![Patton logo] *Let's Connect!*™

OnSite Model 3088A Series
G.SHDSL.bis CPE with fixed serial interface

User Manual

CE

Important

This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment.

REGULATORY MODEL NUMBER: 03340D4-001

Trademark Statement

The term *OnSite* is a trademark of Patton Electronics Company. All other trademarks presented in this document are the property of their respective owners.

Warranty Information

Patton Electronics warrants all Model 3088A components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall Patton Electronics be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. Patton Electronics specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

Note Conformity documents of all Patton products can be viewed online at www.patton.com under the appropriate product page.

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About this guide

This guide describes installing and operating the Patton Electronics Model 3088A G.SHDSL OnSite™ CPE.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

For best results, read the contents of this guide *before* you install the CPE.

Precautions

Notes, cautions, and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential problems. *Warnings* are intended to prevent safety hazards that could result in personal injury. *Cautions* are intended to prevent situations that could result in property damage or impaired functioning.

Note A note presents additional information or interesting sidelights.

WARNING	**The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.**
WARNING	**The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.**
CAUTION	The shock hazard symbol and CAUTION heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.
CAUTION	The alert symbol and CAUTION heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.

Safety when working with electricity

WARNING

- **Do not open the device when the power cord is connected. For systems without a power switch and without an external power adapter, line voltages are present within the device when the power cord is connected.**
- **For devices with an external power adapter, the power adapter shall be a listed *imited Power Source* The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker in compliance with local regulatory requirements.**
- **For AC powered devices, ensure that the power cable used meets all applicable standards for the country in which it is to be installed.**
- **For AC powered devices which have 3 conductor power plugs (L1, L2 & GND or Hot, Neutral & Safety/Protective Ground), the wall outlet (or socket) must have an earth ground.**
- **For DC powered devices, ensure that the interconnecting cables are rated for proper voltage, current, anticipated temperature, flammability, and mechanical serviceability.**
- **WAN, LAN & PSTN ports (connections) may have hazardous voltages present regardless of whether the device is powered ON or OFF. PSTN relates to interfaces such as telephone lines, FXS, FXO, DSL, xDSL, T1, E1, ISDN, Voice, etc. These are known as "hazardous network voltages" and to avoid electric shock use caution when working near these ports. When disconnecting cables for these ports, detach the far end connection first.**
- **Do not work on the device or connect or disconnect cables during periods of lightning activity.**

WARNING

This device contains no user serviceable parts. This device can only be repaired by qualified service personnel.

WARNING

This device is NOT intended nor approved for connection to the PSTN. It is intended only for connection to customer premise equipment.

In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.

CAUTION

Electrostatic Discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. Do the following to prevent ESD:

- Always follow ESD prevention procedures when removing and replacing cards.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground.
- To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the **Go to Previous View** button ⬅ in the Adobe® Acrobat® Reader toolbar to return to your starting point.
Futura bold type	Commands and keywords are in **boldface** font.
Futura bold-italic type	Parts of commands, which are related to elements already named by the user, are in ***boldface italic*** font.
Italicized Futura type	Variables for which you supply values are in *italic* font
Futura type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.

Chapter 1 **General information**

Chapter contents

OnSite 3088A overview

The Patton Electronics Model 3088A G.SHDSL OnSite provides high speed 2-wire connectivity to ISPs, PTTs, and enterprise environments using Symmetrical High-data-rate Digital Subscriber Line (G.SHDSL) technology.

As a symmetric DSL CPE, OnSite DSL offers the same data rates in both directions over a single pair of regular twisted pair lines using TC-PAM modulation. Line connection is made with an RJ-45 jack. Standard versions of Model 3088A are powered by an 100/230 VAC (Universal) supply. The CPE features externally-accessible DIP switches, loopback diagnostics, SNMP/HTTP remote-management capabilities using OnSite Plug 'n' Play, as well as in-band management.

Figure 1. OnSite 3088A

Serial interface types

The Model 3088A versions listed below provide the following types of built-in serial interfaces:

- Model 3088A/**A** provides an **RS-232** interface on a DB-25 female connector
- Model 3088A/**CA** provides a **V.35** interface on a DB-25 female connector.
- Model 3088A/**D** provides an **X.21** interface on a DB-15 female connector.
- Model 3088A/**K** provides an **E1** (G.703/G.704) interface on dual BNC connectors and an RJ-48C receptacle.

Features

- Symmetrical high data-rate DSL (G.SHDSL)
- Data rates up to 5.69 Mbps in 64-kbps intervals for X.21 and V.35 models
- Data rates up to 2.048 Mbps in 64-kbps intervals for E1 models
- One of the following built-in serial interfaces:
    - RS-232 (selectable DCE or DTE) — Model 3088A/A
    - V.35 (selectable DCE or DTE) — Model 3088A/CA
    - X.21 (selectable DCE or DTE) — Model 3088A/D
    - E1 — Model 3088A/K
- Data rates up to 256kbps in 64-kbps intervals for RS-232 model (Model 3088A/A)

- 10/100 Ethernet port for management and configuration
- Built-in testing and diagnostics
- OnSite Plug 'n' Play for easy installations
- Interoperable with other Patton G.SHDSL modems
- Configurable as remote (CP) units
- Configurable as central (CO) units to operate back-to-back
- Front-panel status indicators
- CE marked

Power input connector

The OnSite comes with an AC or DC power supply. (See section "Power and power supply specifications" on page 60.)

- The power connection to the CPE is a 2.5 mm barrel receptacle with the center conductor positive (see figure 2).
- Rated voltage: 5 VDC

  Rated current: 1 A
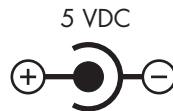
5 VDC

Figure 2. Power connection barrel receptacle 5 VDC diagram

External AC universal power supply

For additional specifications, see section "Power and power supply specifications" on page 60.

- Output from power supply: 5 VDC, 2 A
- Input to power supply: universal input 100–240 VAC 50/60 Hz 0.3A

> **⚠ CAUTION**
>
> The external AC adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. Ensure that the AC power cable meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.

External 48 VDC power supply

<table>
<tr>
<td>⚠ CAUTION</td>
<td>The external DC adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. The interconnecting cables shall be rated for the proper voltage, current, anticipated temperature, flammability, and mechanical serviceability</td>
</tr>
</table>

Refer to section "Power and power supply specifications" on page 60 for additional specifications.

- Input
  - Rated voltage: 36–60 VDC
  - Rated current: 0.25 A DC
  - 3-pin locking connector, 3.5 mm pitch
  - Transient over-voltage protection, 100VDC at 2 ms
- Output
  - Rated voltage: 5 VDC ± 5%, 5W
  - Rated current; 1 A DC
  - 6-inch cable terminated with 2.5 mm barrel plug, center positive

Chapter 2   Configuration

Chapter contents

Introduction

You can configure the OnSite (see figure 3) in one of two ways:

- Software configuration using command line interface (CLI) via the console port

- Hardware configuration via DIP switches

Figure 3. OnSite (Model 3088A/D shown)

Software (CLI) configuration

To use the software configuration, you must set the *S4* (Rate) DIP switches to the *OFF* position *before* powering up the OnSite. When it is set for software-configuration mode, the OnSite will read any configuration data previously saved to FLASH memory during system power-up. If no configuration data was previously saved to FLASH, then the OnSite will load the factory-default configuration from FLASH memory. After power-up, you may use console commands or the Embedded Operations Channel (EOC) to modify the configuration parameters.

Hardware (DIP-switch) configuration

To use DIP-switch configuration you must first set the DIP switches to a position other than all *OFF* or all *ON* *before* powering-up the OnSite. When all the DIP switches are set to any position other than all *OFF* or all *ON* the OnSite will operate in hardware (DIP-switch)-configuration mode. In DIP-switch-configuration mode the OnSite will read the DIP-switch settings during system startup and configure itself according to the switch settings.

Once you power-up the OnSite in DIP-switch mode, it will operate in DIP-switch mode until powered down. When operating in DIP-switch mode you cannot change any configuration settings:

- Changing the DIP switch settings while the device is running requires the *dsl start* command.

- If you attempt to modify the configuration by issuing console commands, the device will not execute your commands- except for the *dsl start* command and the *show* commands. Instead, the OnSite will respond with a message indicating the device is operating in DIP-switch-configuration mode.

- If you attempt to modify any configuration parameters via the EOC (by changing (EOC variables), the OnSite will not execute your changes.

Table 2 lists the Model 3088A's configurable parameters.

Table 2. OnSite configurable parameters

Parameter	Description	Possible Values
Password	The password used to login to the console.	1-10 characters
Circuit ID	The circuit ID used to identify the unit.	1-64 characters
DTE Loops (model /CA & /A)	The DB-25 interface can request LALs and RDLs using its RRDL and RLAL pins. If DTE loops are disabled, requests for loopbacks on these pins will be ignored.	Enabled or Disabled
TX Clock (models /CA, /A & /D)	Defines where (RS-232, V.35 or X.21) serial transmit data is sampled in relation to the TX clock: on the falling edge (normal) or the rising edge (inverted) of the TX clock.	Normal or Inverted
DSL Data Rate/ Timeslots	Defines the number of DSL timeslots. The DSL data rate is calculated by the equation: data rate = DSL timeslots x 64k. This value also defines the maximum serial/E1 data rate.	1–72
Serial/E1 Timeslots	Defines the total number of serial/E1 timeslots utilized. This value must be less than or equal to DSL timeslots.	3–89 (RS-232) 3–89 (V.35) 3–89 (X.21) 1–32 (E1)
Timeslot Mapping (Model /K)	Defines E1–to–DSL timeslot mapping. By default defined/utilized DSL timeslots are mapped to the first n data–bearing timeslots on the E1 line. Line type determines which timeslots are data–bearing: E1–Unframed: 0–31 E1–Fractional: 1–31 E1–CRC: 1–31 E1–MF: 1–15,17–31 E1–CRCMF: 1–15,17–31	
Line Type (Model /K)	Defines the framing format of the E1 line.	E1–Unframed (Clear Channel G.703) E1–Fractional E1–CRC E1–Multiframe E1–CRC & Multiframe
Line Code (Model /K)	Selects line coding for the E1 line.	AMI HDB3 (E1 only)
Line Build Out (Model /K)	Selects wave form used on the E1 line.	Pulse–75 Ohm(E1) Pulse–120 Ohm (E1)
RX Equalizer (Model /K)	When enabled, this feature removes signal distortion introduced on the E1 cable.	Enabled (select for long–haul link). Disabled (select for short–haul link). Long haul LBO (line build-out) is defined by ANSI T1.403).
Pass Framing (Model /K)	When enabled, the OnSite transparently passes framing information (E1 TS0) over the DSL link to the remote E1 network.	Enabled or Disabled.

Table 2. OnSite configurable parameters (Continued)

Parameter	Description	Possible Values
Pass Alarms (Model /K)	When enabled, the OnSite passes alarms detected on one E1 network over the DSL link to the remote E1 network.	Enabled or Disabled
Clock Mode	Defines the clock source operation for both DSL and serial/E1 ports as follows. Internal: the on–board oscillator in the 3088A provides clock for both serial/E1 and DSL lines. External: the serial/E1interface provides clock for the DSL line. Receive Recover: the DSL interface provides clock for the serial/E1 line.	Internal External Receive Recover
Annex	The G.991.2 Annex.	A or B
Loopback	The 3088A provides both a local loopback (LAL) and a remote loopback (RDL). This can be used to troubleshoot problems.	OFF, LAL, or RDL
Pattern	The 3088A provides an internal PRBS pattern generator and detector that can be used to run BER tests without external equipment.	OFF or 511/511e

Configuring the DIP switches

The Model 3088A is equipped with three sets of DIP switches, which you can use to configure the OnSite for a broad range of applications. This section describes switch locations and discusses the configuration options available.

Note   By default, the OnSite's DIP switches are all set to "OFF" so the CPE can be configured via OnSite Plug 'n' Play from a 3096RC. If that is how you will be configuring the CPE, skip ahead to section "Ethernet Management Port" on page 27. Otherwise, read the following sections to manually configure the DIP switch settings.

The three sets of DIP switches are externally accessible from the underside of the Model 3088A (see figure 4).
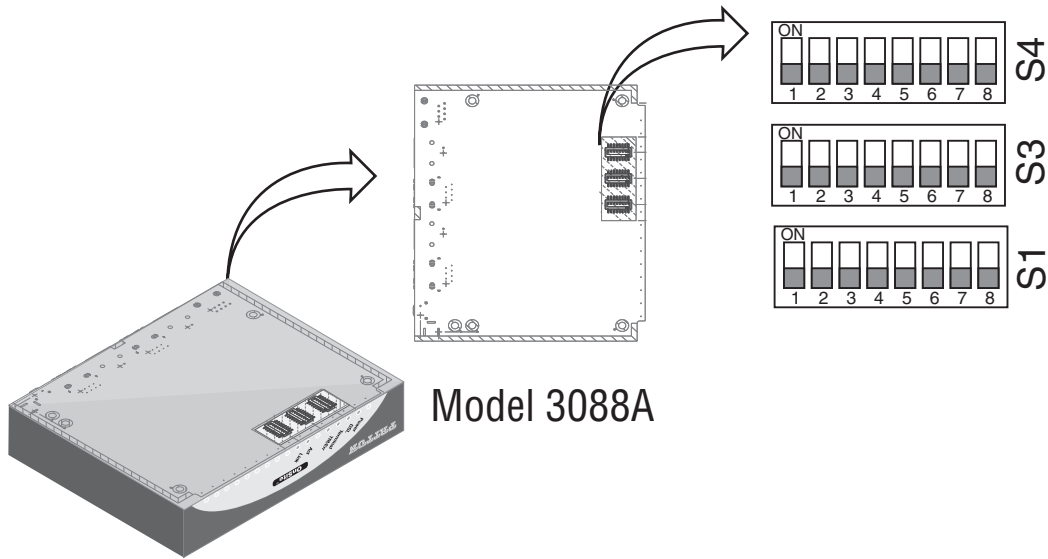
Figure 4. Underside of Model 3088A showing location of DIP switches

The three sets of DIP switches on the underside of the Model 3088A are referred to as *S1*, *S3* and *S4*. For basic **configuration**, use DIP switch *S1*. For **testing** the 3088A, use DIP switch *S3*. To configure the **rate**, use DIP switch *S4*. This figure shows the DIP switch orientation with respect to *ON* and *OFF* positions is consistent for all switches.

System reset mode

To enter system reset mode, turn the *S1-1* DIP switch to the *ON* position and power cycle the unit. For information on how to upgrade the software, refer to Chapter 6, "Software Upgrade" on page 49. For more information on applying factory default configuration to the 3088A, refer to Chapter *7,* "Reset configuration to factory defaults" on page 51.

DIP switch settings

You can configure the 3088A by setting the DIP switches to the desired positions *before* you power up the OnSite. If the DIP switches are set to anything other than all *OFF* or all *ON*, the OnSite will operate in DIP switch configuration mode. Once the device is powered up and operating in DIP switch config-uration mode, you cannot change configuration by any method until you power it down again.
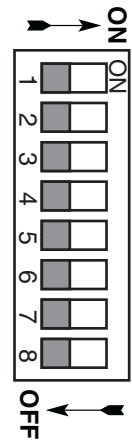
DIP switch settings

The following tables provide an overview of the OnSite DIP switch functions.

Table 3. Model 3088A Series - S1 DIP-Switch Functions (Configuration)

Position	Function (/A, /CA, /D models)	Function (/K models)
S1-1	Software Reset	Software Reset
S1-2	Reserved	ON - Multiframe OFF - Fractional/Unframed[a]
S1-3		ON - CRC OFF - Fractional/Unframed
S1-4		Line Coding ON - HDB3 OFF - AMI
S1-5	DTE/DCE (CO Only) ON - DTE OFF - DCE	Reserved (Leave OFF)
S1-6	Annex ON - Annex B OFF - Annex A	Annex ON - Annex B OFF - Annex A
S1-7	Timing Source (CO only) ON - Internal OFF - External (Network)	Timing Source ON - Internal OFF - External (Network)
S1-8	DSL Mode ON - CO OFF - CPE	DSL Mode ON - CO OFF - CPE

a. For the Fractional or Unframed setting, both S1-2 and S1-3 must be set to the OFF position. For the Fractional setting, timeslots must be set to a value less than 32 (a data rate set at 1984 or less on DIP switch S4). For the Unframed setting, timeslots must be set to a value equal to 32 (the 2048 data rate on DIP switch S4).

Table 4. Model 3088A Series - S3 DIP-Switch Functions (Test Modes and Patterns)

Position	Function
S3-1	Reserved
S3-2	
S3-3	
S3-4	
S3-5	511e Pattern
S3-6	511 Pattern
S3-7	Test Mode Remote
S3-8	Test Mode Local

S4-2 through S4-8: Data Rate
Switches S4-2 through S4-8 define both the DSL line rate and the serial data rate.

Note For **3088A/K models**, only columns **S4-4** through **S4-8** apply in this table. Also, use **S4-1** to configure the **Line Build Out**: **OFF** = 75 ohms, **ON** = 120 ohms.

Table 5. S4-2 through S4-8 Data Rate DIP switch settings

S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8	Data Rate (kbps)
OFF	OFF	OFF	OFF	OFF	OFF	ON	192
OFF	OFF	OFF	OFF	OFF	ON	OFF	256
OFF	OFF	OFF	OFF	OFF	ON	ON	320
OFF	OFF	OFF	OFF	ON	OFF	OFF	384
OFF	OFF	OFF	OFF	ON	OFF	ON	448
OFF	OFF	OFF	OFF	ON	ON	OFF	512
OFF	OFF	OFF	OFF	ON	ON	ON	576
OFF	OFF	OFF	ON	OFF	OFF	OFF	640
OFF	OFF	OFF	ON	OFF	OFF	ON	704
OFF	OFF	OFF	ON	OFF	ON	OFF	768
OFF	OFF	OFF	ON	OFF	ON	ON	832
OFF	OFF	OFF	ON	ON	OFF	OFF	896
OFF	OFF	OFF	ON	ON	OFF	ON	960
OFF	OFF	OFF	ON	ON	ON	OFF	1024
OFF	OFF	OFF	ON	ON	ON	ON	1088
OFF	OFF	ON	OFF	OFF	OFF	OFF	1152
OFF	OFF	ON	OFF	OFF	OFF	ON	1216
OFF	OFF	ON	OFF	OFF	ON	OFF	1280
OFF	OFF	ON	OFF	OFF	ON	ON	1344
OFF	OFF	ON	OFF	ON	OFF	OFF	1408
OFF	OFF	ON	OFF	ON	OFF	ON	1472
OFF	OFF	ON	OFF	ON	ON	OFF	1536
OFF	OFF	ON	OFF	ON	ON	ON	1600
OFF	OFF	ON	ON	OFF	OFF	OFF	1664
OFF	OFF	ON	ON	OFF	OFF	ON	1728
OFF	OFF	ON	ON	OFF	ON	OFF	1792
OFF	OFF	ON	ON	OFF	ON	ON	1856
OFF	OFF	ON	ON	ON	OFF	OFF	1920
OFF	OFF	ON	ON	ON	OFF	ON	1984
OFF	OFF	ON	ON	ON	ON	OFF	2048
OFF	OFF	ON	ON	ON	ON	ON	2112
OFF	ON	OFF	OFF	OFF	OFF	OFF	2176

Table 5. S4-2 through S4-8 Data Rate DIP switch settings (Continued)

S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8	Data Rate (kbps)
OFF	ON	OFF	OFF	OFF	OFF	ON	2240
OFF	ON	OFF	OFF	OFF	ON	OFF	2304
OFF	ON	OFF	OFF	OFF	ON	ON	2368
OFF	ON	OFF	OFF	ON	OFF	OFF	2432
OFF	ON	OFF	OFF	ON	OFF	ON	2496
OFF	ON	OFF	OFF	ON	ON	OFF	2560
OFF	ON	OFF	OFF	ON	ON	ON	2624
OFF	ON	OFF	ON	OFF	OFF	OFF	2688
OFF	ON	OFF	ON	OFF	OFF	ON	2752
OFF	ON	OFF	ON	OFF	ON	OFF	2816
OFF	ON	OFF	ON	OFF	ON	ON	2880
OFF	ON	OFF	ON	ON	OFF	OFF	2944
OFF	ON	OFF	ON	ON	OFF	ON	3008
OFF	ON	OFF	ON	ON	ON	OFF	3072
OFF	ON	OFF	ON	ON	ON	ON	3136
OFF	ON	ON	OFF	OFF	OFF	OFF	3200
OFF	ON	ON	OFF	OFF	OFF	ON	3264
OFF	ON	ON	OFF	OFF	ON	OFF	3328
OFF	ON	ON	OFF	OFF	ON	ON	3392
OFF	ON	ON	OFF	ON	OFF	OFF	3456
OFF	ON	ON	OFF	ON	OFF	ON	3520
OFF	ON	ON	OFF	ON	ON	OFF	3584
OFF	ON	ON	OFF	ON	ON	ON	3648
OFF	ON	ON	ON	OFF	OFF	OFF	3712
OFF	ON	ON	ON	OFF	OFF	ON	3776
OFF	ON	ON	ON	OFF	ON	OFF	3840
OFF	ON	ON	ON	OFF	ON	ON	3904
OFF	ON	ON	ON	ON	OFF	OFF	3968
OFF	ON	ON	ON	ON	OFF	ON	4032
OFF	ON	ON	ON	ON	ON	OFF	4096
OFF	ON	ON	ON	ON	ON	ON	4160
ON	OFF	OFF	OFF	OFF	OFF	OFF	4224
ON	OFF	OFF	OFF	OFF	OFF	ON	4288
ON	OFF	OFF	OFF	OFF	ON	OFF	4352
ON	OFF	OFF	OFF	OFF	ON	ON	4416
ON	OFF	OFF	OFF	ON	OFF	OFF	4480
ON	OFF	OFF	OFF	ON	OFF	ON	4544
ON	OFF	OFF	OFF	ON	ON	OFF	4608

Table 5. S4-2 through S4-8 Data Rate DIP switch settings (Continued)

S4-2	S4-3	S4-4	S4-5	S4-6	S4-7	S4-8	Data Rate (kbps)
ON	OFF	OFF	OFF	ON	ON	ON	4672
ON	OFF	OFF	ON	OFF	OFF	OFF	4736
ON	OFF	OFF	ON	OFF	OFF	ON	4800
ON	OFF	OFF	ON	OFF	ON	OFF	4864
ON	OFF	OFF	ON	OFF	ON	ON	4928
ON	OFF	OFF	ON	ON	OFF	OFF	4992
ON	OFF	OFF	ON	ON	OFF	ON	5056
ON	OFF	OFF	ON	ON	ON	OFF	5120
ON	OFF	OFF	ON	ON	ON	ON	5184
ON	OFF	ON	OFF	OFF	OFF	OFF	5248
ON	OFF	ON	OFF	OFF	OFF	ON	5312
ON	OFF	ON	OFF	OFF	ON	OFF	5376
ON	OFF	ON	OFF	OFF	ON	ON	5440
ON	OFF	ON	OFF	ON	OFF	OFF	5504
ON	OFF	ON	OFF	ON	OFF	ON	5568
ON	OFF	ON	OFF	ON	ON	OFF	5632
ON	OFF	ON	OFF	ON	ON	ON	5696

DCE/DTE operation

Note   This section applies to the following 3088A models:
- 3088A/A - RS-232
- 3088A/CA - V.35
- 3088A/D - X.21

There are a few things to note about clock modes and the 3088A sync serial interface.

- One 3088A must be set to *Receive-Recover.* The other 3088A must be set to either *Internal* or *External/Network* clock mode.

- The 3088A that is configured as *Receive-Recover* must be DCE.

- The 3088A that is configured as *Internal* must also be DCE, but if it is an *External/Network* clock, then the modem must be configured as DTE.

Table 6. 3088A Clocking

Mode	DTE/DCE	Clock Source
Internal	DCE	3088A Internal Oscillator
Receive-Recover	DCE	Clock recovered from DSL
External	DTE	Clock from external Interface
External	DCE	Clock from external Interface[a]

a. For X.21, external DTE must provide clocking on pins 7 & 14.

Ethernet Management Port

The 3088A offers a 10/100 Ethernet port for configuration and management via Telnet sessions. Because the Ethernet port is configured as MDI, a crossover Ethernet cable is required when connecting directly from a local PC or laptop. The Ethernet interface default IP address is 192.168.200.1.

Through the Ethernet management port, the following variables can be configured:

- **Password**: The password used to login to the console (1-10 characters).

- **Circuit ID**: The circuit ID communicated to other units via EOC (1-64 characters). EOC (Embedded Operations Channel) is an out-of-band channel specified in the G.991.2 standard for SHDSL. We use standard EOC messages for our remote loopback. The 3088A also supports proprietary EOC messages that allow a 3096RC to configure it.

- **Clock Mode:** The following options are available:

  - Internal: The internal oscillator in the 3088A provides the clock to both the serial/E1 and DSL interfaces.

  - Network: The E1 interface provides the clock for the DSL interface (E1 only).

  - External: The serial interface provides the clock for the DSL interface (RS-232, V.35, X.21). X.21 can only be set to DCE if DTE signal element timing is provided to pins 7/14. Otherwise, it must be set to DTE.

  - Receive Recover: The 3088A recovers the clock from the DSL interface and provides it to the serial/E1 interface.

- **Data Rate**: Both the serial/E1 and DSL data rates are set by specifying the number of 64k timeslots.

- **Pass Framing:** For E1, the entire TS0 time slot is passed. When E1 is configured for CAS (Multiframe), the entire TS0 time slot and all of TS16 are both passed.

- **Pass Alarms**: When Passed Framing is enabled, the alarms are always passed, even if Pass Alarms is disabled. When Passed Framing is disabled, you can pass alarms by enabling *Pass Alarms*.

- **Rx Equalizer:** This can be enabled to remove distortion introduced in the E1 cable.

- **Line Type**: The following framing formats are available:

  - E1-Unframed: G.703 Clear Channel

  - E1-Fractional: G.703/G.704 fractional.

  - E1-CRC: Includes CRC multiframe.

  - E1-Multiframe: Includes channel associated signalling (CAS).

  - E1-CRC & Multiframe: Includes CRC and CAS multiframe.

- **Line Code**: The following line codes are available:

  - AMI: Alternate Mark Inversion.

  - HDB3: High Density Bipolar 3 (E1 only).

- **Line Build Out**: The following line build outs are available:

  - Pulse-75 (E1 only)

  - Pulse-120 (E1 only)

- **Annex**: Either G.991.2 Annex A or Annex B.

The following status information is available through the command line interface:

- **Configuration Mode**: Whether the 3088A is configured by DIP switches or software.
- **DSL Link State**: *In Progress*, *Success*, *Deactivated*, or *Idle*.
- **DSL Sync State**: *Out of Sync*, *Acquiring Sync*, *In Sync*, or *Losing Sync*.

> **Note** **DSL Link State vs. DSL Sync State**—The DSL link state describes whether the DSL is training (in progress), linked (success), deactivated (we don't have an option to deactivate the modem, so the user should not see this), or idle.
>
> The DSL sync state describes whether no sync words have been found (out of sync), there are no sync word errors (in sync), or whether we are transitioning from out of sync to in sync (acquiring sync) or vice versa (losing sync). Typically, when the link is training, the sync state goes from out of sync to acquiring sync to in sync.

- **DSL Actual Rate**: The actual rate at which the DSL link is running (minus DSL overhead).
- **DSL Line Condition**: *Good* or *Poor*.
- **Noise Margin Ratio**: the maximum tolerable increase in external noise power that still allows for BER of less than $1x\ 10^{-7}$.
- **DSL Error Counters**: The following error counters are available:
  - CRC
  - LOSW (Loss of Sync Word)
- **E1 Loss of Signal**: Active or Inactive.
- **E1 Frame Sync**: Searching or Found.
- **E1 Frame Errors**: Yes or No.
- **E1 Buffer Slips**: Yes or No.
- **Alarms: RED, YELLOW, BLUE.** Active or Inactive.
- **E1 Error Counters:** The following error counters are available:
  - Line Code Violations
  - Path Code Violations
  - Errored Seconds
  - Severely Errored Seconds
  - Severely Errored Frame Seconds
  - Unavailable Seconds
  - Controlled Slip Seconds
  - Line Errored Seconds

- Bursty Errored Seconds

- Degraded Minutes

Help Commands

The following commands are provided to help the user find the correct command:

- **help:** Lists all the commands that the console recognizes.

- **system help:** Lists all the commands that start with **system** that the console recognizes.

- **system set help:** Lists all the commands that start with **system set** that the console recognizes.

- **system show help:** Lists all the commands that start with **system show** that the console recognizes.

- **dsl help:** Lists all the commands that start with **dsl** that the console recognizes.

- **dsl set help:** Lists all the commands that start with **dsl set** that the console recognizes.

- **dsl show help:** Lists all the commands that start with **dsl show** that the console recognizes.

- **dsl show errcntr help:** Lists all the commands that start with **dsl show errcntr** that the console recognizes.

- **e1 help**: Lists all the commands that start with **e1** that the console recognizes.

- **e1 set help:** Lists all the commands that start with **e1 set** that the console recognizes.

- **e1 show help**: Lists all the commands that start with **e1 show** that the console recognizes.

System Configuration Commands

The following commands allow the user to configure the system:

- **system set password <password>:** Sets the system password (1-10 characters).

- **system set devicetype <dte|dce>:** Sets the serial device type as DTE or DCE. Only valid in CO mode.

- **system set circuitid <circuitid>:** Sets the circuit ID (1-64 characters).

- **system set clockmode <internal|external|receiverecover>:** Sets the clock mode. Internal clock mode means the 3088A provides the clock to both the DSL and the serial/E1 interface. External clock mode means the 3088A uses the serial/E1 transmit clock as its DSL transmit clock. Receive recover clock mode means that the 3088A uses the DSL receive clock as its DSL transmit clock and as the serial/E1 receive clock.

The following commands allow the user to view the current system configuration:

- **system show config:** Shows the configuration of the entire system, including DSL and serial/E1 lines.

Any changes to the system configuration or the DSL configuration will be lost on the next power cycle unless the changes are saved. The command **system save config** is used to save the changes.

System Status Commands

The following commands show system status:

- **system show status**: Shows the following system status information: LEDs, DSL test mode, front panel switch settings, DSL link state, and configuration mode.

DSL Configuration Commands
The following commands are used to configure the DSL:

- **dsl set timeslots <1–32 (e1) | 89 (v.35, x.21) | 4 (rs-232)>:** Sets the number of timeslots. For E1 NTUs, the number of E1 timeslots is set simultaneously. The E1 timeslot mapping will be set to the default. The data rate is calculated by the equation: *data-rate = #timeslots x 64k.*

- **dsl set annex <a|b>:** Set the annex.

- **dsl set lineprobe <enabled|disabled>:** Enable or disable line probe.

- **dsl set loopback <off|lal|rdl>:** Start or stop loopbacks.

- **dsl set pattern <off|511|511e>:** Start or stop PRBS generator and BER meter.

- **dsl set mode <co|cpe>:** Set the CPE as local (CO) or remote (CPE).

DSL Status Command
The **dsl show status** command shows the following DSL status information: link state, sync state, link speed, error counters, line condition, noise margin, and test mode status.

DSL Clear Errcntrs Command
The **dsl clear errcntrs** command clears the error counters.

E1 Configuration Commands
e1 set linetype <e1-unframed|e1-fractional|e1-crc|e1-multiframe|e1-crc-multiframe>
Select the E1 framing format to use.

e1 set linecode <ami|hdb3|b8zs>
Select the line code to use. HDB3 can only be used for E1 line types.

e1 set lbo <75ohm|120ohm>
Select the line build out.

e1 set ts_map <tsmap>
Specify the E1 timeslots to map to DSL timeslots. This is a string that can contain ranges (-) and groups (,). For example, the string *2-4,8-9* will select timeslots 2, 3, 4, 8, and 9.

e1 set rxeq <enabled|disabled>
Enable or disable the Rx equalizer. This is usually only enabled for long haul applications.

e1 set passalarms <enabled|disabled>
Specify whether to generate alarms on the remote unit when detected on the local unit.

E1 Status Commands
e1 show status: Shows the active E1 configuration, loss-of-signal and framing errors, alarms, and performance statistics.

Remote Console

Provided that there is a DSL link to a second 3088A, a user may login to the first 3088A's console and enter the remote console command to access the second 3088A's console. Using this remote console feature, the user can configure and query the status of the second 3088A from a remote location. When the user is finished with the remote console, the logout command can be used to return to the local console.

Example Command Line Interface Session

```
3088A/K Command Shell
Password:
3088A> system show config
clocking
  clock mode:          receive-recover
  dsl timeslots:       31
system
  circuit id:          Patton Model 3088A
interface
  timeslot map:        fffffffe
  line type:           e1-fractional
  line coding:         hdb3
  line build out:      75ohm
  rx equalizer:        inactive
  pass alarms:         inactive
  pass framing:        inactive
g.shdsl
  annex:               b
  mode:                cpe
dsl test modes
  loopback:            off
  pattern:             off
3088A> dsl show status
configuration:
  dsl mode:            cpe
  dsl timeslots:       31
  annex:               b
status:
  actual rate:         0
  loss of signal:      signal found
  noise margin:        0
  sync state:          out of sync
  link state:          idle
test modes:
  loopback:            off
  pattern:             off
  errors:              0
error counters:
  crc:                 0
  losw:                0
3088A> system set help
Usage: system set <options>
```

```
    password ...    Set the login password.
    circuitid ...   Change the circuit ID
    clockmode ...   Change the clocking mode
    ipaddress ...   Set the IP address of the console port
    3088A> system set circuitid "3088A/K Circuit ID"
    3088A> system save config
    3088A> system show config
    clocking
      clock mode:          receive-recover
      dsl timeslots:       31
    system
      circuit id:          3088A/K Circuit ID
    interface
      timeslot map:        fffffffe
      line type:           e1-fractional
      line coding:         hdb3
      line build out:      75ohm
      rx equalizer:        inactive
      pass alarms:         inactive
      pass framing:        inactive
    g.shdsl
      annex:               b
      mode:                cpe
    dsl test modes
      loopback:            off
      pattern:             off
    3088A> exit
```

OnSite Plug 'n' Play

The OnSite Plug 'n' Play feature allows ISPs, carriers and PTTs to quickly upgrade the link speed for a customer without requiring a visit to re-configure the Customer Premise (CP) Model 3088A. This feature also allows service providers to set up all of the configurations at the Central Office (via the ForeFront AIS system) before installing the stand alone units, saving time spent configuring or re-configuring DIP switches.

> **Note**   OnSite Plug 'n' Play is only available when using a ForeFront Model 3096RC running software release 1.5.7 or later. Since the 3096RC is CO, the OnSite must be CP, which is the default.

The OnSite Plug 'n' Play feature allows the user to configure the CP unit via the ForeFront Model 3096RC at the Central Office (CO). The stand alone unit at the Customer Premise (CP) site will automatically configure itself to the DTE rate (Bandwidth Allocation) defined at the Model 3096RC. Other configuration parameters may likewise be modified from their default setting.

Follow the instructions below to activate OnSite Plug 'n' Play between CO (Model 3096RC and CP (Model 3088A) units:

• Set the Model 3096RC (CO) to either Internal or External clocking mode as defined by the application.
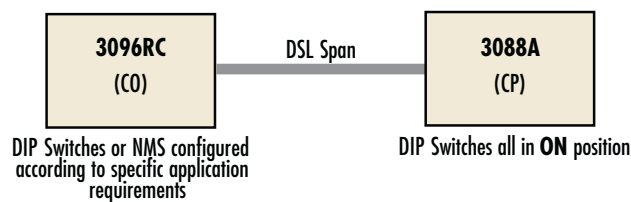
Figure 5. Typical OnSite Plug 'n' Play Application

When the CO and CP units connect over DSL, the CP will enter a predefined default configuration (Receive Recovered Clocking). During the negotiation process, the CO unit will configure the DTE rate/line rate on the CP unit as defined by the settings of the CO unit.

Chapter 3 OnSite installation

Chapter contents

Installation

Once the Model 3088A is properly configured, it is ready to connect to the twisted pair interface, to the serial port, and to the power source. This section tells you how to make these connections.

Connecting the twisted pair interface

The Model 3088A supports communication between two DTE devices as follows:

Using 24 AWG (0.5 mm) wire up to:

- 21,500 feet (6.5 km) at 192 kbps

- 10,000 feet (3.0 km) at 2560 kbps

Two things are essential:

1. These units work in pairs. Both units at the end of the twisted pair DSL span must be set for the same DTE rate—one unit set as CO, the other as CP.

2. To function properly, the Model 3088A needs one twisted pair of metallic wire. This twisted pair must be unconditioned, dry, metallic wire, between 19 (0.9mm) and 26 AWG (0.4mm) (the higher number gauges will limit distance). Standard dial-up telephone circuits, or leased circuits that run through signal equalization equipment, or standard, flat modular telephone type cable, are not acceptable.

The RJ-45 **Line** connector on the Model 3088A's twisted pair interface is polarity insensitive and is wired for a two-wire interface. The signal/pin relationships are shown in figure 6.
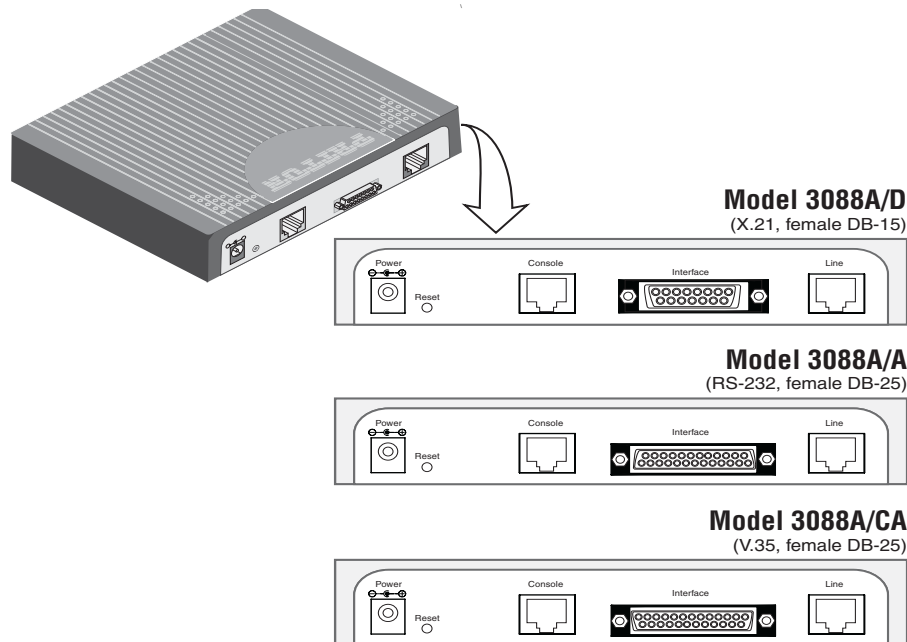

Figure 6. Model 3088A Sync Serial interfaces

Connecting the Model 3088A serial interface

This section describes how to connect the serial ports to your serial equipment.

⚠ **CAUTION** The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

The Model 3088A versions listed below provide the following types of built-in serial interfaces:

- Model 3088A/**A** provides an **RS-232** interface on a DB-25 female connector
- Model 3088A/**CA** provides a **V.35** interface on a DB-25 female connector.
- Model 3088A/**D** provides an **X.21** interface on a DB-15 female connector.

Connecting the Model 3088A to a "DCE" or "DTE" device

The Models 3088A/A, 3088A/CA and 3088A/D provide serial interfaces for connecting to a DCE or DTE device. The serial interface default configuration is DCE for connection to DTE (data terminal equipment) such as a router. However, the serial interface on the 3088/A may be configured as DTE (data terminal equipment) for connection to DCE such as a modem or multiplexer. When the 3088A is set as CO, the internal serial interface is always configured as DCE. When the CO is set to external, the serial interface is configured as DTE.
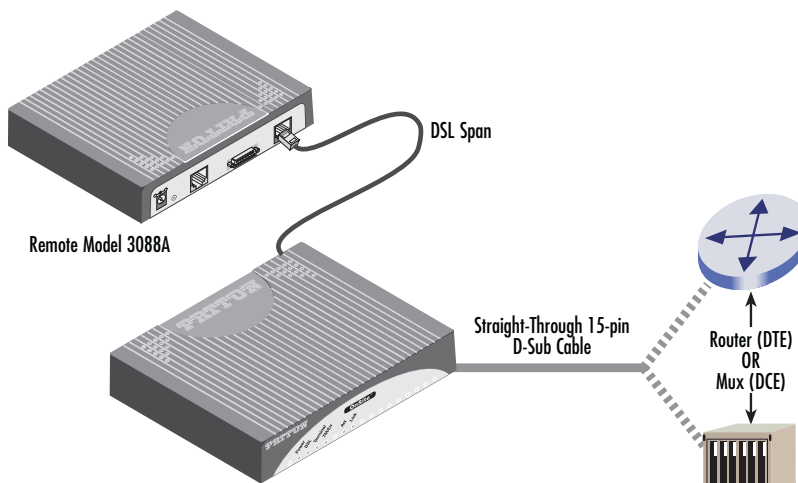

Figure 7. Connecting the Model 3088A/D to X.21 DTE or DCE

You may change the DCE/DTE orientation from the default position (DCE) by turning DIP switch S1-5 to the ON position (refer to table 3 on page 23).

Connecting the Model 3088A/K serial interface

The Model 3088A/**K** provides an **E1** (G.703/G.704) interface on dual BNC connectors and an RJ-48C receptacle.

> ⚠️ **CAUTION**
>
> The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

Connecting the Model 3088A/K to an E1 Network

The Model 3088A/K supports E1 network connections. This section describes how to connect the network to your Model 3088A/K.

Connect twisted pair (120 ohm) to E1 network

The Model 3088A/K is equipped with a single RJ-48C jack for connections to a 120 ohm twisted pair E1 network interface. If your E1 network terminates via RJ-48C, use the diagram below and the table following it to make the proper connections. The connector pinout and signals are shown in figure 8.
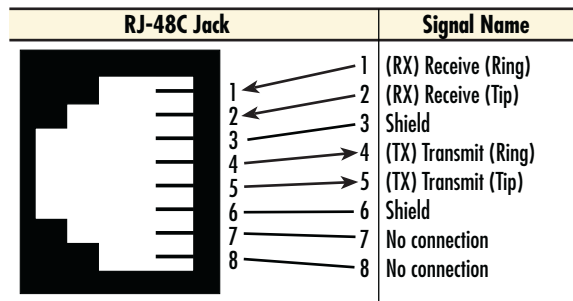
RJ-48C Jack	Signal Name
1	(RX) Receive (Ring)
2	(RX) Receive (Tip)
3	Shield
4	(TX) Transmit (Ring)
5	(TX) Transmit (Tip)
6	Shield
7	No connection
8	No connection

Figure 8. 120 Ohm RJ-48C E1 interface

Use the following connection diagram to connect the 120-ohm E1 network channel.

RJ-48C Cable (8-Wire)

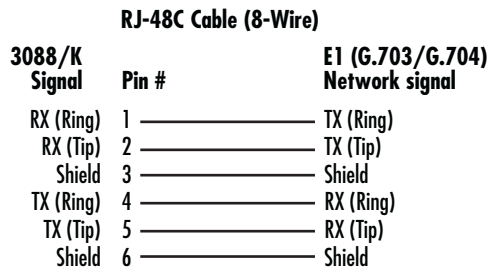| 3088/K Signal	Pin #	E1 (G.703/G.704) Network signal
RX (Ring)	1	TX (Ring)
RX (Tip)	2	TX (Tip)
Shield	3	Shield
TX (Ring)	4	RX (Ring)
TX (Tip)	5	RX (Tip)
Shield	6	Shield

Figure 9. RJ-45 cable diagram for E1 connection

Connecting dual coaxial cable (75 ohm) to E1 network

The Model 3088A/K is also equipped with dual female BNCs (TX and RX) for connection to a 75 ohm dual coax E1 network interface. If your E1 network terminates via dual coaxial cable, use figure 10 to make the proper connections.

> **CAUTION**
> The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.
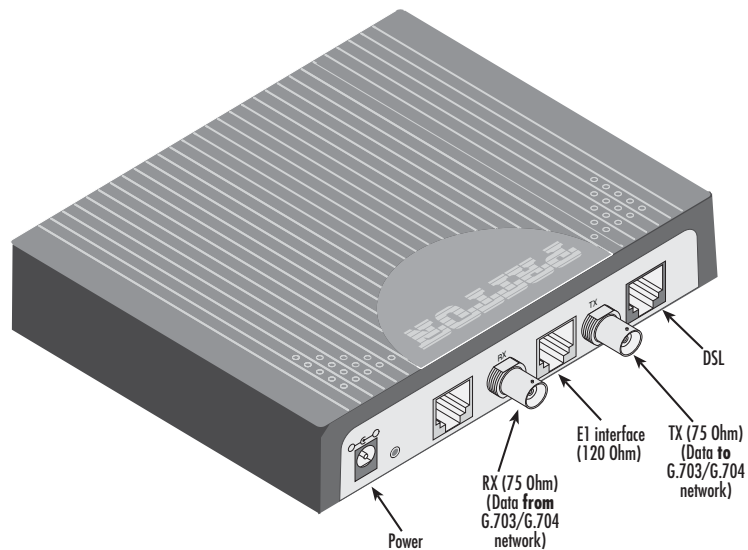

Figure 10. Model 3088A/K rear panel

Connecting power

External AC universal power supply

1. Connect the power cord from the AC socket to the IEC-320 power entry connector on the universal input power supply.

> ⚠ **CAUTION**
>
> The external AC adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. Ensure that the AC power cable meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.

2. Connect the barrel plug to the *Power* connector on the Model 3088A.

> **Note** The Model 3088A powers up as soon as it is plugged into an AC outlet—there is no power switch.

DC Power

The 36-60 VDC DC to DC adapter is supplied with the DC version of the Model 3088A. The black and red leads plug into a DC source (nominal 48VDC) and the barrel power connector plugs into the barrel power supply jack on the 3088A. (See Figure 11).

Figure 11. DC Power Supply

⚠ **WARNING**	There are no user-servicable parts in the power supply section of the Model 3088A. Fuse replacement should only be performed by qualified service personnel. See Chapter 8, "Contacting Patton for assistance" on page 53.

Chapter 4 **Operation**

Chapter contents

Introduction

Once the Model 3088A is properly configured and installed, it should operate transparently. The following sections describe power-up, reading the LED status monitors, and using the built-in loopback test modes.

Power-up

To apply power to the Model 3088A, first be sure that you have read section "Power input connector" on page 16, and that the unit is connected to the appropriate power source. Power up the unit.

LED status monitors

There are six LEDs that provide feedback on the state of the unit. Figure 12 shows the location of the front panel LEDs. Following figure 12 is a description of each LED's function.
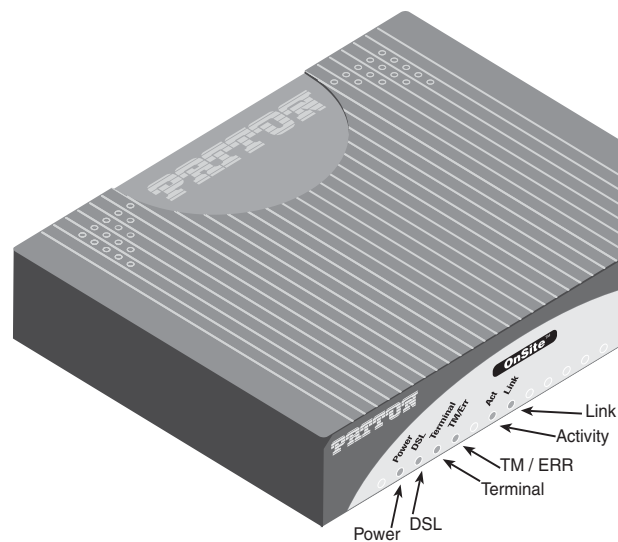

Figure 12. Model 3088A front panel

Power (Green)

The Power LED glows solid during normal operation. At startup, during the POST, the LED blinks once every second. If the POST fails, the unit does not enter normal operation, and the LED blinks once every 0.4 seconds.

DSL (Green)

The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

Link (Green) (Model /K)

The Link LED indicates the status of the E1 link. It is dark when it detects no signal. It blinks once per second when it detects signal, but not valid framing. It glows solid when it detects valid framing.

Terminal (Green)

The Terminal LED glows solid under the following circumstances:

• **3088A/CA with V.35 interface and 3088A/A with RS-232 interface:** if the serial interface has asserted DTR

• **3088A/D with the X.21 interface**

  - **Configured as DCE**: Indicates that the "Control" signals have been asserted.

  - **Configured as DTE**: Indicates that the "Indication" signals have been asserted

TM/ER (Yellow)

The TM/ER LED is used to indicate that a test mode is in progress or an error has been detected. It blinks once every second while a test mode is starting. It glows solid while a test mode is in progress. It blinks once if an error is detected either during a test mode, or in normal DSL operation.

LOS (Red) [Model /K]

The LOS LED blinks once per second to indicate either framing errors or clock slips. Clock slips are often caused by a mis-configured clock mode.

Link (Green)

The Link LED shows that there is an active physical connection to the Console.

Activity (Green)

The Activity LED shows that there is data being transferred through the Console connection. During a software upgrade procedure, if the Activity LED is on for an unusually long time, there is a problem with the upgrade, and the device should be restarted. The TFTP server should be checked (normal upgrades take about 10 seconds on a 100mbit link).

Test modes

The 3088A offers test modes in the form of loopbacks, PRBS pattern generators, and combinations of both. This section discusses how the test modes work.

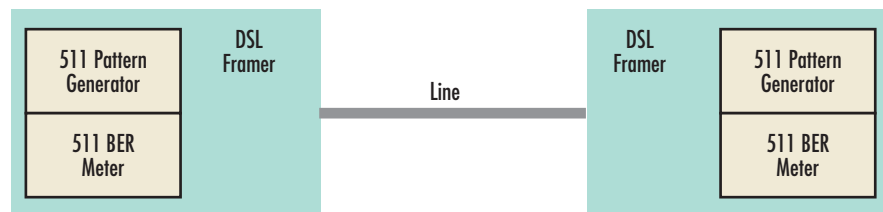Figure 13 is a block diagram of the Model 3088A with respect to test modes.

Figure 13. Model 3088A Block Diagram

Loopbacks

The 3088A supports both Local Analog Loopbacks (LAL) and Remote Digital Loopbacks (RDL). These can be initiated either from the optional front panel switches or by the console command dsl set loopback <off|lal|rdl>. The data path for the LAL is shown in figure 14.

Note Local loopback causes bit errors on the remote end if the link is up.
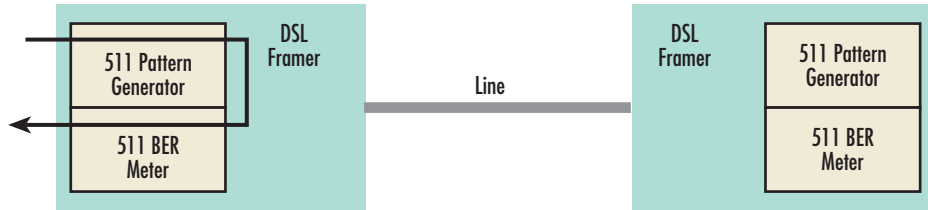

Figure 14. Local Analog Loopback diagram

The data received from the serial interface is looped back before going out on the DSL line. Note that this loopback occurs after the pattern generator/BER meter. This means that running a 511 pattern in conjunction with an LAL should result in no error detected by the meter.
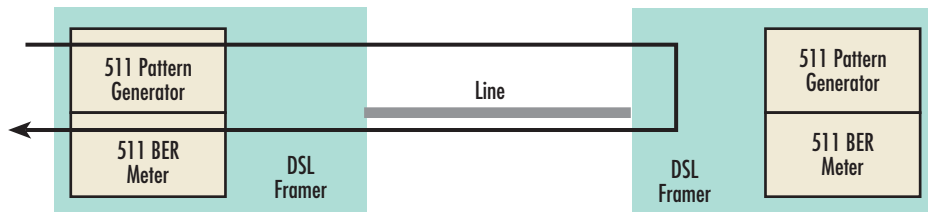
The data path for the RDL is shown in figure 15.

Figure 15. Remote Digital Loopback diagram

The RDL causes the remote unit to loop the data received from the DSL line back tow the DSL line.

Patterns
The 3088A can generate and detect 511 patterns. These can be initiated either by the middle DIP switch or by the console command dsl set pattern <off|511>. When the pattern is started, the DSL framer uses its internal 511 pattern generator for its DSL TX data instead of the data received from the serial interface. Also, the framer's internal BER Meter tries to detect a 511 pattern in the DSL RX Data.

Because the BER Meter always runs when the pattern generator runs, the meter will detect errors if either the pattern is not either looped back or the remote unit is not transmitting a 511 pattern.

Chapter 5   Remote console operation

Chapter contents

Introduction

The PC user (near-end) may configure and verify status of the remote 3088A (far-end) via a Remote Console session. The PC user must log onto the 3088A (near-end) unit to establish a remote console session. Once done, the remote 3088A (far-end) appears as a unit which is locally connected through the console port. All commands are transmitted over the G.SHDSL link in the EOC channel.
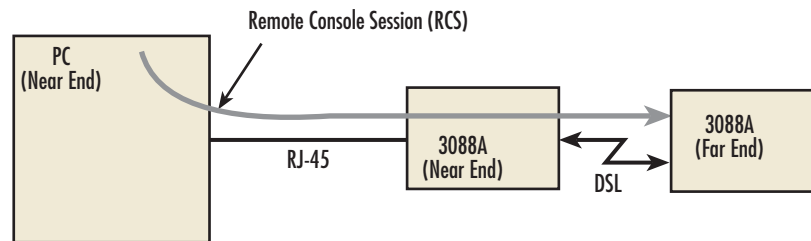
Figure 16. Remote control session diagram

Establishing a Remote Console Session

How to Connect

The following steps are to establish a connection to the remote 3088A (far-end) via Remote Console Session (RCS):

1. Connect to the console port of the 3088A (near-end) via Telnet session.

2. At the password prompt, log in to the near-end Model 3088A.

3. Ensure that a DSL link is established. You can verify an established DSL link by using the system show status command or by checking that the DSL LED is solid green. Upon executing the **show status** command, the **dsl link state** is shown as *success* if the DSL link is established.

4. At the command prompt, enter the command **remote console**.

5. Wait for the message *Console: Remote console connection established.*

    – If a DSL link is not established, or for some other reason the 3088A (far-end) does not respond in a reasonable amount of time, the following message appears: *Console: Remote console timed out trying to connect.* Enter the command remote console again.

    – If 3088A (Far End) already has an active remote console session open, you will see the message *Console: Remote console connection request rejected.* This can also happen if the remote 3088A (far-end) has an established remote console session with the local 3088A (near-end) which has timed out.

6. Enter the password at the password prompt for the remote console session.

    Note   The passwords for a local console session of the 3088A (near-end) and the remote console session of the 3088A (far-end) should be different for the purpose of security.

7. You should now be logged into the remote 3088A (far-end) via the remote console session. The communication with the remote 3088A (far-end) is essentially the same as having a local console connection.

Note   The local or remote 3088A may be CO or CPE, as long as there is one of each. Either the CO or CPE unit may accept a remote console connection.

Note   With a remote console session open, a user at PC (far-end) is blocked from using the local console. Upon typing anything, the 3088A (far-end) sends a message to the PC (far-end) stating *Console: Remote console connection is open*.

Figure 17 is a screenshot of opening a typical remote console session:

Figure 17. Opening a typical remote console session

How to Disconnect
The remote console session ends under any of the following conditions:

- The user enters the command **logout**

- A timeout period of 5 minutes elapses since the user has entered a command to the console.

- The DSL link drops.

The response upon logging out of the remote console session with the command **logout** is *Console: Remote console connection lost*. The following is what is displayed upon a user's logging out of a remote console session after logging in.

```
> remote console
>
Console: Remote console connection established.

password: ******
> logout
Console: Remote console connection lost.


>
```

The timeout period is a fixed, non-configurable parameter of 5 minutes. If the remote 3088A (far-end) has received no command within 5 minutes, it automatically terminates the RCS. Once the RCS is terminated, the PC (far-end) can establish a local console session if desired. However if the PC (near-end) wishes to re-establish a RCS, it is able to do so whether or not the PC (far-end) is in an active local session, because the RCS has priority over a local console session. If the PC (near-end) establishes an RCS while the PC (far-end) is on a local session, the PC (far-end) is kicked off.

Differences in Local and Remote Control Session Behavior

Since the remote console session communication occurs over the G.SHDSL link's EOC channel, some commands via the RCS have unusual effects.
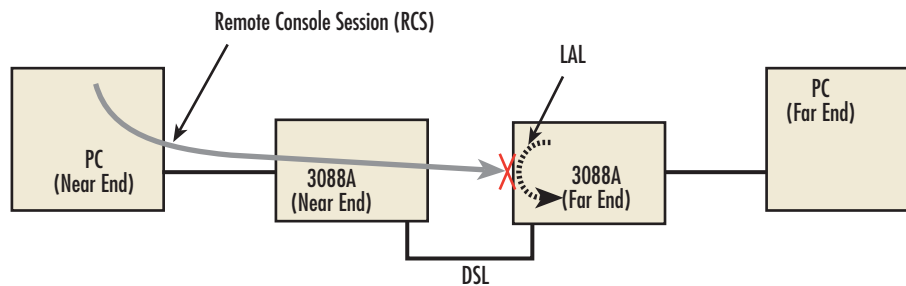
Figure 18. Remote control session with LAL diagram

- **dsl set loopback lal**: Do not issue this command over the RCS to the far-end 3088A. If the far-end goes into Local Analog Loopback (LAL), the near-end and far-end 3088A NTUs can no longer communicate over the RCS.

> ⚠ **CAUTION**
> Do not issue this command to a far-end unit. If you were to do so, the near-end 3088A would no longer be able to communicate with the far-end 3088A.

Chapter 6 Software Upgrade

Chapter contents

Introduction

The software upgrade feature is available through BOOTP/TFTP. The software upgrade takes approximately 2-3 minutes to complete. To upgrade the software:

1. Connect to the Model 3088A via the Ethernet management port and a Telnet session.

2. Enter the **system show info** command to view the unit's MAC address.

3. Configure a BOOTP/TFTP server and enter the **system upgrade** / **yes** command to begin the upgrade.

4. Alternatively, you may enter the **system upgrade** *<TFTP server IP address>:/<filename>* command to begin the upgrade.

After approximately 2-3 minutes, the 3088A will operate with the upgraded software.

Chapter 7 Reset configuration to factory defaults

Chapter contents

Introduction

The configuration can be reset to factory defaults using DIP switch *S1*. A factory reset allows a user to recover from a forgotten password. To reset to the configuration:

1. Turn the Model 3088A off.

2. Turn the S1-1 switch to the *ON* position.

3. Turn the Model 3088A on.

4. Turn the S1-1 switch to the *OFF* position.

Chapter 8   Contacting Patton for assistance

Chapter contents

Introduction

This chapter contains the following information:

- "Contact information"—describes how to contact Patton technical support for assistance.

- "Warranty Service and Returned Merchandise Authorizations (RMAs)"—contains information about the warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Patton support headquarters in the USA

- Online support: available at **www.patton.com**

- E-mail support: e-mail sent to **support@patton.com** will be answered within 1 business day

- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm EST** (**1300** to **2200 UTC/GMT**)—by calling **+1 (301) 975-1007**

- Fax: **+1 (253) 663-5693**

Alternate Patton support for Europe, Middle East, and Africa (EMEA)

- Online support: available at **www.patton-inalp.com**

- E-mail support: e-mail sent to **support@patton-inalp.com** will be answered within 1 business day

- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm CET** (**0900** to **1800 UTC/GMT**)—by calling **+41 (0)31 985 25 55**

- Fax: **+41 (0)31 985 25 26**

Warranty Service and Returned Merchandise Authorizations (RMAs)

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

> **Note**   If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

Out-of-warranty service

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

Returns for credit

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

Return for credit policy

• Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.

• 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).

• Over 60 days: Products will be accepted for repairs only.

RMA numbers

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

• Completing a request on the RMA Request page in the *Support* section at **www.patton.com**

• By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer

• By sending an e-mail to **returns@patton.com**

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

Shipping instructions

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

> **Patton Electronics Company**
> RMA#: xxxx
> 7622 Rickenbacker Dr.
> Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

Appendix A **Compliance information**

Chapter contents

Compliance

EMC
- FCC Part 15, Class A
- EN55022, Class A
- EN55024

Safety
- UL 60950-1/CSA C22.2 N0. 60950-1
- IEC/EN60950-1 2nd edition
- AS/NZS 60950-1

Radio and TV Interference (FCC Part 15)

This device generates and uses radio frequency energy, and if not installed and used properly-that is, in strict accordance with the manufacturer's instructions-may cause interference to radio and television reception. The device has been tested and found to comply with the limits for a Class A computing device in accordance with specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the device does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

CE Declaration of Conformity

Patton Electronics, Inc declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The Declaration of Conformity may be obtained from Patton Electronics, Inc at www.patton.com/certifications.

The safety advice in the documentation accompanying this device shall be obeyed. The conformity to the above directive is indicated by CE mark on the device.

Authorized European Representative

D R M Green

European Compliance Services Limited.

Avalon House, Marcham Road

Abingdon,

Oxon OX14 1UD, UK

Appendix B **Specifications**

Chapter contents

Clocking modes

Internal, external, or receive recovered

DTE rate

All 64k steps from 64 to 5696 kbps

Serial interface

RS-232 (Model 3088A/A), DCE/DTE selectable

V.35 (Model 3088A/CA), DCE/DTE selectable

X.21 (Model 3088A/D), DCE/DTE selectable

E1 (Model 3088A/K) presents G.703/G.704 interface. Either 75 Ohms (unbalanced) or 120 Ohms (balanced). Pins 1 & 2 are Receive. Pins 4 & 5 are Transmit.

Serial connector

D-Sub-25 Female (Model 3088A/A and Model 3088A/CA)

D-Sub-15 Female (Model 3088A/D)

Dual BNC and RJ48C (Model 3088A/K), strap selectable

Diagnostics

V.52 compliant (511) pattern generator and detector with error injection mode controlled by front-panel switch. Local and Remote Loopback control either by a front-panel switch or from the DTE interface.

Status LEDs

Power (Green)
The Power LED glows solid during normal operation. At startup, during the POST, the LED blinks once every second. If the POST fails, the unit does not enter normal operation, and the LED blinks once every 0.4 seconds.

DSL (Green)
The DSL LED glows solid while a DSL link is established. While the DSL link is training it blinks once every second.

Link (Green) (E1 only)
Solid green indicates valid E1 framing. Flashing indicates signal being received, but the link has not yet been established.

Terminal (Green)
The Terminal LED glows solid under the following circumstances:

- **3088A/CA with V.35 interface and 3088A/A with RS-232 interface:** if the serial interface has asserted DTR

- **3088A/D with the X.21 interface**

    - **Configured as DCE**: Indicates that the "Control" signals have been asserted.

    - **Configured as DTE**: Indicates that the "Indication" signals have been asserted

TM/ER (Yellow)
The Test Mode/Error (TM/ER) LED is used to indicate that a test mode is in progress or an error has been detected. It blinks once every second while a test mode is starting. It glows solid while a test mode is in progress. It blinks once if an error is detected either during a test mode, or in normal DSL operation.

LOS (Red) [Model /K]
The LOS LED blinks once per second to indicate either framing errors or clock slips. Clock slips are often caused by a mis-configured clock mode.

Link (Green)
The Link LED shows that there is an active physical connection to the Console.

Activity (Green)
The Activity LED shows that there is data being transferred through the Console connection. During a software upgrade procedure, if the Activity LED is on for an unusually long time, there is a problem with the upgrade, and the device should be restarted. The TFTP server should be checked (normal upgrades take about 10 seconds on a 100mbit link).

Configuration

Configuration is done with either externally accessible DIP switches, CLI or through the EOC (Embedded Operations Channel) from a Model 3096RC G.SHDSL concentration card.

Power and power supply specifications

The CPE comes with either an AC or DC power supply:

- The supply's connection to the CPE is a 2.5 mm barrel receptacle with the center conductor positive.

- There is one fuse in the equipment rated at 250V, 500 mA, 2 sec.

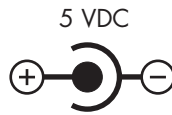- Rated voltage: 5 VDC

- Rated current: 1 A DC

5 VDC

Figure 19. Power connection barrel receptacle 5 VDC diagram

External AC universal power supply

> ⚠ **CAUTION** The external AC adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. Ensure that the AC power cable meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.

- Output from power supply: 5 VDC, 2A

- Input to power supply: universal input 100–240 VAC 50/60 Hz 0.3A

External 48 VDC power supply

> ⚠ **CAUTION** The external DC adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. The interconnecting cables shall be rated for the proper voltage, current, anticipated temperature, flammability, and mechanical serviceability

- Input
  - Rated voltage: 36–60 VDC
  - Rated current: 0.25 A DC
- Output
  - Rated voltage: 5 VDC ± 5%, 5W
  - Rated current: 1 A DC
  - 6-inch cable terminated with 2.5 mm barrel plug, center positive
- Isolation: 500 VDC
- Environment: 0–40°C; 5–95% relative humidity, non-condensing

Transmission line

Single Twisted Pair

Line coding

TC-PAM (Trellis Coded Pulse Amplitude Modulation)

Line rates (DSL line)

All nx64 rates from 192kbps up to 5.696 Mbps

Line interface

Transformer coupled, 2500 VRMS isolation

G.SHDSL physical connection

RJ-45, 2-wire polarity insensitive pins 4 and 5

Environment

Operating temp: 32–122°F (0–50°C)

Humidity: 5–95% non-condensing

Altitude: 0–15,000 feet (0–4,600 meters)

Third party software licenses

Note   The 3088A includes software developed under third party licenses. Contact Patton (Chapter 8, "Contacting Patton for assistance" on page 53) for more information.

Appendix C **Factory default values**

Chapter contents

Factory default values for software-configurable parameters

Note   The default management IP address is **192.168.200.1**.

Note   The default logout timer value is set for 300 seconds (5 minutes).

Table 7. 3088A/CA and 3088A/D

Parameter	Default value
Clock Mode	Receive-Recover
DSL Timeslots	89
Tx Clock	Normal
Circuit ID	Patton Model 3088A
Password	superuser
Annex	B
Loopback	Off
Pattern	Off
DSL Mode	CPE
Device Type	DCE

Table 8. 3088A/A

Parameter	Default value
Clock Mode	Receive-Recover
DSL Timeslots	4
Tx Clock	Normal
Circuit ID	Patton Model 3088A
Password	superuser
Annex	B
Loopback	Off
Pattern	Off
DSL Mode	CPE
Device Type	DCE

Table 9. 3088A/K

Parameter	Default value
Clock Mode	Receive-Recover
DSL Timeslots	31
E1 Timeslots	31
E1 Timeslot Map	1-31
E1 Line Type	E1 - Fractional
E1 Line Code	HDB3
E1 Line Build Out	75 Ohm
E1 Rx Equalizer	Disabled
E1 Pass Framing	Disabled
E1 Pass Alarms	Disabled
Circuit ID	Patton Model 3088A
Password	superuser
Annex	B
Loopback	Off
Pattern	Off

Appendix D Factory replacement parts and accessories

Chapter contents

Factory replacement parts and accessories

Power Supplies	
PS-03671H1-00	100-240VAC (12V, DC/2A) Wall mount power adapter
Power Adapters	
12-130	European replacement plug
12-129	American replacement plug
12-131	United Kingdom plug
12-132	Australian/Chinese plug

Appendix E **Interface pinouts**

Chapter contents

Line port

RJ-45 connector

Pin #	Signal
1	No connection
2	No connection
3	No connection
4	Tip
5	Ring
6	No connection
7	No connection
8	No connection

RS-232 interface

DB-25 female connector (DTE/DCE orientation)

Pin #	Signal Designation	Source	Pin #	Signal Designation	Source
1	Shield	Common	14	Secondary TD	DTE
2	TD	DTE	15	Transmit Clock	DCE
3	RD	DCE	16	Secondary RD	DCE
4	RTS	DTE	17	Receiver Clock	DCE
5	CTS	DCE	18	Local Loopback	DTE
6	DSR	DCE	19	Secondary RTS	DTE
7	Signal Ground	Common	20	Data Terminal Ready	DTE
8	CD	DCE	21	Remote Loopback	DTE
9	DC Test Voltage (+)	-	22	Ring Indicator	DCE
10	DC Test Voltage (-)	-	23	Data Signal Rate Selector	DTE/DCE
12	Secondary CD	DCE	24	External Transmit Clock	DTE
13	Secondary CTS	DCE	25	Test Mode	DCE

V.35 interface

DB-25 female connector (DTE/DCE orientation)

Pin #	Signal	Pin #	Signal
1	Frame Ground	12	TxC-b (DTE Source)
2	TxD-a (DTE Source)	14	TxD-b (DTE Source)
3	RxD-a (DCE Source)	15	TxC-a (DCE Source)
4	RTS (DTE Source)	16	RxD-b (DCE Source)
5	CTS (DCE Source)	17	RxC-a (DCE Source)
6	DSR (DCE Source)	18	LL (DTE Source)
7	Signal Ground	20	DTR
8	CD (DCE Source)	21	RL
9	RxC-b (DCE Source)	24	ExtC-a (DTE Source)
11	ExtC-b (DTE Source)	25	TM (DCE Source)

E1 interface

RJ-48C female connector

Pin #	Signal
1	Receive (Ring)
2	Receive (Tip)
3	Shield
4	Transmit (Ring)
5	Transmit (Tip)
6	Shield
7	No connection
8	No connection

X.21 interface

D-sub-15 female connector (DTE/DCE orientation)

Pin #	Signal
1	Frame Ground
2	T - Transmit Data-A (DTE Source)
3	C - Control-A (DTE Source)
4	R - Receive Data-A (DCE Source)
5	I - Indication-A (DCE Source)
6	S - Signal Element Timing-A (DCE Source)
7	BT - Byte Timing-A (DCE Source) X - DTE Signal Element Timing - A (DTE source)
8	SGND - Signal Ground
9	T/ - Transmit Data-B (DTE Source)
10	C/ - Control-B (DTE Source)
11	R/ - Receive Data-B (DCE Source)
12	I/ Indication-B (DCE Source)
13	S/ Signal Element Timing-B (DCE Source)
14	BT/ - Byte Timing-B (DCE Source) X/ - DTE Signal Element Timing - B (DTE source)

Ethernet Console port

Table 10. RJ45 socket 10/100Base-T

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Note   Pins not listed are not used.