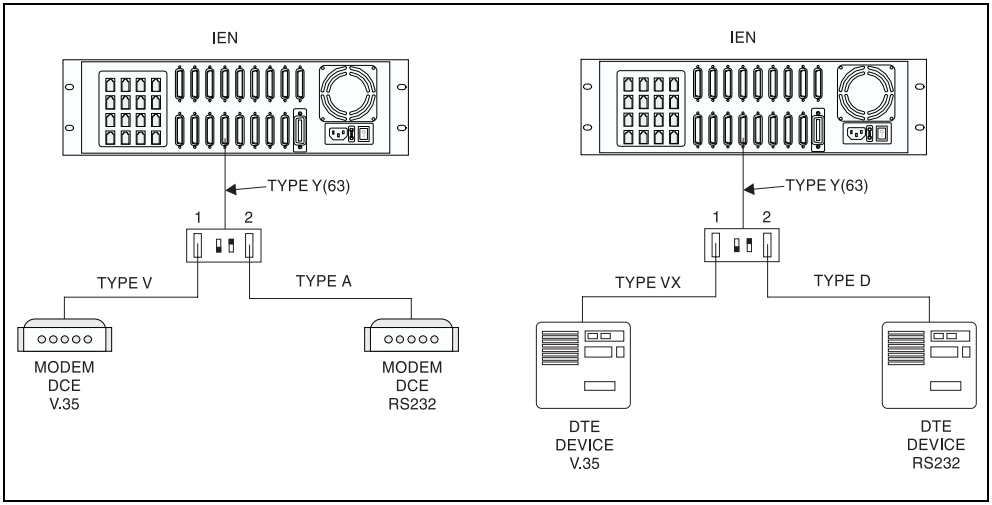

Figure 4-63 Type Y(63) Cable Connection

There is a set of switches on the Type Y(63) cable DB25 connectors for the CID63 port that must be set to the appropriate RS232 or V.35 settings.

Type 2VE

The Hypercom Type 2VE cable (#810083-001) is a male DB25 to two female DB25 cable. The cable is used only with the CID61-Dual port processor to connect up to two V.35 DCE ports. The length of the cable is 3'. Figure 4-64 illustrates the pinout for the Type 2VE cable.

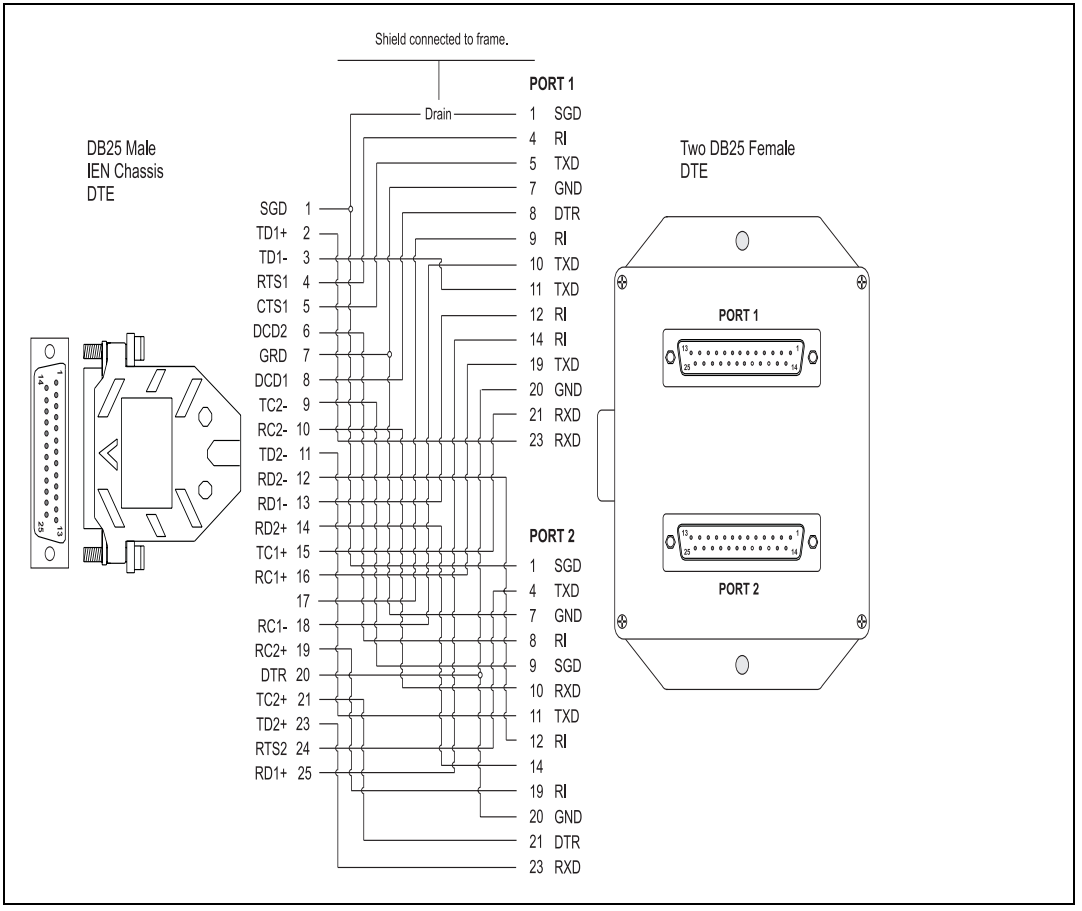

Figure 4-64 Type 2VE Cable Pinouts

The Type 2VE male DB25 connector is attached to an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis port that corresponds to the slot occupied by the CID61-Dual port processor. Each female DB25 connector requires a Type V or VF cable which is then attached to the V.35 DCE device. Figure 4-65 illustrates the use of the Type 2VE cable.

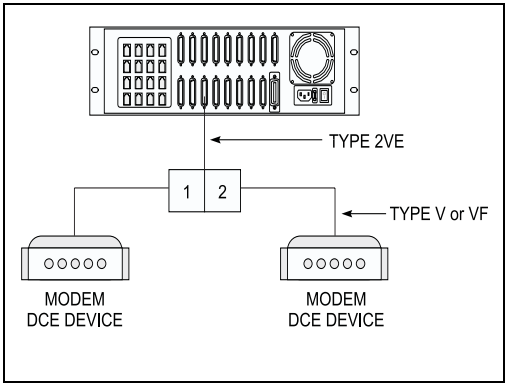

Figure 4-65 Type 2VE Cable

HUB08/LET10 PATCH

The patch cable is used only on the IEN 1000 chassis with the combination of the HB08 and LET10 modules. With the HUB08 and LET10 combination, the AUI and BNC port of the LET10 belong to the HUB08. The LET10 router defaults to the UTP port for network access. The LET10 UTP port must be plugged into the eight RJ45 hub ports. Hypercom provides an RJ45 straight cable for use with the HUB08 and LET10 modules. Figure 4-66 illustrates the HUB08 and LET10 module combination using the patch cable.

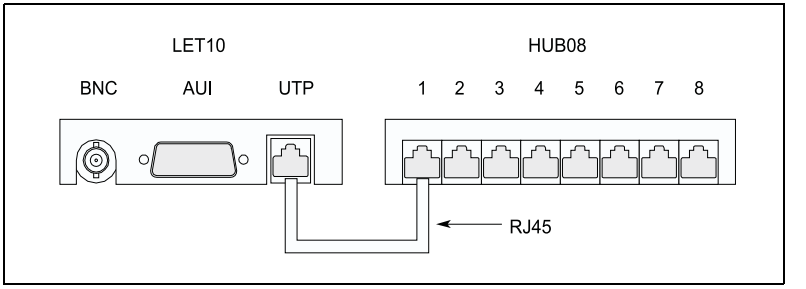

Figure 4-66 HUB08 and LET10 Combination Patch Cable

POWER CABLES

Hypercom IEN chassis are provided with either an AC or DC power supply. The IEC 320-C14 power input module on each IEN node is labeled 110V, 220V, or 48V DC. Figure 4-67 illustrates the 120VAC power connections for the IEN chassis.

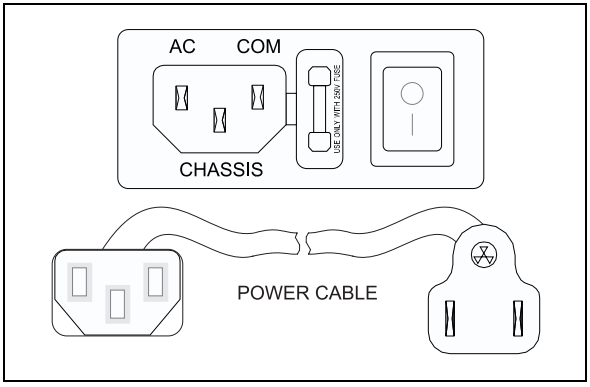

Figure 4-67 AC 120V Power Cable

Figure 4-68 illustrates the IEN 1000 AC power connector.

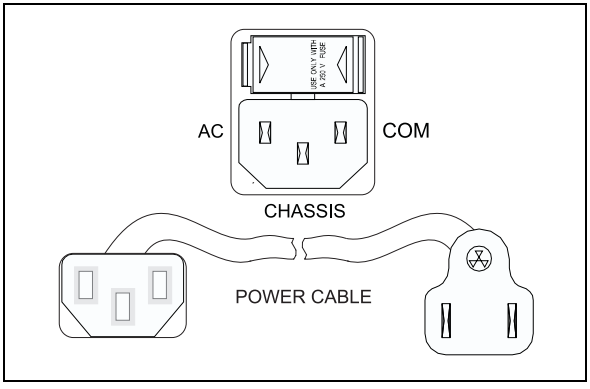

Figure 4-68 AC 120V IEN 1000

The IEC 320-C14 DC connector on an IEN node is modified to prevent the insertion of an AC line cord. Figure 4-69 illustrates the 48VDC power connections for the IEN chassis.

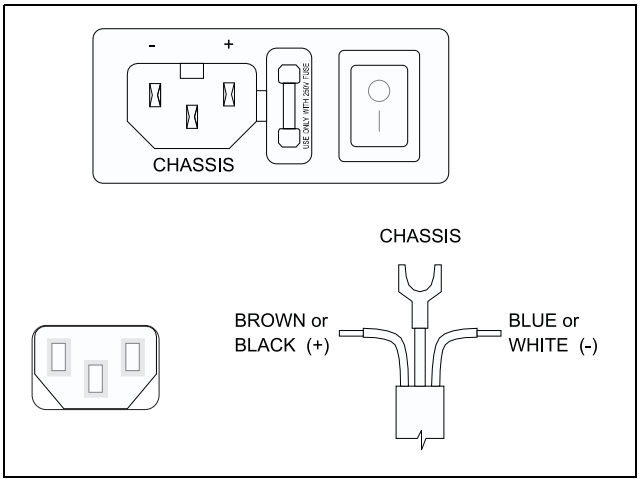

Figure 4-69 DC 48V Power Cable

ADAPTERS

The following adapters are used when connecting IEN chassis to a Thinnet cable or when a AUI interface is required.

LEC01

The LEC01 (#030017-001) is a DB25 to Thinnet Ethernet adapter, and is used with the LET61 when connecting to a Thinnet cable. The LEC01 provides a standard 10Base-2 (BNC) interface. Figure 4-70 illustrates the block diagram for the LEC01 Ethernet Adapter.

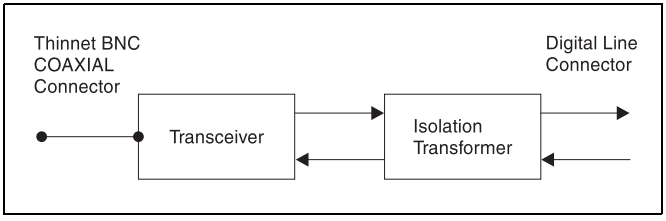

Figure 4-70 LEC01 Block Diagram

Figure 4-71 illustrates the LEC01 Ethernet Adapter.

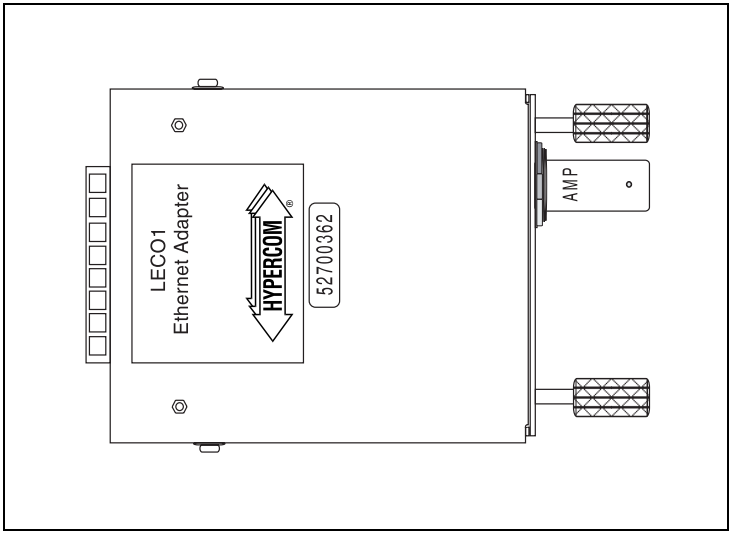

Figure 4-71 LEC01 Ethernet Adapter

LAU01

The LAU01 (#TBD) is a DB25 to AUI Interface adapter, and is used with the LET61 when connecting an AUI interface is required. Figure 4-72 illustrates the LAU01 adapter.

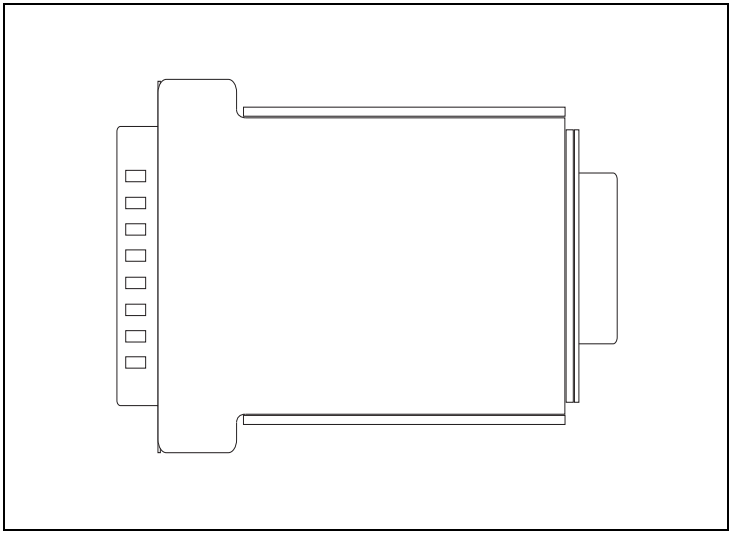

Figure 4-72 LAU01 Adapter

T1/PCM Line Filter

To provide additional surge protection for the IEN chassis network access DTC11-LHO port processor, an external surge protector is required on each IEN chassis. Install only one surge protector per IEN chassis. Figure 4-73 illustrates the IEN T1/PCM Line Filter.

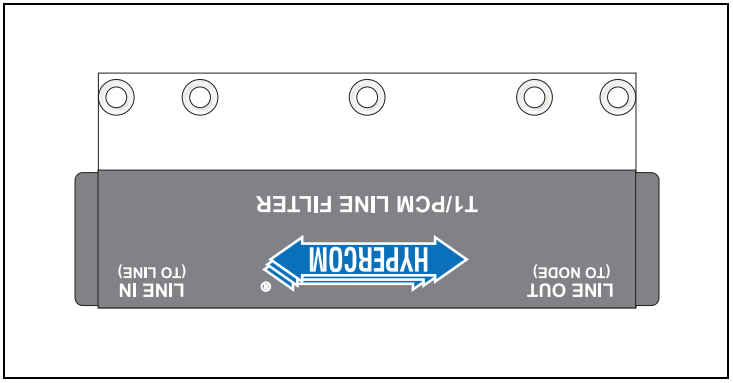

Figure 4-73 IEN T1/PCM Line Filter

System Configuration

In This Chapter

BUS EXTENSION

The IEN 2000, IEN 3000, IEN 4000 and IEN 5000 chassis contain two and sixteen slots respectively. When your site requirements exceed the number of slots provided by a single chassis, you use the bus extension to combine several chassis (up to 240 ports) into a single IEN logical node. Bus connected chassis appear to IENView as a single node with many ports.

There are two types of bus extensions supported by the IEN 2000, IEN 3000, IEN 4000 and IEN 5000 chassis: standard and high-speed.

Note: *The IEN 1000 chassis does not support bus extension.*

IEN 2000 CONFIGURATION

This section describes the configuration procedures for the IEN 2000 chassis. Defining the IEN 2000 chassis to IENView is similar to defining an IEN 1000, IEN 3000, IEN 4000 or IEN 5000 chassis in that, each port is represented by a unique bus address.

Bus Extension

Ethernet or Token Ring bus extension is required when exceeding four chassis. Groups of four chassis may be bus connected using Type HB2 cables and then connect the groups using Ethernet or Token Ring bus extension.

Note: *Standard bus extension is not an option with the IEN 2000 chassis.*

The Ethernet or Token Ring bus extension uses LET61B or LTR61B LAN boards respectively; however, these interfaces may not be used as router interfaces and must have their own dedicated LAN for bus traffic. This method extends both the standard and high-speed busses.

- Used when exceeding four chassis
- This method of bus expansion is used to extend both the high-speed and the standard bus
- The topology chosen should be dedicated as a backbone for the IEN node and not shared with a LAN application
- Traffic across the extended bus is minimized to that which requires to be crossed to an application interface in another chassis

Figure 5-1 illustrates the bus expansion for the IEN 2000 chassis.

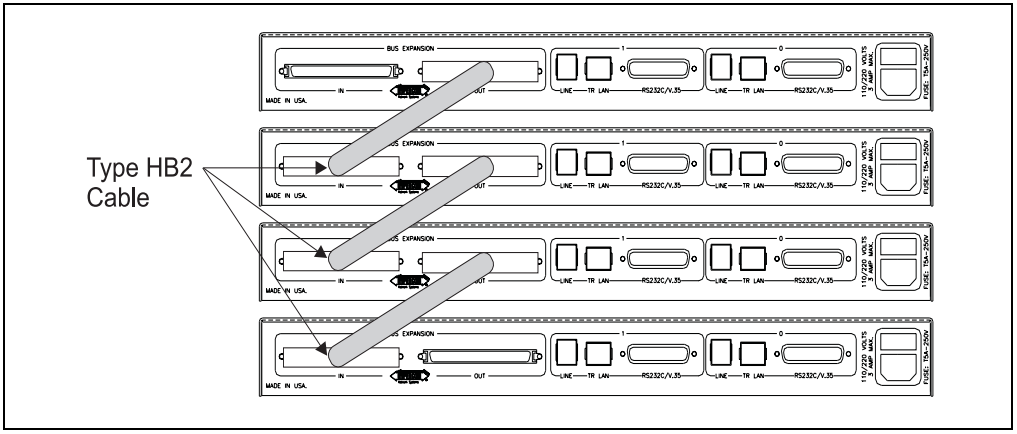

Figure 5-1 IEN 2000 Bus Expansion

High-Speed Bus Extension

You can extend the high-speed bus by using the Ethernet or Token Ring bus extension. The Ethernet and Token Ring bus extension is required when your network requirements exceed four chassis per node.

The standard bus is also extended by grouping three chassis, using the Hypercom Type HB2 cable, and connecting these groups using the Ethernet or Token Ring bus extension. Refer to CHAPTER 4, Type HB2 for more information about the Hypercom Type HB2 cable. Figure 5-10 illustrates the Ethernet high-speed bus extension.

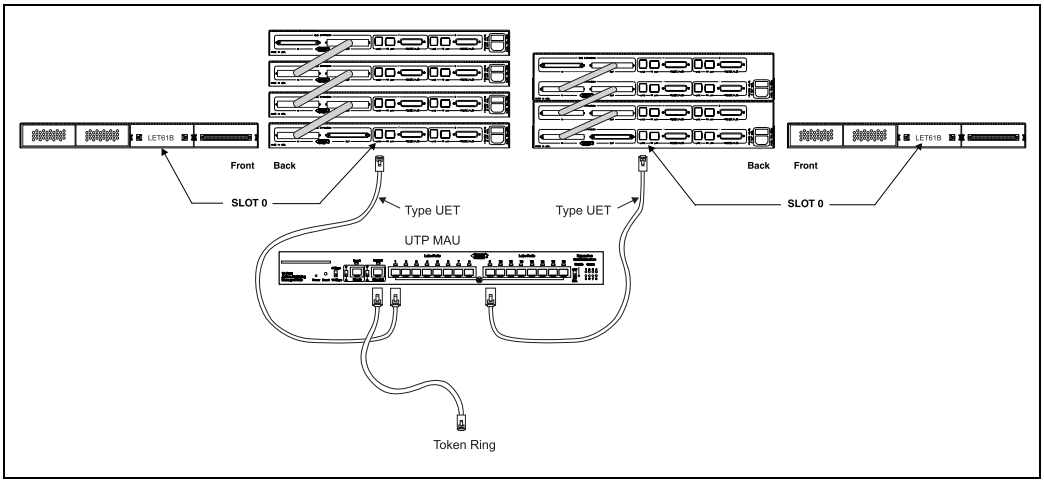

Figure 5-2 Ethernet High-Speed Bus Extension

Note: *The TDM bus is also extended via the Type HB2 cable in the IEN 2000 chassis.*

IEN 3000 CONFIGURATION

This section describes the configuration procedures for the IEN 3000 chassis. Defining the IEN 3000 chassis to IENView is similar to defining an IEN 1000, IEN 2000, IEN 4000 or IEN 5000 chassis in that, each port is represented by a unique bus address.

Bus Clock Settings

The standard bus clock is generated within the IEN 3000 chassis backplane. Therefore, when bus expanding IEN 3000 chassis, it is necessary to adhere to the following bus setting. Figure 5-3 illustrates the bus clock settings for the IEN 3000 chassis.

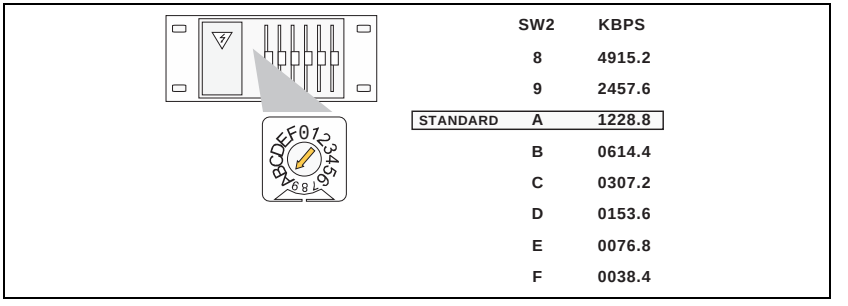

Figure 5-3 IEN 3000 Bus Clock Settings

Note: *The standard bus speed must be set to A (factory default) when using a standard bus extension. If 32 Bit port processors are in use (CID61, LET61, LTR61 or CID63), the use of Token Ring or Ethernet bus extension is recommended to optimize performance.*

DIP Switch Settings

The Hypercom IEN 3000 chassis may be bus connected using a Hypercom Type B cable, up to three chassis. In a two chassis IEN 3000 configuration, one chassis must be set to Master Clock (default factory settings), and the other must be set to Redundant Clock. If the Master Clock fails, the redundant clock takes over. Figure 5-4 illustrates the DIP switch settings for the IEN 3000 chassis.

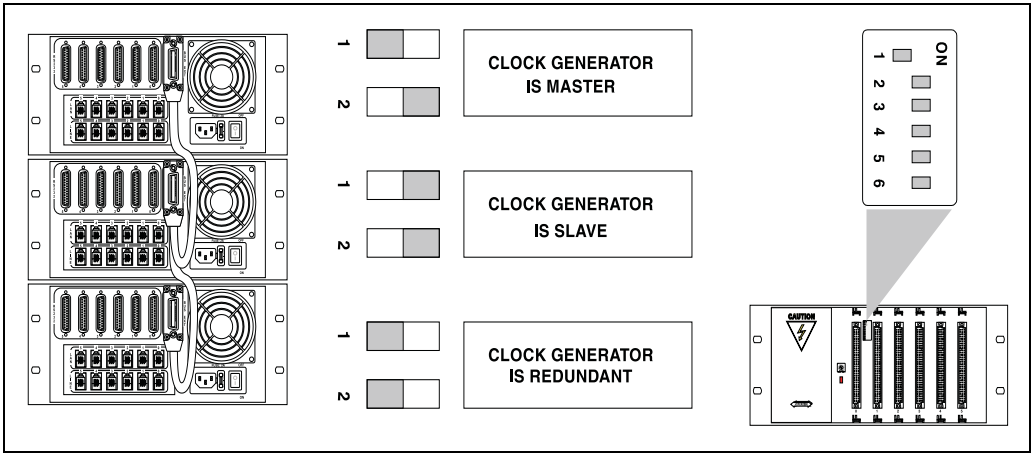

Figure 5-4 IEN 3000 DIP Switch Settings

Note: *The Master and Redundant chassis are end points of the expanded bus and require bus terminators attached to the Type B cables. Refer to CHAPTER 4, Type B for more information about the Hypercom Type B cable and terminator.*

Bus Extension

Ethernet or Token Ring bus extension is required when exceeding three chassis. Standard bus extension may still be used. Groups of three chassis may be connected using Type B cables and then connect the groups using Ethernet or Token Ring bus extension.

Note: *Connecting more than three chassis using the standard bus extension may result in deterioration of the standard bus clock and errors on the standard bus.*

The Ethernet or Token Ring bus extension uses LET61B or LTR61B LAN port processors respectively; however, these interfaces may not be used as router interfaces and must have their own dedicated LAN for bus traffic. This method extends both the standard and high-speed busses.

- Used when exceeding three chassis
- This method of bus extension is used to extend both the high-speed and the standard bus
- The topology chosen should be dedicated as a backbone for the IEN node and not shared with a LAN application
- Traffic across the extended bus is minimized to that which requires to be crossed to an application interface in another chassis

High-Speed Bus Extension

You can extend the high-speed bus by using the Ethernet or Token Ring bus extension. The Ethernet and Token Ring bus extension is required when your network requirements exceed three chassis per node.

The standard bus is also extended by grouping three chassis, using the Hypercom Type B cable, and connecting these groups using the Ethernet or Token Ring bus extension. Refer to CHAPTER 4, Type B for more information about the Hypercom Type B cable. Figure 5-10 illustrates the Ethernet high-speed bus extension.

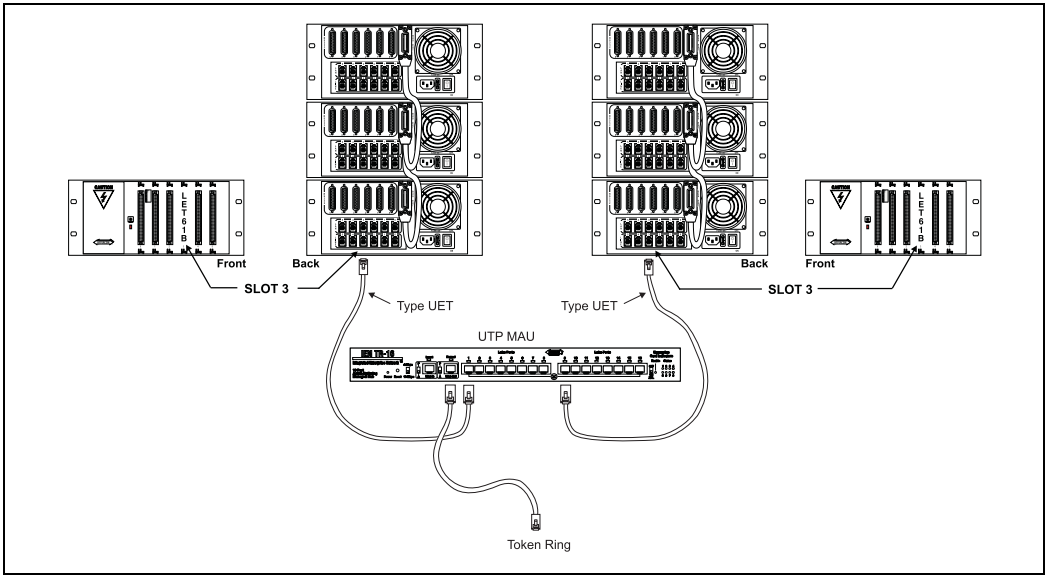

Figure 5-5 Ethernet High-Speed Bus Extension

The Ethernet bus extension uses the LET61B port processor and may use 10Base-T or 10Base-2. 10Base-T requires an external UTP HUB. 10Base-2 requires an LEC01 for each LET61B and appropriate coax cable. The Token Ring bus extension uses the LET61B port processor and requires a UTP or STP MAU. Refer to CHAPTER 3, Port Processors/Modules for more information about the LET61B and LTR61B port processors.

Note: *The Ethernet or Token Ring extended bus must not be shared with other LAN traffic.*

All bus connected chassis appear as a single node to IENView. One node may support up to 240 ports. This method of bus extension extends both the standard bus and high-speed bus. Traffic across the extended bus is minimized to that which needs to cross to an application interface in another chassis.

Note: *Hypercom recommends that each chassis be assigned a range of bus addresses. This permits the Token Ring or Ethernet bus extenders to filter unnecessary traffic from each chassis.*

IEN 4000 CONFIGURATION

This section describes the configuration procedures for the IEN 4000 chassis. Defining the IEN 4000 chassis to IENView is similar to defining an IEN 1000, IEN 2000, IEN 3000 or IEN 5000 chassis in that, each port is represented by a unique bus address.

Bus Extension

Ethernet or Token Ring bus extension is required when exceeding three chassis. Standard bus extension may still be used. Groups of three chassis may be connected using Type HB3 cables and then connect the groups using Ethernet or Token Ring bus extension.

Note: *Connecting more than three chassis using the standard bus extension may result in deterioration of the standard bus clock and errors on the standard bus.*

The Ethernet or Token Ring bus extension uses LET61B or LTR61B LAN boards respectively; however, these interfaces may not be used as router interfaces and must have their own dedicated LAN for bus traffic. This method extends both the standard and high-speed busses.

- Used when exceeding four chassis
- This method of bus extension is used to extend both the high-speed and the standard bus
- The topology chosen should be dedicated as a backbone for the IEN node and not shared with a LAN application
- Traffic across the extended bus is minimized to that which requires to be crossed to an application interface in another chassis

Figure 5-1 illustrates the bus expansion for the IEN 4000 chassis.

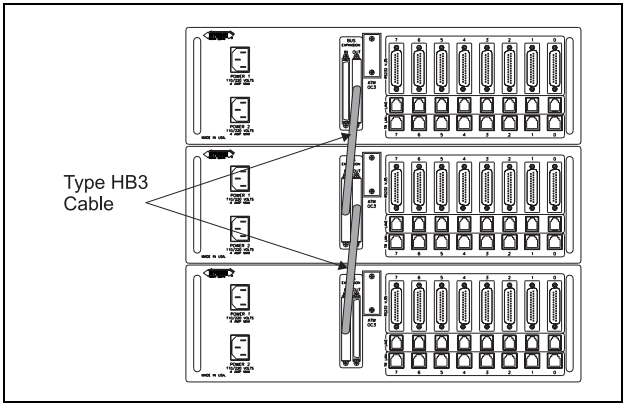

Figure 5-6 IEN 4000 Bus Expansion

High-Speed Bus Extension

You can extend the high-speed bus by using the Ethernet or Token Ring bus extension. The Ethernet and Token Ring bus extension is required when your network requirements exceed three chassis per node.

The standard bus is also extended by grouping three chassis, using the Hypercom Type HB3 cable, and connecting these groups using the Ethernet or Token Ring bus extension. Refer to CHAPTER 4, Type HB3 for more information about the Hypercom Type HB3 cable. Figure 5-10 illustrates the Ethernet high-speed bus extension.

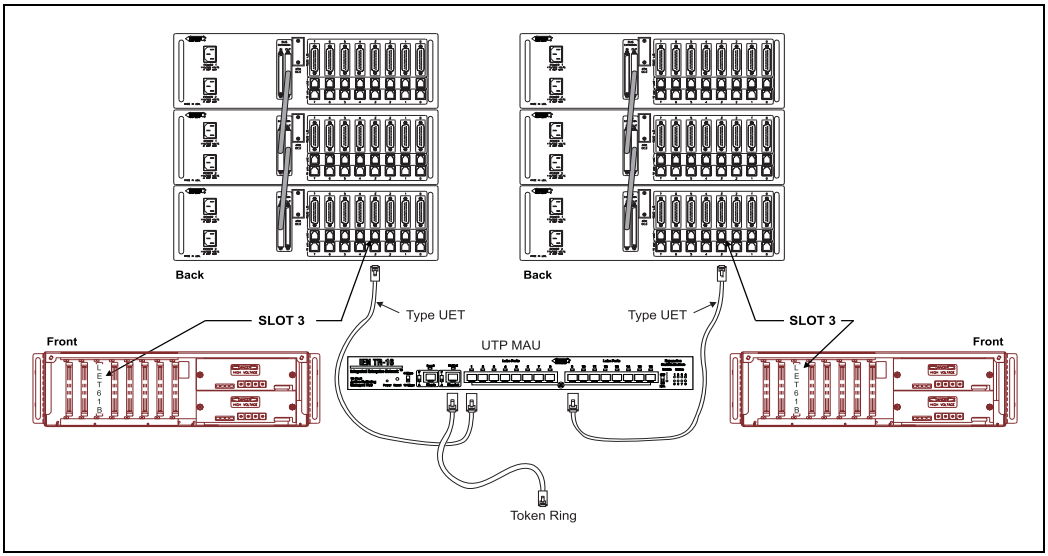

Figure 5-7 Ethernet High-Speed Bus Extension

IEN 5000 CONFIGURATION

This section describes the configuration procedures for the IEN 5000 chassis. Defining the IEN 5000 chassis to IENView is similar to defining an IEN 1000, IEN 2000, IEN 3000 or IEN 4000 chassis in that, each port is represented by a unique bus address.

Bus Clock Settings

The standard bus clock is generated within the IEN 5000 chassis backplane. Therefore, when bus extending IEN 5000 chassis, it is necessary to adhere to following the bus setting. Figure 5-8 illustrates the bus clock settings for the IEN 5000.

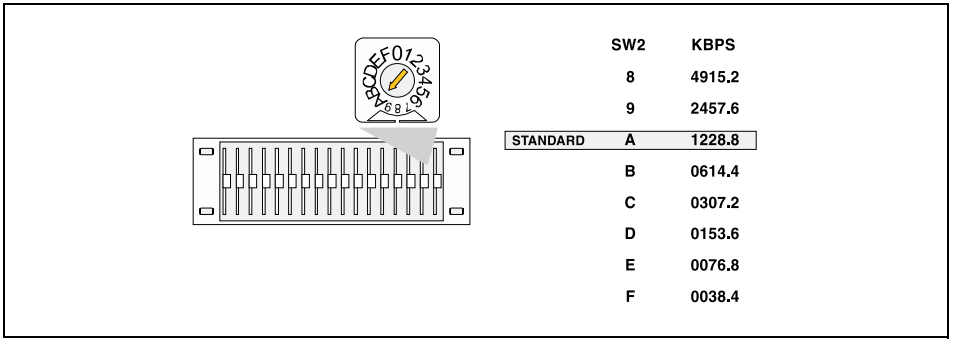

Figure 5-8 IEN 5000 Bus Clock Settings

Note: *The standard bus speed must be set to A (factory default) when using a standard bus extension. If 32 Bit port processors are in use (CID61, LET61, LTR61 or CID63), the use of Token Ring or Ethernet bus extension is recommended to optimize performance.*

DIP Switch Settings

The Hypercom IEN 5000 chassis may be bus connected using a Hypercom Type B cable, up to three chassis. By bus connecting three IEN 5000 chassis, a 51 port node is possible. The Type B cable used only for standard bus expanding the IEN 5000 chassis.

The IEN 5000 chassis can be connected in any order as long as only one master and one redundant are configured.

- Up to three chassis may be connected
- The redundant clock chassis backs up the master clock chassis
- The standard bus speed should always be set to “A” (default factory setting)
- Using this method, only the standard bus is extended
- The bus cable is Hypercom Type B

Figure 5-9 illustrates the DIP switch settings for the IEN 5000 chassis.

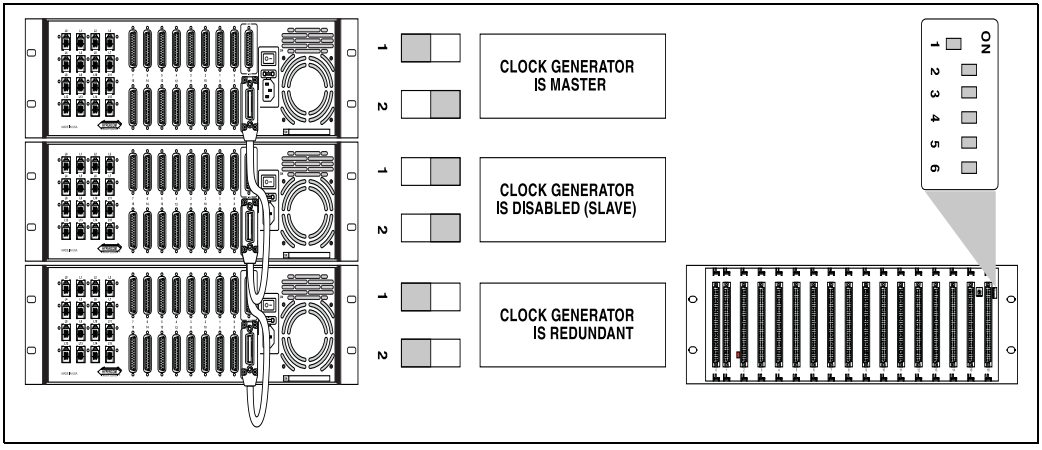

Figure 5-9 DIP Switch Settings

Note: *The Master and Redundant chassis are end points of the extended bus and require bus terminators attached to the Type B cables. Refer to CHAPTER 4, Type B for more information about the Hypercom Type B cable and terminator.*

Bus Extension

Ethernet or Token Ring bus extension is required when exceeding three chassis. Standard bus extension may still be used. Groups of three chassis may be connected using Type B cables and then connect the groups using Ethernet or Token Ring bus extension.

The Ethernet or Token Ring bus extension uses LET61B or LTR61B LAN port processors respectively; however, these interfaces may not be used as router interfaces and must have their own dedicated LAN for bus traffic. This method extends both the standard and high-speed buses.

- Used when exceeding three chassis
- This method of bus extension is used to extend either the high-speed and/or the standard bus
- The topology chosen should be dedicated as a backbone for the IEN node and not shared with a LAN application
- Traffic across the extended bus is minimized to that which requires to be crossed to an application interface in another chassis

High-Speed Bus Extension

You can extend the high-speed bus by using the Ethernet or Token Ring bus extension. The Ethernet and Token Ring bus extension is required when your network requirements exceed three chassis per node.

The standard bus is also extended by grouping three chassis, using the Hypercom Type B cable, and connecting these groups using the Ethernet or Token Ring bus extension. Refer to CHAPTER 4, Type B for more information about the Hypercom Type B cable. Figure 5-10 illustrates the Ethernet high-speed bus extension.

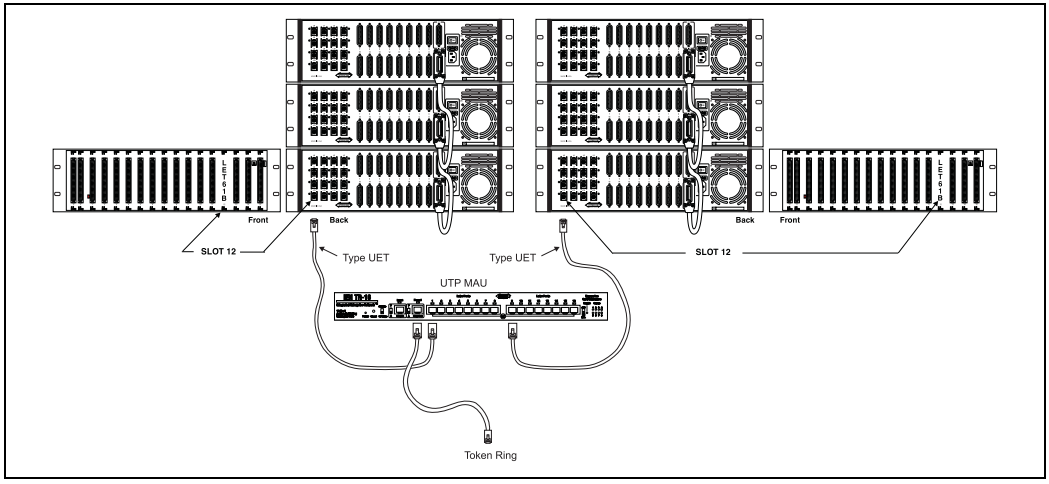

Figure 5-10 Ethernet High-Speed Bus Extension

The Ethernet bus extension uses the LET61B port processor and may use 10Base-T or 10Base-2. 10Base-T requires an external UTP HUB. 10Base-2 requires an LEC01 for each LET61B and appropriate thinned cable. The Token Ring bus extension uses the LET61B port processor and requires a UTP or STP MAU. Refer to CHAPTER 3, Port Processors/Modules for more information about the LET61B and LTR61B port processors.

Note: *The Ethernet or Token Ring extended bus must not be shared with other LAN traffic.*

All bus connected chassis appear as a single node to IENView. One node may support up to 240 ports. This method of bus extension extends both the standard bus and high-speed bus. Traffic across the extended bus is minimized to that which needs to cross to an application interface in another chassis.

Note: *Hypercom recommends that each chassis be assigned a range of bus addresses. This permits the Token Ring or Ethernet bus extenders to filter unnecessary traffic from each chassis.*

System Configuration

In This Chapter

IEN 1000 CONFIGURATION

This section describes the configuration procedures for the IEN 1000 chassis and optional upgrade modules. Defining the IEN 1000 chassis to IENView is similar to defining an IEN 2000, IEN 3000, IEN 4000 or IEN 5000 chassis in that, each port is represented by a unique bus address. However, the bus address for each IEN 1000 chassis port is preassigned in the IEN 1000 chassis software. Table 6-1 lists the bus address assignments for the IEN 1000 chassis and optional upgrade modules.

Bus Address	Port Function
00	WAN
01	Serial Port 1
02	Serial Port 2
03	Serial Port 3
04	Serial Port 4
05	Dial Backup
06	LAN Port (Ethernet or Token Ring)
07	T1
08	HUB
09	MAU
0A	IENView Diagnostics Port (73KS224SL Modem) available for direct dialup.

Table 6-1 Bus Address Assignments

Note: *These addresses must be used when defining the IEN 1000 chassis to IENView.*

Software Configuration

The IEN 1000 chassis must be configured to set up the initial physical interface and protocol to communicate with the Hypercom Network Management System (IENView). This is a two-part process, WAN port initialization and IENView configuration.

Note: *The base IEN 1000* chassis *contains one downlink port designated RS232-1. This port must always be configured.*

WAN Port Initialization

The WAN port initialization is required to establish a path for IENView to access the IEN 1000 chassis for configuration. IENView may be used to change WAN port settings and override any manual settings.

WAN port initialization is accomplished by the Node ID switches set to specific values while power is cycled to the IEN 1000 chassis.

The four Node ID rotary switches are referenced 1 through 4, from left to right, throughout this section. Figure 6-1 illustrates the Node ID rotary switches.

Note: *The following IEN 1000 WAN port initialization procedure is only an example. Your site configuration should reflect a unique address scheme. Refer to the IEN Software Reference manual for more information about specific addressing for your environment.*

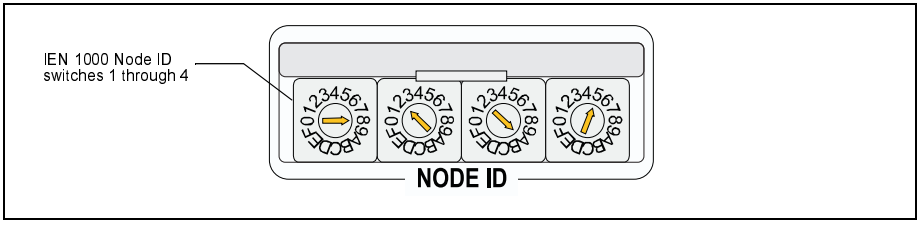

Figure 6-1 Node ID Rotary Switches

Step-By-Step

To initialize the IEN 1000 chassis WAN port:

1. Set rotary switches 1 and 2 to FF. Figure 6-2 illustrates the CU Address switch settings.

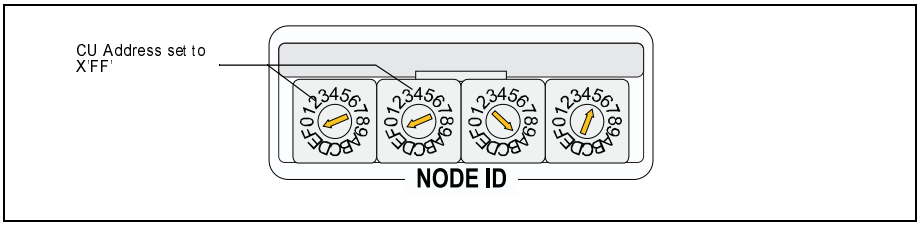

Figure 6-2 CU Address Settings

2. Set rotary switches 3 and 4 to F0. Figure 6-3 illustrates the bus address switch settings.

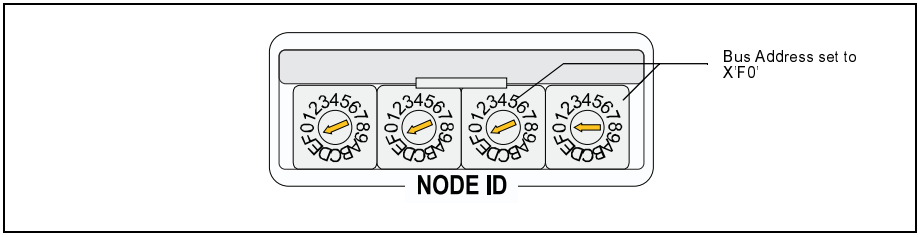

Figure 6-3 Bus Address Settings

3. Press the bus address switch on the motherboard located left of rotary switch 1.

Note: *You may also reset the IEN 1000* chassis *by pressing and holding the Menu button for five seconds.*

4. Set rotary switches 1 and 2 to 00. Figure 6-4 illustrates the CU address switch settings.

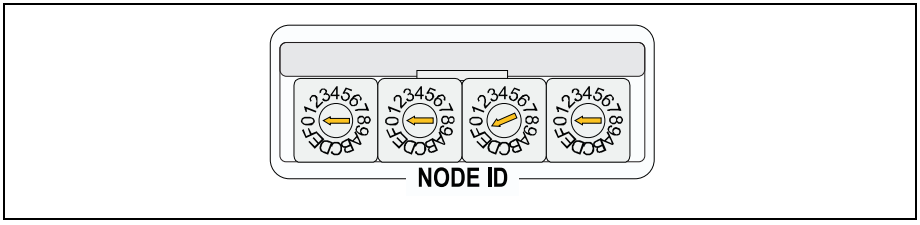

Figure 6-4 CU Address Settings

5. Set rotary switches 3 and 4 to 07. Figure 6-5 illustrates the final configuration of the Node ID switch settings.

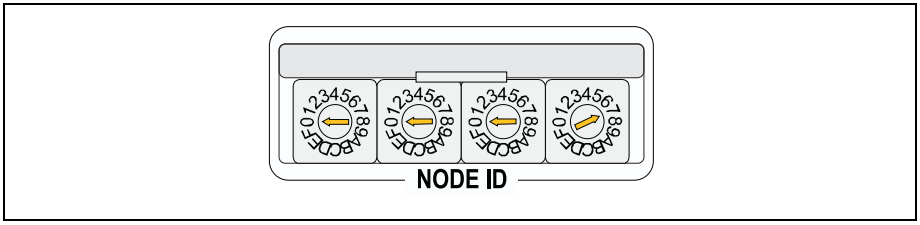

Figure 6-5 Final Configuration

6. Press the Master Reset switch.

The IEN 1000 chassis can be configured through the network using the Rockwell high-speed modem or the KS224 modem chip. In addition, you may connect the IEN 1000 chassis directly to the host IENView PC and configure the IEN 1000 chassis using the KS224 modem chip.

IENView Configuration

Following the application of power, the IEN 1000 chassis begins a start-up self-test and configuration indicated by the menu display. Figure 6-6 illustrates the IEN 1000 menu display during a power-on self-test and configuration process.

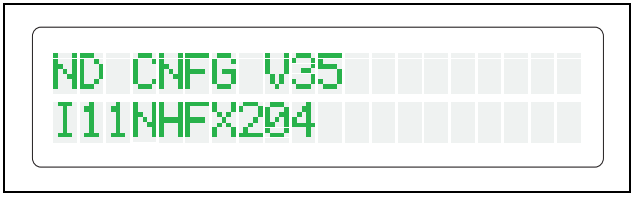

Figure 6-6 Power-On Self-test and Configuration Display

Successful completion of the start-up self-test is indicated by the RUN indicator flashing. The menu display and status indicators assume appropriate states following the time period the respective operating system and communication conditions take to establish connection. Figure 6-7 illustrates the IEN 1000 menu display after start-up.

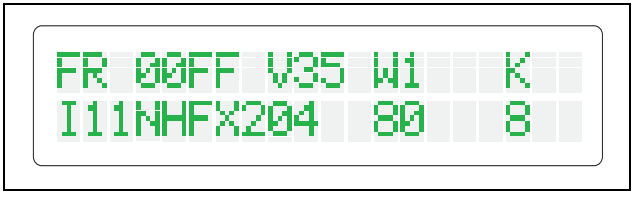

Figure 6-7 IEN 1000 Menu Display

The IEN 1000 menu display is subdivided to represent the status of the standard and optional upgrade modules installed, and the current software and version. Areas that do not contain values do not have the associated module installed. Figure 6-8 illustrates the different areas of the IEN 1000 menu display.

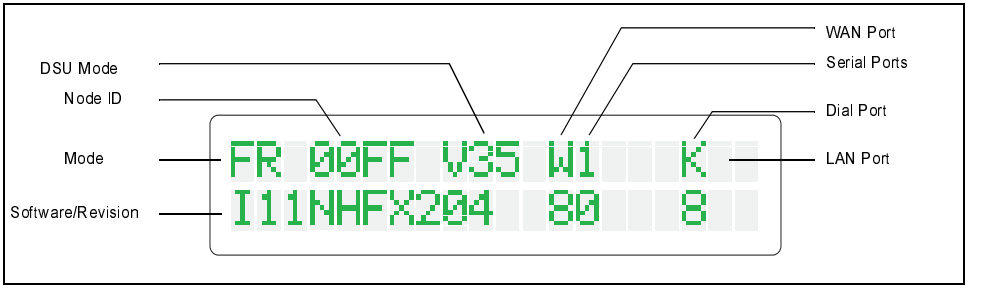

Figure 6-8 IEN 1000 Menu Display Areas

DSU Mode The DSU Mode area contains the following valid values (Refer to CHAPTER 3, DSU56 for more information about the DSU upgrade module.):

- **DSU** The IEN 1000 is configured with an internal DSU.
- **V35** The IEN 1000 is configured with an external DSU and V.35 interface.
- **R32** The IEN 1000 is configured with an external DSU and RS232 interface.

Node ID The Node ID display indicates the current IEN 1000 Node ID switch settings.

Mode The Mode area contains the following valid values:

- **ND** The IEN 1000 chassis is not configured.
- **FR** The IEN 1000 chassis is configured as a Frame Relay interface.

Software Revision The Software/Revision area displays the currently operating software name and version level.

WAN Port The base IEN 1000 WAN Port status contains the following valid values:

- **C** The WAN Port is connected.
- **0** The WAN Port is not connected.
- **A** The WAN Port is not connected.

Serial Ports

The Serial Ports area displays the operational status of the base IEN 1000 serial port 1, and the status of the optional serial ports 2 through 4. Refer to CHAPTER 3, CPA03 for more information about the CPA03 upgrade module. The Serial Port status contains the following valid values:

C The circuit is connected.

A The circuit is not connected.

Dial Port

The Dial Port area contains the following valid values:

R The optional Dial Backup Unit is installed.

K The base IEN 1000 internal V.22 modem is installed.

LAN Port

The LAN Port area indicates whether an optional LAN interface module is installed. The IEN 1000 may contain the LET10 Ethernet or LTR10 Token Ring optional upgrade module. The LAN Port status contains the following valid values:

Ethernet

Refer to CHAPTER 3, LET10 for more information about the LET10 upgrade module.

C The circuit is connected.

0 The circuit is not connected.

A The circuit is not connected.

Token Ring

Refer to CHAPTER 3, LTR10 for more information about the LTR10 upgrade module.

0 Indicates normal system start-up: No ring connection.

A Received configuration table from NMS.

2 Ring insertion in progress (waiting for ring connection).

C Indicates a ring insertion.

L Indicates a lobe wire fault.

F Indicates a failure to insert in the ring.

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Phoenix, Arizona 85023
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Document Number: 940043-002

Printed in the United States
P/N 940043-002