



CDD-562AL/564A/L

Multi-Channel Demodulator Installation and Operation Manual

CDD-564A 70/140 MHz Satellite Quad Demodulator

CDD-564AL L-Band Satellite Quad Demodulator

CDD-562AL L-Band Satellite Dual Demodulator

For Firmware Version 1.3.1 or higher

IMPORTANT NOTE: The information contained in this document supersedes all previously published information regarding these products. Product specifications are subject to change without prior notice.

Errata C for MN-CDD562AL564AL Rev 0

Comtech EF Data Documentation Update

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Part Number MN-CDD562AL564AL
Revision 0

Subject: Section 9.2.2.6.1.1 Rx Configuration - Filter rolloff updated to show six (6) selections.

Errata Part Number: ER-CDD562AL-EC0 Rev - (*Errata documents are not revised*)

PLM CO Number: C-0038165

Comments: See attached page(s). The new information will be included in the next released revision of the manual.

From Section 9.2.2.6.1.1:

- o 1 to 32HKz if symbol rate < 625Ksymbol on CDD-564L
- o 1 to 32HKz on CDD-564

Eb/No Alarm Point, keystroke: **P**

- Valid range is from 0.0 to 16.0.

Clock Inversion, keystroke: **A**

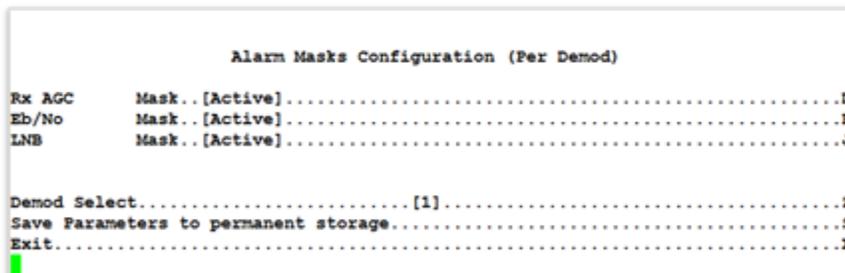
- Select one:
 - o 1 – Normal
 - o 2 – Inverted

Filter Rolloff, keystroke: **E**

- Select one:
 - o 1 – 0.35
 - o 2 – 0.25
 - o 3 – 0.20
 - o 4 – 0.15
 - o 5 – 0.10
 - o 6 – 0.05

9.2.2.6.1.2 Alarm Masks Configuration (Per Demod) screen

Go to the Alarm Masks Configuration (Per Demod) screen from the Configuration screen.



Rx AGC (Auto Gain Control) Mask, keystroke: **D**

- Select **[Active]** or **[Masked]**.

Eb/No Mask, keystroke: **E**

- Select **[Active]** or **[Masked]**.

LNB Mask, keystroke: **J**

- Select **[Active]** or **[Masked]**, if an LNB is detected.

Errata B for MN-CDD562AL564L Rev 0

Comtech EF Data Documentation Update

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For Firmware Version 1.3.1 or higher

Part Number MN-CDD562AL564AL
Revision 0

Subject: Update page 1-13, change 3xDES Data Encryption Installation Method to Available as EN model

Errata Part Number: ER-CDD562564L-EB0 (*Errata documents are not revised*)

PLM CO Number: C-0035153

Comments: See attached page(s). The new information will be included in the next released revision of the manual.

1.3.8 Fully Accessible System Topology (FAST)

The CDD-564A/L has a number of optional features. You can purchase the unit with only the desired features enabled.

To upgrade the functionality of a unit, Comtech EF Data provides FAST (Fully Accessible System Topology). FAST lets you purchase and activate options through special authorization codes. Contact Comtech EF Data Product Support to purchase these unique, register-specific Fast Access Codes. Then, use the HTTP Web interface to enter these codes into the unit.

For basic modems, you can order hardware options for installation either at the factory or in the field. You can easily activate these options in the field.

Table 1-1 lists the available options: standard hardware (Base Unit), FAST and FAST-accessible options.

See also: Chapter 6. FAST Activation Procedure.

Table 1-1. CDD-564A/L Standard, FAST and FAST-accessible Hardware Options

Option	Description and Comments	Installation Method
Data Rate	Data rate 16 kbps to 512 kbps	Base Unit
BPSK and QPSK	Modulation Type	Standard
TPC Codec	Turbo Product Codec for Rate 3/4	Standard
	Turbo Product Codec for CCM (IESS-315 compliant) Rate 5/16, 21/44 and 7/8	FAST
	Turbo Product Codec for Rate 0.95	Hardware
IP Packet Processor	10/100 Base-T Interface Traffic and M&C	Standard
-48 VDC	-48 VDC Prime Power Supply	Hardware
Data Rate	Data rate 16 kbps to 1.1 Mbps	FAST
Data Rate	Data rate 16 kbps to 2.5 Mbps	FAST
Data Rate	Data rate 16 kbps to 5.0 Mbps	FAST
Data Rate	Data rate 16 kbps to 10.239 Mbps	FAST
3xDES Data Decryption	3xDES-128 (NIST certified 3x core) Available for the -EN version only	Available as EN model
IP Header Compression	Uses proprietary IP Header Compressions Version 1.3.1 and later	FAST
Payload Compression	Uses proprietary Payload Compressions Version 1.3.1 and later	FAST
8-PSK and 8-QAM	8-PSK/8-QAM Modulation	FAST
16-QAM	16-QAM Modulation	FAST
ViperSat	ViperSat Software	FAST
VFS	ViperSat File Streamer	FAST

Errata A for MN-CDD562AL564AL Rev 0

Comtech EF Data Documentation Update

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For Firmware Version 1.3.1 or higher

Part Number MN-CDD562AL564AL

Revision 0

Subject: Add Default IP Address in Chapters 9 and 10

Errata Part Number: ER-CDD562564AL-EA0 Rev - (*Errata documents are not revised*)

PLM CO Number: C-0034791

Comments: These changes will be incorporated into the next manual revision:

1. IN CHAPTER 9. TELNET AND CLI OPERATION, SECT. 9.2.2.2.1 (PAGE 9-18), ADD DEFAULT IP ADDRESS AS FOLLOWS:

9.2.2.2.1 Ethernet Interface screen



Mgmt IP Address, keystroke: **I**

- This is the IP Address assigned to the Ethernet Interface used for management over Web/SNMP. This is the same as Traffic IP when Dedicated Management Port is enabled. Enter the IP address in aaa.bbb.ccc.ddd format:
 - **The default IP address is 192.168.1.4.**

2. IN CHAPTER 10. HTTP WEB INTERFACE, SECT. 10.1.1 (PAGE 10-1), ADD DEFAULT IP ADDRESS AS FOLLOWS:

10.1.1 Open the HTTP Web Interface

Type the CDD-56xAL IP Address into the Address area of the user-supplied web browser. **The default IP address is 192.168.1.4.**



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PREFACE

About this Manual

This manual is intended for the persons who operate and maintain these Comtech EF Data products.

- CDD-562AL (L-Band) Dual Demodulator
- CDD-564A (70/140 MHz IF) Quad Demodulator
- CDD-564AL (L-Band) Quad Demodulator

These demodulators include support for externally connected Low-Noise Block Downconverters (LNBs).

Warnings, Cautions, and Notes



WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. CAUTION may also be used to indicate other unsafe practices or risks of property damage.



NOTE: Type in the note text here.

Patents and Trademarks

See all of Comtech EF Data's Patents and Patents Pending at <http://patents.comtechefdata.com>.

Comtech EF Data acknowledges that all trademarks are the property of the trademark owners.

Electrical Safety and Compliance

The unit complies with the IEC 60950 Safety of Information Technology Equipment (Including Electrical Business Machines) safety standard.



CAUTION

If the unit is operated in a vehicle or movable installation, make sure the unit is stable. Otherwise, IEC 60950 safety is not guaranteed.

Electrical Installation

The equipment is rated for operation over the range 100 - 240 volts AC. It has a maximum power consumption of 106 Watts (when all inputs are supplying DC to LNBS), and draws a maximum of 1.5 Amps.

The installation and connection to the line supply must be made in compliance to local or national wiring codes and regulations.

The CDD-562AL/564A/L is shipped with a line inlet cable suitable for use in the country of operation. If it is necessary to replace this cable, ensure the replacement has an equivalent specification.

Examples of acceptable ratings for the cable include HAR, BASEC and HOXXX-X.

Examples of acceptable connector ratings include VDE, NF-USE, UL, CSA, OVE, CEBEC, NEMKO, DEMKO, BS1636A, BSI, SETI, IMQ, KEMA-KEUR and SEV.

Fuses

See Chapter 3 for correct fuse type specifications.



CAUTION

For continued operator safety, always replace the fuses with the correct type and rating.

Grounding

The installation instructions require that the integrity of the protective earth must be ensured and that the equipment shall be connected to the protective earth connection at all times.

The CDD-562AL/564A/L is designed for connection to a power system that has separate ground, line and neutral conductors. The equipment is not designed for connection to a power system that has no direct connection to ground. It is therefore imperative during installation, configuration, and operation for the user to ensure that the unit has been properly grounded using the ground stud provided on the rear panel of the unit.



CAUTION

Correct grounding protection is required.

Operating Environment



CAUTION

Do not operate the unit in any of these extreme operating conditions:

- Ambient temperatures less than 0°C (32°F) or more than 50°C (122°F). (maximum storage temperature allowed is -25°C (-13°F) to 85°C (185°F)).
- Precipitation, condensation, or humid atmospheres of more than 95% relative humidity.
- Unpressurized altitudes of more than 2000 metres (6561.7 feet).
- Excessive dust.
- Flammable gases.
- Corrosive or explosive atmospheres.

European Union Radio Equipment and Telecommunications Terminal Equipment (R&TTE) Directive (1999/5/EC) and EN 301 489-1

Independent testing verifies that the unit complies with the European Union R&TTE Directive, its reference to EN 301 489-1 (Electromagnetic compatibility and Radio spectrum Matters [ERM]; ElectroMagnetic Compatibility [EMC] standard for radio equipment and services, Part 1: Common technical requirements), and the Declarations of Conformity for the applicable directives, standards, and practices that follow.

- Use coaxial cable that is of good quality (e.g., RG58/U (50Ω) or RG59/U (75Ω)) for connections to the IF Tx and Rx (transmit and receive) BNC female connectors.
- Use Type 'D' connectors that have back-shells with continuous metallic shielding.
- Type 'D' cabling must have a continuous outer shield (either foil or braid, or both). The shield must be bonded to the back-shell.
- Operate the unit with its cover on at all times.

EMC (Electromagnetic Compatibility)

In accordance with European Directive 2004/108/EC, independent testing showed that the CDD-562AL/564A/L complied with these standards:

Emissions	EN 55022 Class B - Limits and methods of measurement of radio interference characteristics of Information Technology Equipment (Also tested to FCC Part 15 Class B)
Immunity	EN 55024 – Information Technology Equipment: Immunity Characteristics, Limits, and Methods of Measurement

Additionally, the CDD-562AL/564A/L complied with these standards:

EN 61000-3-2 Harmonic Currents Emission	EN 61000-4-6 RF Conducted Immunity
EN 61000-3-3 Voltage Fluctuations and Flicker	EN 61000-4-11 Voltage Dips, Interruptions, and Variations Immunity
EN 61000-4-2 ESD Immunity	EN 61000-4-3 Radiated Immunity
EN 61000-4-4 EFT Burst Immunity	
EN 61000-4-5 Surge Immunity	

European Union Low Voltage Directive (LVD) (2006/95/EC)

Symbol	Description
<HAR>	Type of power cord required for use in the European Community.
	CAUTION: Double-pole/Neutral Fusing ACHTUNG: Zweipolige bzw. Neutraleiter-Sicherung

International Symbols			
Symbol	Definition	Symbol	Definition
	Alternating Current		Protective Earth
	Fuse		Chassis Ground

European Union RoHS Directive (2011/65/EC)

This unit satisfies (with exemptions) the requirements specified in the European Union Directive on the Restriction of Hazardous Substances in Electrical and Electronic Equipment (EU RoHS, Directive 2011/65/EC).

European Union Telecommunications Terminal Equipment Directive (91/263/EEC)

In accordance with the European Union Telecommunications Terminal Equipment Directive 91/263/EEC, the unit should not be directly connected to the Public Telecommunications Network.

CE Mark

Comtech EF Data declares that the CDD-562AL/564A/L meets the necessary requirements for the CE Mark.

Federal Communications Commission

Federal Code of Regulation FCC Part 15, Subpart B.

Product Support

For all product support, please call:

+1.240.243.1880

+1.866.472.3963 (toll free USA)

Comtech EF Data Headquarters

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Comtech EF Data Corp.

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+1.480.333.2200

Warranty Policy

Comtech EF Data products are warranted against defects in material and workmanship for a specific period from the date of shipment, and this period varies by product. In most cases, the warranty period is two years. During the warranty period, Comtech EF Data will, at its option, repair or replace products that prove to be defective. Repairs are warranted for the remainder of the original warranty or a 90 day extended warranty, whichever is longer. Contact Comtech EF Data for the warranty period specific to the product purchased.

For equipment under warranty, the owner is responsible for freight to Comtech EF Data and all related customs, taxes, tariffs, insurance, etc. Comtech EF Data is responsible for the freight charges only for return of the equipment from the factory to the owner. Comtech EF Data will return the equipment by the same method (i.e., Air, Express, Surface) as the equipment was sent to Comtech EF Data.

All equipment returned for warranty repair must have a valid RMA number issued prior to return and be marked clearly on the return packaging. Comtech EF Data strongly recommends all equipment be returned in its original packaging.

Comtech EF Data Corporation's obligations under this warranty are limited to repair or replacement of failed parts, and the return shipment to the buyer of the repaired or replaced parts.

Limitations of Warranty

The warranty does not apply to any part of a product that has been installed, altered, repaired, or misused in any way that, in the opinion of Comtech EF Data Corporation, would affect the reliability or detracts from the performance of any part of the product, or is damaged as the result of use in a way or with equipment that had not been previously approved by Comtech EF Data Corporation.

The warranty does not apply to any product or parts thereof where the serial number or the serial number of any of its parts has been altered, defaced, or removed.

The warranty does not cover damage or loss incurred in transportation of the product.

The warranty does not cover replacement or repair necessitated by loss or damage from any cause beyond the control of Comtech EF Data Corporation, such as lightning or other natural and weather related events or wartime environments.

The warranty does not cover any labor involved in the removal and or reinstallation of warranted equipment or parts on site, or any labor required to diagnose the necessity for repair or replacement.

The warranty excludes any responsibility by Comtech EF Data Corporation for incidental or consequential damages arising from the use of the equipment or products, or for any inability to use them either separate from or in combination with any other equipment or products.

A fixed charge established for each product will be imposed for all equipment returned for warranty repair where Comtech EF Data Corporation cannot identify the cause of the reported failure.

Exclusive Remedies

Comtech EF Data Corporation's warranty, as stated is in lieu of all other warranties, expressed, implied, or statutory, including those of merchantability and fitness for a particular purpose. The buyer shall pass on to any purchaser, lessee, or other user of Comtech EF Data Corporation's products, the aforementioned warranty, and shall indemnify and hold harmless Comtech EF Data Corporation from any claims or liability of such purchaser, lessee, or user based upon allegations that the buyer, its agents, or employees have made additional warranties or representations as to product preference or use.

The remedies provided herein are the buyer's sole and exclusive remedies. Comtech EF Data shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Chapter 1. INTRODUCTION

1.1 Overview

Equipped with an IP router, these demodulators are applicable to closed network applications.

- CDD-564A is a quad (4-channel) 70/140 MHz IF satellite demodulator
- CDD-564AL is a quad (4-channel) L-Band satellite demodulator
- CDD-562AL is a dual (2-channel) L-Band satellite demodulator



Figure 1-1. CDD-564A 70/140 MHz IF Satellite Quad Demodulator



Figure 1-2. CDD-564AL L-Band Satellite Quad Demodulator



Figure 1-3. CDD-562AL L-Band Satellite Dual Demodulator

Both frequency versions serve as replacements for the CDD-564L/CDD-562L (L-Band) or CDD-564(70/140 MHz) Satellite Demodulators. They are 100% backwards compatible with their predecessors, but incorporate new features and expansion capabilities.

Unless otherwise specified, these products are referred to collectively throughout this manual as the CDD-56xA/L.

1.1.1 CDD-56xA/L Features

The CDD-56xA/L has many standard and optional features:

- Fast acquisition demodulator
- The **CDD-564A**:
 - Provides a 70/140 MHz IF frequency range from 50 to 90 MHz and 100 to 180 MHz.
- The **CDD-564AL**:
 - Provides an L-Band IF frequency range from 950 to 2250 MHz.
 - Supports external Low-Noise Block Down Converters (LNBs).
 - Consumes only 55 Watts (without LNB).
- The **CDD-564A/L** is equipped for 10/100 BaseT Ethernet operation with a number of key features for Wide Area Network (WAN) bandwidth optimization: very low overhead High-Level Data Link Control (HDLC) encapsulation, Header and Payload Decompression.
- The **CDD-564A/L** offers variable data rates from 16 kbps to 10.239 Mbps, in BPSK, QPSK, 8-PSK, 8-QAM, and 16-QAM modes.
- The **CDD-564A/L** provides, as Forward Error Correction (FEC) options: Turbo Product Coding (TPC, IESS-315 compliant), ULL (Ultra Low Latency), and VersaFEC® (a short-block, low latency Low-density Parity Check Coding (LDPC)).
- The **CDD-564A/L** is compact – it is 1RU high, with a depth of 17.25 inches
- The **CDD-564A/L** has an integrated 10/100 BaseT Ethernet interface for network-based remote product M&C – including SNMP, HTTP (non-secure Web server), and Telnet.

1.2 Functional Description

The demodulator has three interface types: IF Ethernet (data), Traffic Ethernet (data) and M&C 100 (Dedicated Management Port).

- The IF interface provides independent unidirectional links (Rx only) with the satellite via the downlink equipment.
- The Traffic Ethernet interface is a bidirectional path, which connects with the customer's equipment through an Ethernet Switch. The Ethernet interface is a 10/100 BaseT Ethernet port where data flow is the combined output of the demodulator channels. Control and status information also uses this port, if the Dedicated Management Port is disabled.
- The M&C Ethernet interface is a 10/100 Ethernet Port. It is used only for managing the modem over Web/SNMP/Telnet when Dedicated Management Port operation is enabled. The modem can be managed only through this M&C Ethernet port when Dedicated Management Port operation is enabled. In Dedicated Management Port mode, the Traffic 100 port aggregates the data from all demodulators, and the unit is not accessible for M&C, except through the M&C 100 port.

The 10/100 Ethernet M&C port is inactive when Dedicated Management Port operation is disabled.

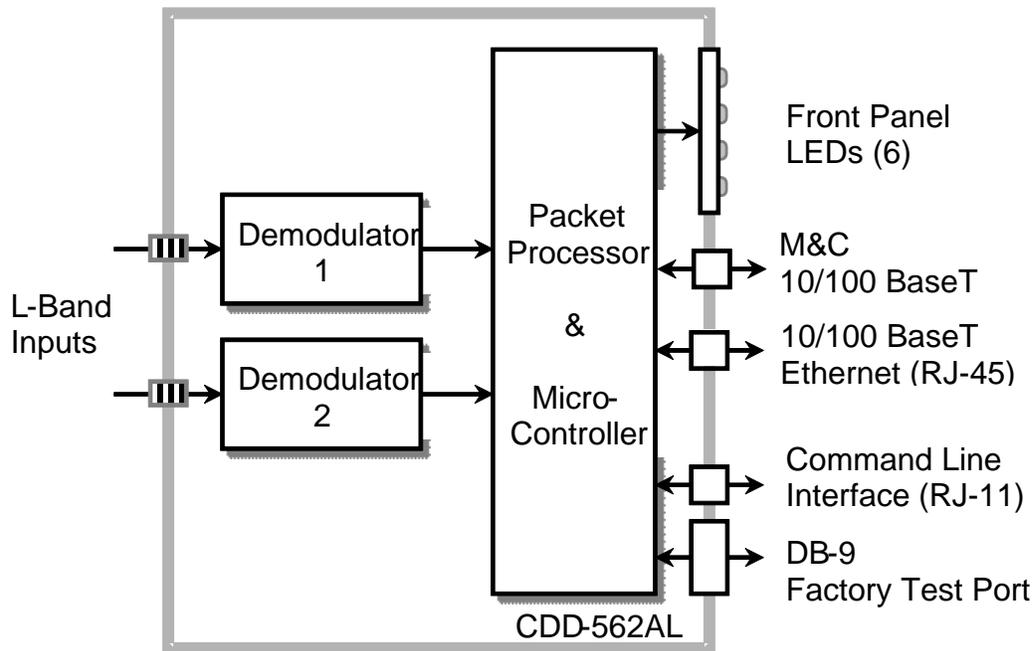
In both L-Band and 70/140 MHz operation, receive signals are first converted to a UHF frequency for SAW filtering. Then, they are down converted to a lower IF frequency for direct sampling in a high speed

A/D converter. An AGC circuit controls the signal level presented to the A/D converter. Digital signal processing does the final quadrature conversion to baseband, followed by Nyquist filtering, carrier recovery and symbol timing recovery. The resulting demodulated signal is fed, in soft decision form, to the selected FEC decoder. The FEC decoder can be TPC or VersaFEC.

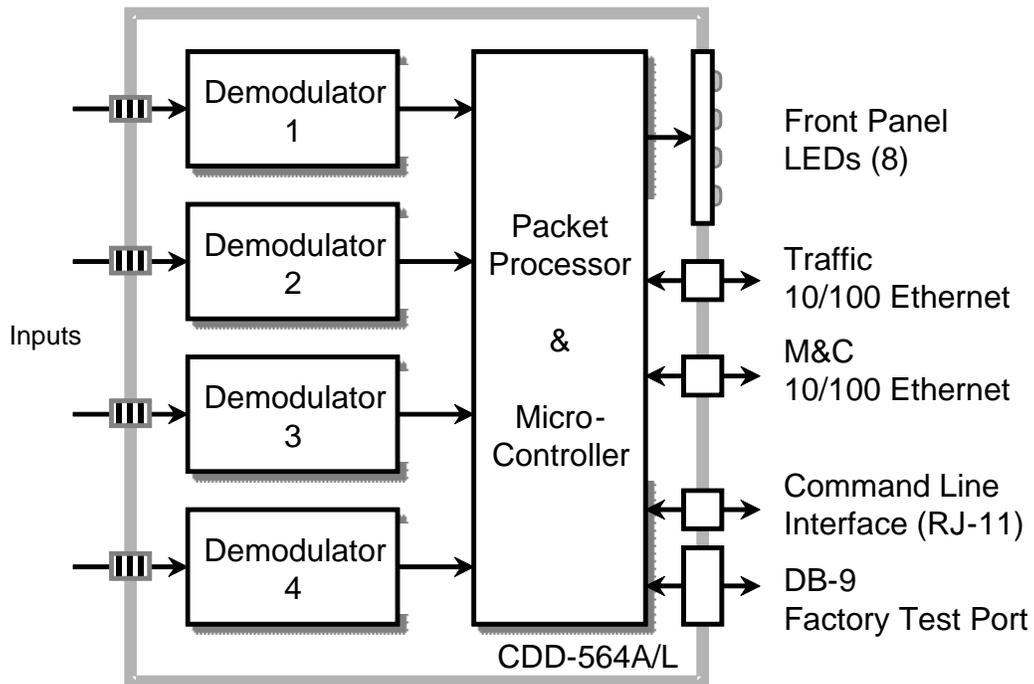
After decoding, the recovered clock and data pass to the IP Module. In the IP Module, traffic is examined and processed for four channels before it is delivered to the Ethernet port.

The demodulator's signal processing functions occur in two, large Field-Programmable Gate Arrays (FPGA). This permits rapid implementation of changes, additions and enhancements in the field. These signal-processing functions are controlled and monitored by a 32-bit RISC microprocessor, which also controls serial and Ethernet interfaces.

As shown in the block diagrams in **Figure 1-3**, the demodulator is comprised of a single printed circuit board assembly with integral FEC and IP router.



CDD-562AL Block Diagram



CDD-564A/L Block Diagram

Figure 1-4. CDD-5xxA/L Block Diagrams

1.3 Features

1.3.1 Physical Description

The demodulator is a 1RU-high chassis. You can install it into a rack or as a free standing unit. Handles at the front help with rack installation.

1.3.2 Major Assemblies

Model	Assembly	Description
CDD-564AL	PL-0021662	AC Chassis
	PL-0021314	DC Chassis
	PL-0021861	Quad Demodulator Card
	PL-0021412	0.95 Turbo Product Codec Card, optional
CDD-564A	PL-0021666	AC Chassis, IF
	PL-0021715	DC Chassis, IF
	PL-0021660	Quad Demodulator Card
	PL-0021412	0.95 Turbo Product Codec Card, optional
CDD-562AL	PL-0022006	AC Chassis
	PL-0022045	DC Chassis
	PL-0021863	Dual Demodulator Card

1.3.3 Interoperability/Compatibility

The demodulator works with the Comtech EF Data Satellite Modems that have the optional IP Module/router:

- CDM-570/L-IP
- CDM-570A/L-IP

The demodulator supports the receive functions of the equipment.

1.3.5 Physical Features

1.3.5.1 Front Panel



CDD-564AL



CDD-564A



CDD-562AL

Figure 1-8. Front Panel Views

Figure 1-8 shows the front panel of the demodulators. Depending on the unit, the front panel has six (CDD-562AL) or eight (CDD-564A/L) Light-Emitting-Diode (LED) indicators.

The LEDs indicate the status of the unit:

- Overall Unit Status
- Stored Event
- Traffic Ethernet Link Activity
- M&C Link Ethernet Activity for the dedicated management port
- Traffic Status for each of the two (CDD-562AL) or four (CDD-564A/L) Rx Traffic (receive) channels

1.3.5.2 Rear Panel

External cables are attached to connectors on the rear panel of the unit.

See also: Chapter 3. Rear Panel Connectors and Pinouts.



CAUTION

The European EMC Directive (EN55022, EN50082-1) requires using properly shielded cables for DATA I/O. These cables must be double-shielded from end-to-end, ensuring a continuous ground shield.



Figure 1-9. CDD-564AL Rear Panel View

CDD-564AL (L-Band)		
Name	Type	Function
AC		Chassis power
DC (Optional)		
Ground	#10-32 stud	Common Chassis Ground
Rx 1	Type N female	L-Band Input
Rx 2	Type N female	
Rx 3	Type N female	
Rx 4	Type N female	
Factory Test	9-pin Type D male	Remote Interface (EIA-232) for Factory Test
Traffic	RJ-45 female	Ethernet Traffic
M&C	RJ-45 female	M&C Port
Console	RJ-11 female	Async Serial Console Port



Figure 1-10. CDD-564A Rear Panel View

CDD-564A (IF)		
Name	Type	Function
AC		Chassis power
DC (Optional)		
Ground	#10-32 stud	Common Chassis Ground
Rx 1	BNC female	IF Input
Rx 2	BNC female	
Rx 3	BNC female	
Rx 4	BNC female	
Factory Test	9-pin Type D male	Remote Interface (EIA-232) for Factory Test
Traffic	RJ-45 female	Ethernet Traffic
M&C	RJ-45 female	M&C Port
Console	RJ-11 female	Async Serial Console Port



Figure 1-11. CDD-562AL Rear Panel View

CDD-562L (L-Band)		
Name	Type	Function
AC		Chassis power
DC (Optional)		
Ground	#10-32 stud	Common Chassis Ground
Rx 1	Type N female	L-Band Input
Rx 2	Type N female	
Factory Test	9-pin Type D male	Remote Interface (EIA-232) for Factory Test
10/100 Ethernet	RJ-45 female	Ethernet Traffic
M&C	RJ-45 female	M&C Port
Console	RJ-11 female	Async Serial Console Port

1.3.6 Data Interfaces

The demodulators include two 10/100 BaseT Ethernet ports. One port is a terrestrial data interface for IP traffic. A separate port is for the management and control interface (the HTTP Web Server Interface).

1.3.7 Updating Demodulator Firmware

The modem uses flash memory technology internally. This simplifies firmware updating – you can perform the update, without opening the unit, simply by connecting the modem to any 10/100 BaseT Ethernet port on a user-supplied PC once you establish Ethernet connectivity. You can receive firmware updates via download over the Internet (from Comtech EF Data’s website), or from Comtech EF Data Product Support through e-mail or standard mail delivery on CD.

See Also: Chapter 5. Updating Firmware

1.3.8 Fully Accessible System Topology (FAST)

The CDD-564A/L has a number of optional features. You can purchase the unit with only the desired features enabled.

To upgrade the functionality of a unit, Comtech EF Data provides FAST (Fully Accessible System Topology). FAST lets you purchase and activate options through special authorization codes. Contact Comtech EF Data Product Support to purchase these unique, register-specific Fast Access Codes. Then, use the HTTP Web interface to enter these codes into the unit.

For basic modems, you can order hardware options for installation either at the factory or in the field. You can easily activate these options in the field.

Table 1-1 lists the available options: standard hardware (Base Unit), FAST and FAST-accessible options.

See also: Chapter 6. FAST Activation Procedure.

Table 1-1. CDD-564A/L Standard, FAST and FAST-accessible Hardware Options

Option	Description and Comments	Installation Method
Data Rate	Data rate 16 kbps to 512 kbps	Base Unit
BPSK and QPSK	Modulation Type	Standard
TPC Codec	Turbo Product Codec for Rate 3/4	Standard
	Turbo Product Codec for CCM (IESS-315 compliant) Rate 5/16, 21/44 and 7/8	FAST
	Turbo Product Codec for Rate 0.95	Hardware
IP Packet Processor	10/100 Base-T Interface Traffic and M&C	Standard
-48 VDC	-48 VDC Prime Power Supply	Hardware
Data Rate	Data rate 16 kbps to 1.1 Mbps	FAST
Data Rate	Data rate 16 kbps to 2.5 Mbps	FAST
Data Rate	Data rate 16 kbps to 5.0 Mbps	FAST
Data Rate	Data rate 16 kbps to 10.239 Mbps	FAST
3xDES Data Decryption	3xDES-128 (NIST certified 3x core) Available for the -EN version only	FAST
IP Header Compression	Uses proprietary IP Header Compressions Version 1.3.1 and later	FAST
Payload Compression	Uses proprietary Payload Compressions Version 1.3.1 and later	FAST
8-PSK and 8-QAM	8-PSK/8-QAM Modulation	FAST
16-QAM	16-QAM Modulation	FAST
ViperSat	ViperSat Software	FAST

Option	Description and Comments	Installation Method
VFS	ViperSat File Streamer	FAST

1.4 Summary of Specifications

1.4.1 Demodulator

Parameters	Specifications
Modulation	BPSK, QPSK, 8-PSK, 8-QAM and 16-QAM
Symbol Rate Range	16Ksps to 3.0 Msps
Data Rate Range	16 kbps to 10.239 Mbps
Operating Modes	<ul style="list-style-type: none"> Turbo Product Codec - 2nd Generation Rates 21/44, 5/16, 3/4, 7/8, and 0.95 (optional plug-in module for rate 0.95) VersaFEC® Codec (short-block, low latency and ultra-low-latency LDPC)
FEC	<p>None: Uncoded BPSK/QPSK</p> <p>Turbo Product Codec, 4-bit soft-decision:</p> <p>Rate 5/16 BPSK - 2 dimensional</p> <p>Rate 21/44 BPSK - 3 dimensional</p> <p>Rate 21/44 QPSK - 3 dimensional</p> <p>Rate 3/4 QPSK/8-PSK/8-QAM/16-QAM - 2 dimensional</p> <p>Rate 7/8 QPSK/8-PSK/8-QAM/16-QAM - 2 dimensional</p> <p>Rate 0.95 (optional plug-in card) QPSK/8-QAM/8-PSK - 2 dimensional eTPC (exact Code Rate is actually 17/18, or 0.944)</p> <p>VersaFEC Codec, 6-bit soft-decision (FAST Option):</p> <p>Rate 0.488 BPSK (also 0.493 BPSK Ultra-Low-Latency</p> <p>Rate 0.533, 0.631, 0.706, 0.803 QPSK (0.493, 0.654, 0.734 Ultra-Low-Latency</p> <p>Rate 0.642, 0.711, 0.780 8-QAM (also 0.576 8-QAM Extended CCM</p> <p>Rate 0.731, 0.780, 0.829, 0.853 16-QAM (also 0.644 16-QAM Extended CCM</p>
Scrambling	<p>Transparent Closed Network mode - per ITU V.35 (Intelsat variant)</p> <p>Turbo Product Code mode - externally frame synchronized – proprietary</p>
Acquisition Range	<p>±1 to ±32 kHz, programmable in 1 kHz increments, for symbol rates below 625 ksymbols/sec</p> <p>±1 to ±200 kHz, 1 kHz increments, for symbol rates above 625 ksymbols/sec, L-Band only</p>
Acquisition Time	Highly dependent on data rate, FEC rate, and demodulator acquisition range.

Parameters	Specifications
Monitor Functions	Eb/No estimate, 2 to 16 dB (± 0.25 dB accuracy) Corrected Bit Error Rate, 1E-3 to 1E-9 Frequency offset, ± 200 kHz range, 100 Hz resolution Receive signal level monitor accuracy: ± 5 dB for CDD-564AL L-Band, ± 3 dB for CDD-564A over specified min to max signal range LNB Voltage and Current
Clocking Options	Internal - CDD-564AL (L-Band) ± 0.06 ppm (SCT); CDD-564A (70/140 MHz) ± 1.0 ppm (SCT) External - None
Input Impedance	50 Ω or 75 Ω with 17 dB minimum return loss

1.4.1.1 BER Performance Specifications

BER Description	For BER=	Rate			
		Guaranteed Eb/No (typical value in parentheses)			
TURBO Product Codec		21/44 (QPSK)	21/44 (BPSK)	5/16 (BPSK)	
Rate 21/44 QPSK	10 ⁻⁶	2.9 dB (2.6 dB)	2.8 dB (2.5dB)	2.4 dB (2.1dB)	
Rate 21/44 BPSK	10 ⁻⁷	3.1 dB (2.7 dB)	3.1 dB (2.8 dB)	2.6 dB (2.3dB)	
Rate 5/16 BPSK (See Note 1)	10 ⁻⁸	3.3 dB (2.8 dB)	3.3 dB (2.90dB)	2.7 dB (2.4dB)	
TURBO Product Codec		3/4 (QPSK)	3/4 (8-PSK)	Rate 3/4 (16-QAM)	
Rate 3/4 QPSK	10 ⁻⁶	3.8dB (3.4dB)	6.2 dB (5.8 dB)	7.4dB (7.0 dB)	
Rate 3/4 8-PSK	10 ⁻⁷	4.1dB (3.7dB)	6.4 dB (6.0 dB)	7.8 dB (7.3 dB)	
Rate 3/4 16-QAM (See Note 1)	10 ⁻⁸	4.4dB (4.0dB)	6.8 dB (6.3 dB)	8.2 dB (7.7 dB)	
TURBO Product Codec		Rate 7/8 (QPSK)	Rate 7/8 (8-PSK)	Rate 7/8 (16-QAM)	
Rate 7/8 QPSK	10 ⁻⁶	4.3 dB (4.0 dB)	7.0 dB (6.6 dB)	8.1 dB (7.7 dB)	
Rate 7/8 8-PSK	10 ⁻⁷	4.4 dB (4.1 dB)	7.1 dB (6.7 dB)	8.2 dB (7.8 dB)	
Rate 7/8 16-QAM (See Note 1)	10 ⁻⁸	4.5 dB (4.2 dB)	7.2 dB (6.8 dB)	8.3 dB (7.9 dB)	
TURBO Product Codec		Rate 0.95 (QPSK)	Rate 0.95 (8-PSK)		
Rate 0.95 QPSK	10 ⁻⁶	6.4 dB (6.0 dB)	9.3 dB (8.9 dB)		
Rate 0.95 8-PSK	10 ⁻⁷	6.7 dB (6.3 dB)	9.8 dB (9.4 dB)		
(See Note 1)	B10 ⁻⁸	6.9 dB (6.5 dB)	10.3 dB (9.9 dB)		
TURBO Product Codec		Rate 3/4 (8-QAM)	Rate 7/8 (8-QAM)	Rate 0.95 (8-QAM)	
Rate 3/4 8-QAM	10 ⁻⁶	6.5 dB (6.1 dB)	6.6 dB (6.2 dB)	9.6 dB (9.2 dB)	
Rate 7/8 8-QAM	10 ⁻⁷	6.8 dB (6.4 dB)	6.7 dB (6.3 dB)	10.1 dB (9.7 dB)	
Rate 0.95 8-QAM (See Note 1)	10 ⁻⁸	7.2 dB (6.8 dB)	6.8 dB (6.4 dB)	10.6 dB (10.2 dB)	
VersaFEC Codec BPSK (See Note 1)		0.488 (BPSK)			
	10 ⁻⁵	2.4 dB (2.1 dB)			
	10 ⁻⁸	2.7 dB (2.4 dB)			
VersaFEC Codec QPSK (See Note 1)		0.533 (QPSK)	0.631 (QPSK)	0.706 (QPSK)	0.803 (QPSK)
	10 ⁻⁵	2.3 dB (2.0 dB)	2.8 dB (2.5 dB)	3.3 dB (3.0 dB)	3.8 dB (3.5 dB)
	10 ⁻⁸	2.5 dB (2.2 dB)	3.0 dB (2.7 dB)	3.7 dB (3.4 dB)	4.1 dB (3.8 dB)
VersaFEC Codec 8-QAM (See Note 1)		0.642 (8-QAM)	0.711 (8-QAM)	0.780 (8-QAM)	
	10 ⁻⁵	4.6 dB (4.3 dB)	5.2 dB (4.9 dB)	5.6 dB (5.3 dB)	
	10 ⁻⁸	4.9 dB (4.6 dB)	5.5 dB (5.2 dB)	6.0 dB (5.7 dB)	
VersaFEC Codec 16-QAM (See Note 1)		0.731 (16-QAM)	0.780 (16-QAM)	0.829 (16-QAM)	0.853 (16-QAM)
	10 ⁻⁵	6.6 dB (6.3 dB)	7.1 dB (6.8 dB)	7.7 dB (7.4 dB)	8.1 dB (7.8 dB)
	10 ⁻⁸	6.8 dB (6.5 dB)	7.4 dB (7.1 dB)	8.0 dB (7.7 dB)	8.4 dB (8.1 dB)

BER Description	For BER=	Rate Guaranteed Eb/No (typical value in parentheses)			
VersaFEC Codec - Extended CCM (See Note 1)		0.576 (8-QAM)	0.644 (16-QAM)		
	10 ⁻⁵	4.5 dB (4.2 dB)	6.4 dB (6.1 dB)		
	10 ⁻⁸	4.9 dB (4.6 dB)	6.9 dB (6.6 dB)		
Ultra-Low-Latency (ULL) Codec (See Note 1)		0.493 (BPSK)	0.493 (QPSK)	0.654 (QPSK)	0.734 (QPSK)
	10 ⁻⁵	3.1 dB (2.8 dB)	3.1 dB (2.8 dB)	3.6 dB (3.3 dB)	4.1 dB (3.8 dB)
	10 ⁻⁸	3.7 dB (3.4 dB)	3.7 dB (3.4 dB)	4.2 dB (3.9 dB)	4.7 dB (4.4 dB)
Note 1: With two adjacent carriers, each 7 dB higher than the desired carrier					

1.4.2 Data Rate Ranges

FEC Type	Modulation	Code Rate	Data Rate Range	
			Lower Limit (kbps)	Upper Limit (Mbps)
None	BPSK	Uncoded	16.0	3.000
	QPSK	Uncoded	16.0	5.000
Turbo	BPSK	5/16	16.0	0.937
		21/44	16.0	1.430
	QPSK	21/44	16.0	2.860
		3/4	16.0	4.500
		7/8	16.0	5.250
	8-PSK/8-QAM	0.95	16.0	5.666
		3/4	16.0	6.750
		7/8	16.0	7.875
	16-QAM	0.95	16.0	8.500
		3/4	16.0	9.000
		7/8	16.8	9.980
VersaFEC	BPSK	0.488	16.0	1.462
	QPSK	0.533	16.0	3.200
		0.631	16.0	3.785
		0.706	16.0	4.233
		0.803	16.0	4.818
	8-QAM	0.576	16.0	5.179
		0.642	16.0	5.782
		0.711	16.0	6.401
		0.780	16.0	7.021
	16-QAM	0.644	16.0	7.726
		0.731	16.0	8.776
		0.780	16.0	9.361
		0.829	16.0	9.946
0.853		16.4	10.239	
Ultra-Low Latency (ULL)	BPSK	0.493	16.0	1.480
	QPSK	0.493	16.0	2.960
		0.654	16.0	3.924
		0.734	16.0	4.405

1.4.3 Low Noise Block Converter (LNB) Support (CDD-564AL only)

Parameters	Specifications
LNB Voltage	+13 volts and +18 volts DC or OFF at 500 mA max per Rx input
10 MHz Reference	0 ±5 dB
Power Level	Selectable ON or OFF per Rx input

1.4.4 Environmental and Physical

Parameters	Specifications
Temperature	Operating 32 to 122°F (0 to 50°C)
	Storage -13 to 185°F (-25 to 85°C)
Power Supply	100 to 240 volts AC, 50/60 Hz Optional: 48 VDC input (38 to 60)
Power Consumption	55 W typical (106 W max – powering 4 LNBS)
Fuse	120/230 VAC: T3, 15A, slow-blow 20 mm 48VDC (38 to 60 VDC): T8.0A, slow-blow 20 mm
Physical Dimensions	1RU high x 19 inches wide x 17.5 inches deep (43.8 mm h x 482.6 mm w x 444.5 mm d)
Weight	7 lbs (3.2 kg)
Agency Approvals	CE Mark FCC Part 15, Class B

1.4.5 Network Protocols

Protocols	
RFC 768 - UDP	RFC 2045 - MIME
RFC 791-IP	RFC 2236 – IGMP v2
RFC 792 – ICMP	RFC 2474 – DS Field
RFC 793 – TCP	RFC 2475 - ADS
RFC 826 - ARP	RFC 2578 - SMI
RFC 856 - Telnet	
RFC 862 – Ping	
RFC 894 – IP	RFC 2616 - HTTP
RFC 959 – FTP	
RFC 1112 – IP Multicast	RFC 3412 - SNMP
RFC 1213 –SNMP MIB II	RFC 3416 – SNMPv2
RFC 1812 – IPv4 Routers	RFC 3418 – SNMP MIB

Chapter 2. INSTALLATION and STARTUP

2.1 Unpacking and Inspecting the Shipment

The CDD-56xA/L Satellite Multi-Channel Demodulator, its Installation and Operation Manual, and its power cord were packaged and shipped in a reusable cardboard carton containing protective foam spacing.

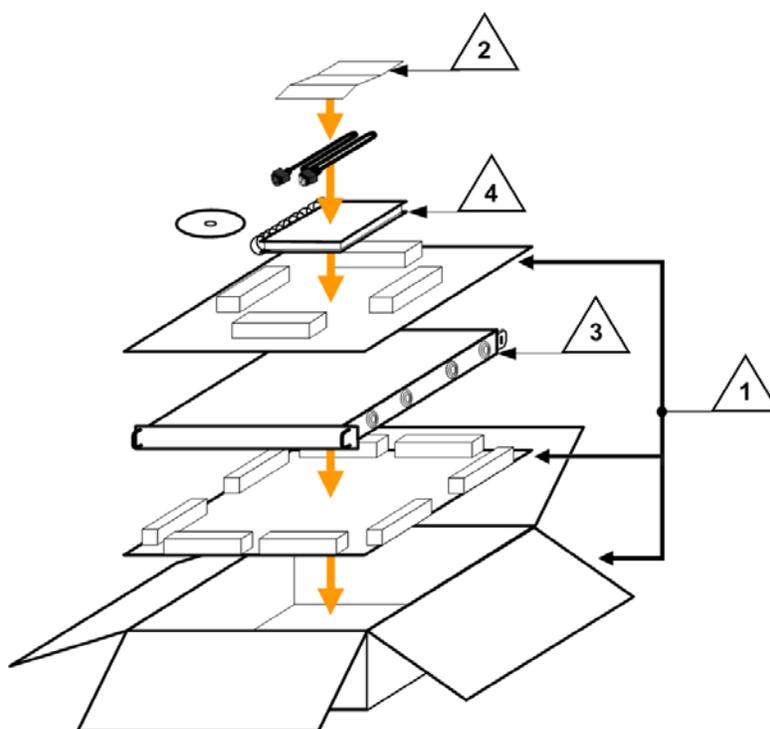


Figure 2-1. Unpacking and Inspecting the Shipment



CAUTION

This equipment contains parts and assemblies sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling the equipment.

Step	Task
1	Keep all shipping materials for storage or reshipment.
2	Check the packing list to ensure the shipment is complete.
3	Inspect the equipment for any possible damage incurred during shipment. Contact the carrier and Comtech EF Data immediately to submit a damage report if damage is evident.
4	Read the Installation and Operation Manual carefully to become familiar with operation.

2.2 Installing the CDD-56xA/L into a rack

For information about custom rack enclosures, contact Comtech EF Data Customer Support during normal business hours or visit Comtech EF Data's Web site (www.comtechefdata.com/support.asp).

The CDD-56xA/L CANNOT have rack slides installed on the sides of the chassis. Cooling fans and exhaust vents are provided here – air flow must not be impeded.

Comtech EF Data recommends that an alternate method of support is provided within the rack, such as standard rack shelves (Figure 2-2) or the optional Rear Support Brackets Kit (Figure 2-3). If there is any doubt, contact Comtech EF Data Customer Support during normal business hours.



CAUTION

PROPER GROUNDING PROTECTION IS REQUIRED. The equipment must be connected to the protective earth connection at all times. It is therefore imperative that the unit is properly grounded, using the ground stud provided on the unit rear panel, during installation, configuration, and operation.

PROPER AIR VENTILATION IS REQUIRED. In a rack system where there is high heat discharge, provide forced-air cooling with top- or bottom-installed fans or blowers.

Make sure there is adequate clearance inside the enclosure, especially at the side for air ventilation.

Air temperature inside the rack enclosure should never exceed 50°C (122°F).

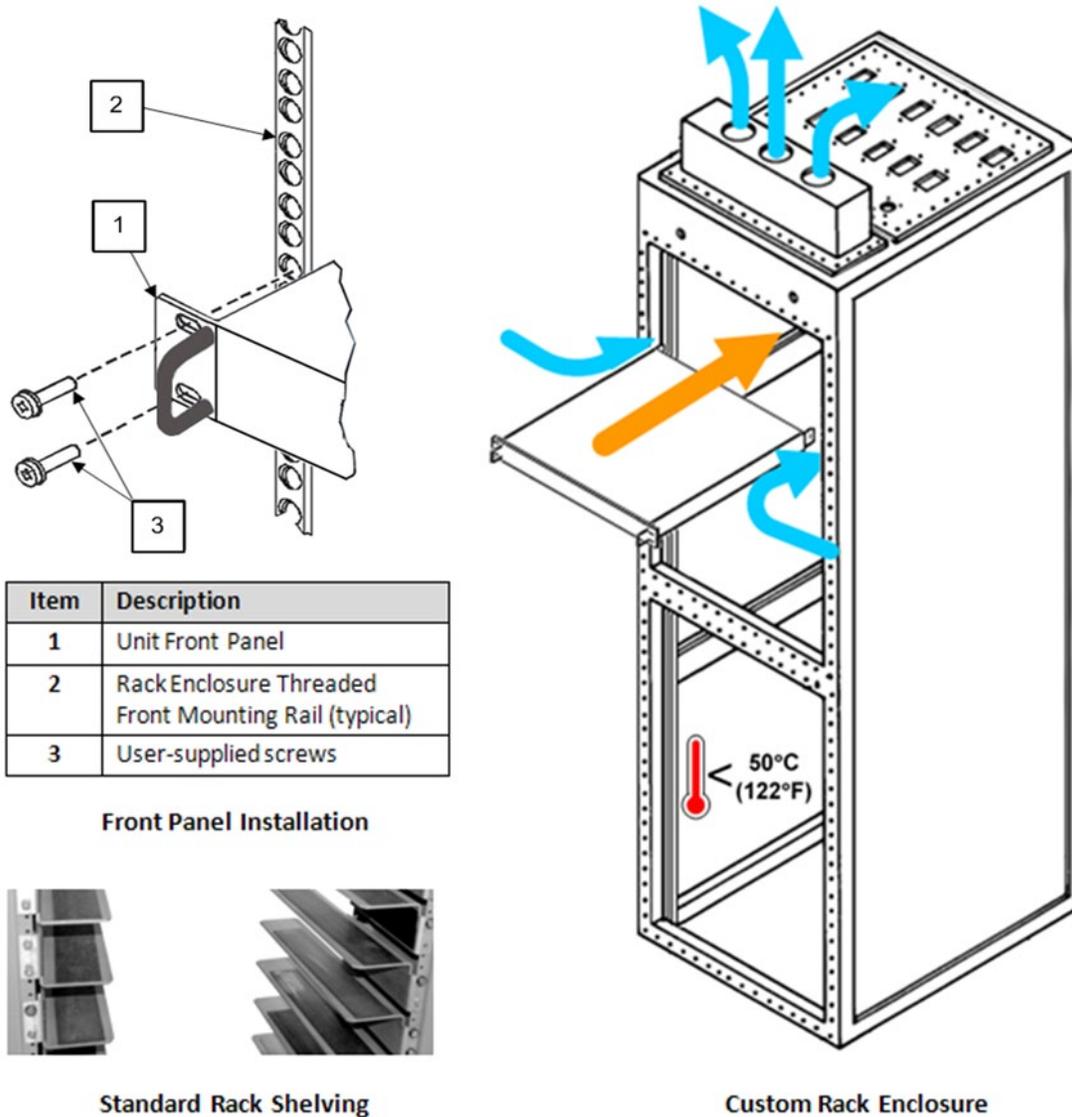


Figure 2-2. Installation into a Rack Enclosure

Install the CDD-56xA/L in its assigned position in the rack enclosure. Use, as required:

- A standard rack installation shelf;
- User-supplied screws to secure the front panel to the rack enclosure threaded front installation rails;
- Comtech EF Data’s optional KT/6228-2 (4”) or KT/6228-3 (10”) Rear Support Brackets Kit.

2.2.1 Installing the Optional Rear Support Brackets Kit

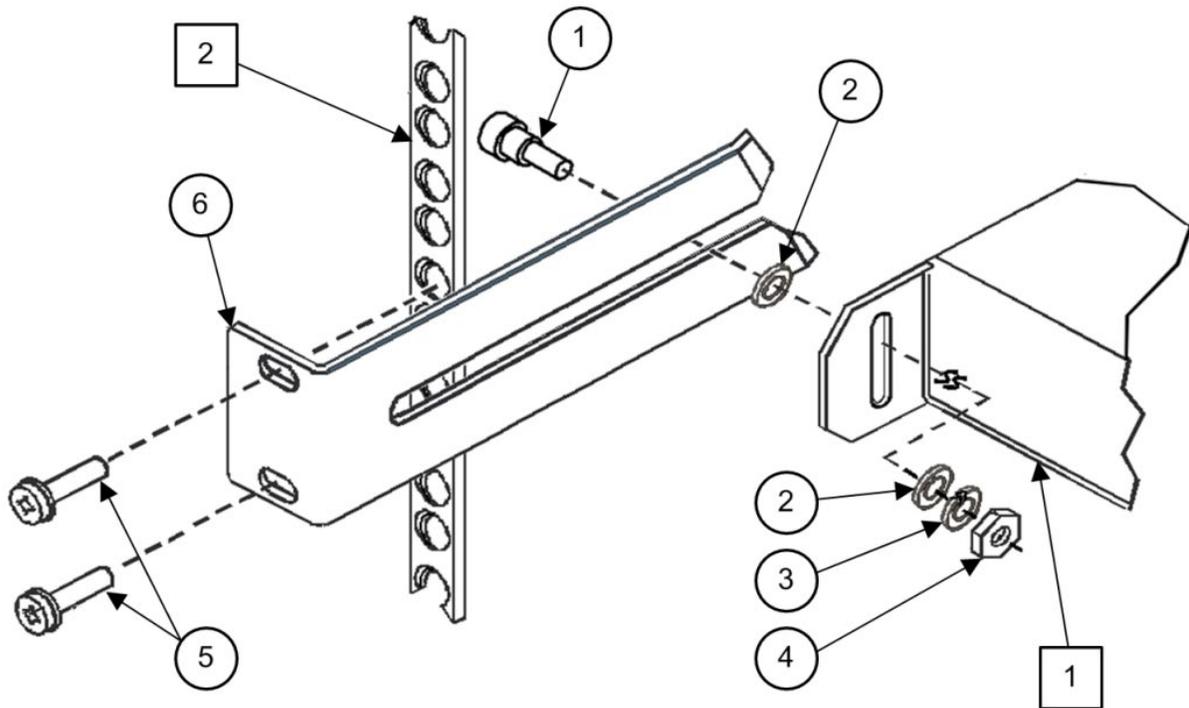


Figure 2-3. Optional Rear Support Brackets Kit Installation

Detail	Description
1	Back of Unit
2	Rack Enclosure Threaded Rear Installation Rail (typical)

Item	Kit / Quantity		Part Number	Description
	KT/6228-2	KT/6228-3		
1	2	2	HW/10-32SHLDR	Shoulder Screw, #10
2	4	4	HW/10-32FLT	Flat Washer, #10
3	2	2	HW/10-32SPLIT	Lock Washer, #10
4	2	2	HW/10-32HEXNUT	Hex Nut, #10
5	4	4	HW/10-32x1/2RK	Bolt, #10, Rear Support Bracket
6	2	–	FP/6138-2	Bracket, Rear Support – 4”
	–	2	FP/6138-3	Bracket, Rear Support – 10”

The tools needed to install the KT/6228-2 (4") or KT/6228-3 (10") Rear Support Brackets Kit are as follows:

- A medium Phillips™ screwdriver
- A 5/32-inch SAE Allen™ Wrench
- An adjustable Crescent™ wrench.

To install the kit (Figure 2-3):

Step	Task
1	Use the #10 flat washers, #10 split washers, and #10 hex nuts to secure the #10 shoulder screws to the unit chassis through the rear right and left side installation slots.
2	Use the #10 rack bracket bolts to install the rear support brackets onto the rack enclosure threaded rear installation rails.
3	Install the unit into the rack enclosure. Ensure that the shoulders of the #10 shoulder screws properly engage into the rear support bracket slots.

2.3 Initial Configuration

There are no internal jumpers to configure, no interface cards to install, and no other options to install. You set up all configurations via the firmware.

The unit has a default 375 kbps, TPC, QPSK, Rate 3/4 configuration. First, make sure to set up additional configuration changes through the RJ-11 Console Interface locally.



NOTE: The auto-sensing AC power supply does not require any adjustments. Simply plug in the supplied line cord, and turn on the switch on the rear panel.

2.4 Connecting External Cables

Once the desired configuration settings have been made, proceed to connect all external cables to the connectors described in Chapter 3. Should difficulties occur, call Comtech EF Data Customer Support for assistance.

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Chapter 3. REAR PANEL CONNECTOR PINOUTS

3.1 CDD-56xAL Rear Panels Overview



CDD-564AL Quad Demodulator (L-Band)



CDD-564A Quad Demodulator (IF Band)



CDD-562AL Demodulator (L-Band)

Figure 3-1. CDD-56xAL Rear Panel Views

Use the rear panel connectors for all external connections between the unit and other equipment. See Figure 3-1 and Table 3-1.

3.2 CDD-56xA/L Cable Connections

Table 3-1. Rear Panel External Cable Connections

Section	Service Type /Function	Connector Name	CDD-562AL (L-Band)	CDD-564AL (L-Band)	CDD-564A (IF Band)
3.2.1	Rx IF /RF Input	Rx 1	Type N female	Type N female	Type BNC female
		Rx 2	Type N female	Type N female	Type BNC female
		Rx 3	N/A	Type N female	Type BNC female
		Rx 4	N/A	Type N female	Type BNC female
Section	Service Type /Function	Connector Name	Type for all CDD-56xA/L units		
3.2.2	Terrestrial Data /Ethernet Traffic and M&C	10/100 Ethernet	RJ-45 female		
	Dedicated Management Port	10/100 Ethernet	RJ-45 female		
3.2.3	Utility /Remote Interface for Factory Test	Remote Control or Factory Test	9-pin Type D male NOT FOR CUSTOMER USE		
	Utility /Async Serial Console Port	Console	RJ-11 female		



CAUTION

The European EMC Directive (EN55022, EN50082-1) requires using properly shielded cables for DATA I/O. These cables must be double-shielded from end-to-end, ensuring a continuous ground shield.

3.2.1 Rx IF Connections

3.2.1.1 CDD-562AL and CDD-564AL L-Band Chassis Rx Input



CAUTION

DC voltages can be present on the Type N Rx IF connectors, up to a maximum of 18 volts.

The Rx IF input port connectors on the L-Band demodulators are 50 Ω N female types. The return loss on these ports is typically better than 17 dB.

To connect to a 75 Ω system, use an inexpensive N to F type adapter. The adapter is available as an optional accessory. This setup will cause a slight reduction in return loss. The effect on most systems is minimal.



The CDD-562AL has two connectors labeled Rx1 and Rx2.

The CDD-564AL has four connectors labeled Rx 1, Rx 2, Rx 3 and Rx 4.

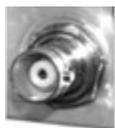
3.2.1.2 CDD-564A 70/140 MHz IF Chassis Rx Input



CAUTION

DC voltages can be present on the BNC Rx IF connectors, up to a maximum of 18 volts.

The Rx IF input port connectors on the 70/140 MHz IF demodulators are BNC female types. The return loss on these ports is typically better than 17 dB for both 50 Ω and 75 Ω systems.

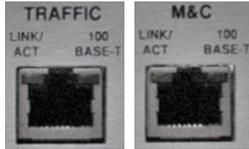


The CDD-564A has four BNC connectors labeled Rx 1, Rx 2, Rx 3 and Rx 4.

3.2.2 Terrestrial Data Connections – 10/100 Ethernet (RJ-45)

The 10/100 BaseT Ethernet ports are standard 8-pin RJ-45 modular jacks. One port is labeled TRAFFIC, and the other port is labeled M&C.

The TRAFFIC port is used for Ethernet traffic. The M&C port is used for management and firmware updates via Telnet/HTTP/SNMP. The M&C port is available only when the Dedicated Management Port is enabled. The Dedicated Management Port is disabled, by default.



Pin #	Function
1	Tx+
2	Tx-
3	Rx+
4	N/C
5	N/C
6	Rx-
7	N/C
8	N/C

3.2.3 Utility Connections

3.2.3.1 Remote Control (DB-9M)



CAUTION

This connector is not a standard EIA-232 interface. It is not intended for customer use. It is intended for Factory Test use only. Contact CEFD Customer Support prior to connecting any equipment to this interface.

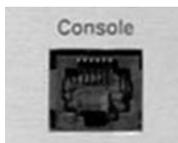
The **Factory Test** interface is a 9-pin Type D male (DB-9M) connector, reserved for use in factory test applications.



Pin #	Description	Direction
1	Ground	--
6	Selected Demod RS-422 Rx Data +	In
2	EIA-232 Transmit Data (38.4k, 8N1 fixed)	Out
7	Selected Demod RS-422 Rx Data -	In
3	EIA-232 Receive Data (38.4k, 8N1 fixed)	In
8	Selected Demod RS-422 Tx Clock +	Out
4	Selected Demod I-Channel monitor	Out
9	Selected Demod RS-422 Tx Clock -	Out
5	Selected Demod Q-Channel monitor	Out

3.2.3.2 Console (RJ-11 Async-Serial Port)

The Console port is a standard 6-pin RJ-11 modular jack. The Async-Serial EIA-232 DCE Console services the IP Module Command Line Interface (CLI). The supplied adapter cable connects the user PC to the Console port. A user-supplied terminal emulator program such as HyperTerminal or Tera Term is used for management of demodulator and IP Module functions.



Pin #	Function
1	Ground
2	Rx
3	Tx
4	Ground
5	Not used
6	Not used

3.3 CDD-56xAL Ground and Power Connections

3.3.1 Chassis Ground Interface



CAUTION

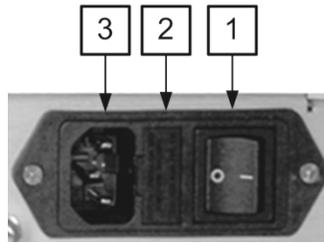
CORRECT GROUNDING PROTECTION IS REQUIRED. The equipment must be connected to the protective earth connection at all times. It is imperative that the unit is properly grounded, using the ground stud provided on the unit rear panel, during installation, configuration, and operation.

Use the #10-32 stud, located adjacent to the power interface, for connecting a common chassis ground among equipment.



NOTE: The AC power interface provides the safety ground.

3.3.2 100V/240V Alternating Current (AC) Power Interface (Standard)



3 IEC Three-prong Connector

2 Press-fit Fuse Holder

1 On / Off Switch

Figure 3-2. CDD-56xAL AC Power Interface

AC Power Specifications	
Input Power	106 W maximum, 63 W typical
Input Voltage	100 V to 240 V AC, +6%/-10%, autosensing (total absolute max. range is 90 V to 254 V AC)
Connector Type	IEC
Fuse Protection	Line and neutral fusing (2X) 5mm x 20mm Slow-blow type fuses: T2 (2.00 Amp) (100 V or 240 V AC operation)

3.3.2.1 AC Operation – Applying Power



Figure 3-3. Applying AC Power to the CDD-56xAL

To apply AC power to the CDD-56xAL (Figure 3-3):

1. Plug the provided AC power cord female end into the unit.
2. Plug the AC power cord male end into the user-supplied power source.
3. Switch the unit ON.

3.3.2.2 AC Operation – Replacing Fuses

The CDD-56xA/L uses two 5mm x 20mm Slow-blow fuses – one each for line and neutral connections. The fuses are contained within a fuse holder that is press-fit into the body of the IEC power module (located on the rear panel, Figure 3-4).

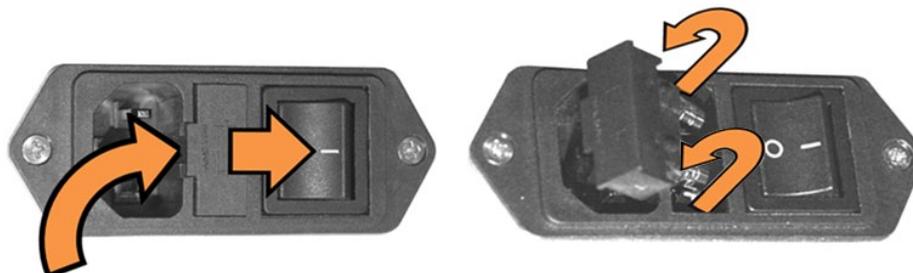


Figure 3-4. Replacing CDD-56xA/L AC Fuses



WARNING

Disconnect the power supply first.

To replace the fuse(s):

1. Disconnect the power supply.
2. Unseat the fuse holder from the IEC power module.
 - a. Use the slot to pry the holder outward from the IEC power module.
 - b. Pull the holder straight out, and then swing the holder away from the module.
3. Remove and replace the T2 (2.00 Amp) fuses as needed.
4. Re-seat the fuse holder in the IEC power module.



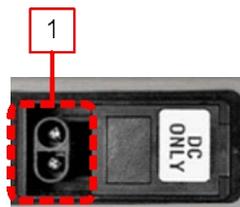
CAUTION

For continued operator safety, always replace the fuses with the correct type and rating. See Table 3-2.

Table 3-2 Correct Fuses

Model	Input	Power Consumption	Fuse
CDD-564A	AC	100-240VAC, 50-60HZ, 0.62-0.26A	1A
CDD-564AL	AC	100-240VAC, 50-60HZ, 1.24-0.52A	2A
CDD-562AL	AC	100-240VAC, 50-60HZ, 0.75-0.31A	1A
CDD-564A	DC	43-60VDC, 1.43-1.1A	2A
CDD-564AL	DC	43-60VDC, 2.9-2.1A	4A
CDD-562AL	DC	43-60VDC, 1.73-1.25A	2.5A

3.3.3 48V Direct Current (DC) Power Interface (Optional)



1 Plug-in Power Receptacle

Figure 3-5. CDD-56xAL DC Power Interface

DC Power Specifications	
Input Power	48 W (typical) 106 W (maximum)
Input Voltage	48 V DC nominal (36 V to 60 V)
Connector Type	Corcom PS series
Mating Connector	Corcom GA210 or Molex 03-12-1026
Fuse Protection	Line and Neutral Fusing (2X) 5mm x 20mm Slow-blow type fuses: T4A (4 Amp)

3.3.3.1 DC Operation – Applying Power

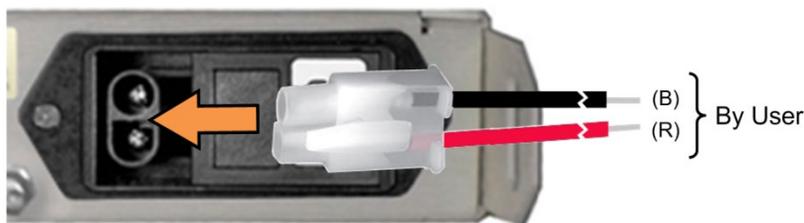


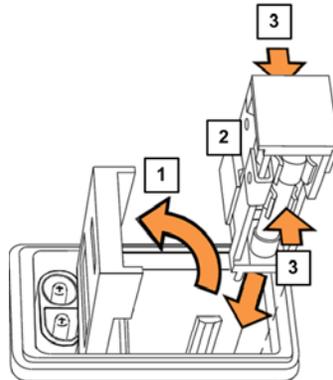
Figure 3-6. Applying DC Power to the CDD-56xAL

To apply DC power to the CDD-56xAL:

1. Assemble the user-supplied red (+) and black (-) DC power leads and their crimped terminals into the shell of the module mating connector.
 - a. Number 18 AWG minimum wires are recommended.
 - b. Note the keyed orientation for the wires.
2. Connect the user-supplied DC power leads to the power source.
3. Plug the connector into the keyed module socket as shown.

3.3.3.2 DC Operation – Replacing Fuses

The CDD-56xA/L uses two 5mm x 20mm Slow-blow fuses – one each for line and neutral connections. The fuses are contained within a fuse holder that is press-fit into the body of the DC power module (located on the rear panel, Figure 3-7).



- 1 Hinged Flap
- 2 Press-fit Fuse Holder
- 3 Fuse (2X)

Figure 3-7. Replacing CDD-56xA/L DC Fuses

To replace the fuse(s):



WARNING
Disconnect the power supply first.

1. Disconnect the power supply.
2. Use a flat-bladed screwdriver to pry open the slot and swing back the hinged flap.
3. Extract the press-fit fuse holder:
 - a. Using the screwdriver, disengage the fuse holder outward from the DC power module.
 - b. Using your fingers, pull the holder straight out of the module.
4. Remove and replace the T4A (4 Amp) fuses as needed.
5. Re-seat the fuse holder into the DC power module, and close the protective flap.



CAUTION
For continued operator safety, always replace the fuses with the correct type and rating.
See Table 3-2

Chapter 4. IP MODULE ETHERNET INTERFACE

4.1 Introduction

The CDD-56xA/L Satellite Demodulator's integral IP Module Ethernet Interface is intended for closed network Single Channel Per Carrier (SCPC) links. It concentrates traffic from two or four independent demodulators into a single Ethernet port, making it ideal for networked VSAT applications. The CDD-56xA/L can also be used in a Vipersat satellite bandwidth management system.



NOTE: For information specific to CDD-56xA/L IP Module operation when used in a Vipersat system, please see Comtech EF Data publication MN/22137 – Vipersat CDD-56X Series Satellite Network Demodulator Router User Guide.

4.1.1 Standard Features

- Two 10/100BaseT Ethernet Interfaces (RJ-45)
- Powerful network management:
 - SNMP with public and private MIB
 - Telnet interface for remote product M & C
 - Web Server interface for complete product management
 - Console Port interface for local network management
- Remote software/firmware upgrade via FTP
- Configuration backup and restore via FTP
- Event Logging to capture all IP Module activity
- Detailed Statistics of IP traffic
- IGMP support for Multicast
- Static IP routing for unicast and multicast

- Symmetric and/or asymmetric operation for maximum bandwidth efficiency
- Point-to-Point or Point-to-Multipoint configuration
- Interoperable with these Comtech EF Data modems:
 - CDM-570/L-IP
 - CDM-570A/L-IP

4.1.2 10/100 BaseT Ethernet Interfaces

The two 10/100BaseT Ethernet Interfaces are used for routing IP traffic received over the satellite to another device on the local LAN, and for monitor and control purposes.

4.1.3 Powerful Network Management

Local or remote management of all demodulator and IP Module functions is available via SNMP, Telnet, or HTTP. The demodulator may be configured, operated and monitored using any of the following methods:

User Interface	Connection	Demod Functions	IP MODULE Functions
SNMP	Local or remote – Ethernet via 10/100 BaseT Traffic/M&C interface	ALL	ALL
Telnet	Local or remote – Ethernet via 10/100 BaseT Traffic/M&C interface	ALL	ALL
Serial Command Line Interface (CLI)	Local – Serial RS-232 via Console Port	ALL	ALL
Web Server	Local or remote – Ethernet via 10/100 BaseT Traffic/M&C interface	ALL	ALL

4.1.4 Remote Firmware Update via FTP

See Chapter 5, Updating Firmware.

The CDD-56xA/L Multi-Channel Demodulator uses flash memory technology internally. Firmware update archive files may be downloaded from the Internet to a user PC (from Comtech EF Data’s website), or obtained through Comtech EF Data Customer Support via e-mail or on CD by standard mail delivery.

Once acquired from Comtech EF Data, new firmware can be uploaded from the user PC by File Transfer Protocol (FTP) without opening the unit or having to be in the same physical location.

4.1.5 Configuration Backup and Restore via FTP

All demodulator configuration parameters are stored in a simple text file. The parameter file can easily be retrieved locally or remotely by FTP. The file can then be used to quickly configure a replacement unit if needed.

4.1.6 Event Logging to Capture All Demodulator Activity

All activity can be stored into an easy-to-read Event Log. This file also can be retrieved locally or remotely by FTP.

4.1.7 Detailed Statistics of IP Traffic

IP traffic statistics are continuously updated and allow detailed performance analysis or can be used to identify traffic problems. The statistics are available through the Serial Console locally, or can be gathered remotely by SNMP, Telnet, or HTTP.

4.1.8 IGMP Support for Multicast

IGMP is a standard feature in the demodulator. If enabled as an IGMP client, it responds to IGMP queries for the configured multicast routes. If enabled as an IGMP server, it generates IGMP queries and transmits multicast traffic per IGMP clients' request. If there are no active IGMP clients on the LAN, it will stop forwarding the multicast traffic (received from the satellite) to the LAN.

4.1.9 Static IP Routing for Unicast and Multicast

Up to 256 static routes can be entered into the demodulator to direct IP traffic to another device on the local LAN.

4.2 Demodulator Features

See Chapter 6, Fast Activation Procedure.

Additional features can be added quickly on site to the CDD-56xA/L by entering FAST Access Codes purchased from Comtech EF Data. FAST-accessible options include:

- IP Header Decompression
- Payload Decompression (future)

4.2.1 3xDES Decryption with Ability to Change Keys (future)

The EN version supports 3xDES-128 (using NIST certified 3x core) decryption for the highest-level security. For link encryption, each unit supports eight decryption keys.

4.2.2 IP Header Decompression

Header Decompression also is an optional feature of the demodulator. The demodulator supports Header Decompression for the following Ethernet and Layer 3 & 4 Headers:

Supported Ethernet Headers
Ethernet 2.0

Ethernet 2.0 + VLAN-tag
Ethernet 2.0 + MPLS
802.3-raw
802.3-raw + VLAN-tag
802.3 + 802.2
802.3 + 802.2 + VLAN-tag
802.3 + 802.2 + SNAP
802.3 + 802.2 + SNAP + VLAN-tag
802.3 + 802.2 + SNAP + MPLS
Supported Layer 3&4 Headers
IP
TCP
UDP
RTP (Codec Independent)

Header Compression reduces the required VoIP bandwidth by 60 percent. Example: A G.729a voice codec, operating at 8 kbps, will occupy 32 kbps once encapsulated into IP framing on a LAN. Using IP/UDP/RTP Header Compression, the same traffic only needs 10.8 kbps total WAN satellite bandwidth to cross the link. A total maximum of 64 simultaneous VoIP calls can be compressed. Normal Web/HTTP traffic can be reduced an additional 10% via IP/TCP header compression.

4.2.2.1 Header Decompression Configuration

Header Decompression requires one configuration change. Make sure the Header Compression and Decompression feature is enabled on both the sending and receiving IP modem and demodulator.

Packets with a Header Decompression header are identified automatically for decompression.

You might want to change only one configuration parameter: the Header Decompression Refresh Rate. This rate is how many decompressed header packets are sent before a single, full header packet is sent.

Sometimes, compressed header traffic can be lost during poor satellite link conditions. Sending a full header packet allows the traffic stream to return. You can increase the Refresh Rate for poor satellite link conditions, or decrease the Refresh Rate to reduce overhead.

4.2.3 Payload Decompression (future)

Traffic optimization through Payload Decompression is another optional feature of the demodulator.

- FAST feature to upgrade
- Compression algorithm applied to all data (HDLC header excluded) on the transmit side
- Compression algorithm not applied to RTP streams because this traffic is already compressed and would only increase the satellite bandwidth if compressed again.

- Additional statistics added to the compression statistics menu to give feedback on the compression efficiency achieved.

4.2.3.1 ALDC vs LZS Compression Comparison

These numbers have been generated using an internally created test program. This program takes the target benchmark files and splits the files into payload size chunks and compresses each chunk in a separate invocation of the compression algorithm. This is important to note because most compression algorithms are applied to the entire file data set as a single invocation of the compression algorithm, which is easier for other types of compression algorithms (LZS, GZIP in specific). This, of course, does not apply to streamed packet data across an IP network (e.g., FTP transfer).

Algorithm	Payload size	File Set	Ratio
ALDC	1472	Calgary	1.76
ALDC	1000	Calgary	1.76
ALDC	500	Calgary	1.77
ALDC	100	Calgary	2.09
ALDC	1472	Canterbury	1.71
ALDC	1000	Canterbury	1.72
ALDC	500	Canterbury	1.74
ALDC	100	Canterbury	2.04

Algorithm	Payload size	File Set	Ratio
LZS	1472	Calgary	1.66
LZS	1000	Calgary	1.66
LZS	500	Calgary	1.68
LZS	100	Calgary	1.97
LZS	1472	Canterbury	1.61
LZS	1000	Canterbury	1.62
LZS	500	Canterbury	1.63
LZS	100	Canterbury	1.91

4.3 IP Module Specifications

4.3.1 Supported RFCs and Protocols

RFC	Protocol
RFC 768 User Datagram Protocol	RFC 791 Internet Protocol
RFC 792 Internet Control Message Protocol	RFC 793 Transmission Control Protocol
RFC 826 An Ethernet Address Resolution Protocol	RFC 856 Telnet Binary Transmission
RFC 862 Echo Protocol	RFC 894 A Standard for the Transmission of IP Datagrams over Ethernet Networks
RFC 959 File Transfer Protocol	RFC 1112 Host Extensions for IP Multicasting
RFC 1213 Management Information Base for Network Management of TCP/IP-based internet: MIB-II	RFC 1812 Requirements for IP Version 4 Routers
RFC 2045 Multipurpose Internet Mail Extensions (MIME)	RFC 2236 Internet Group Management Protocol, Version 2
	RFC 2475 An Architecture for Differentiated Services
RFC 2578 Structure of Management Information Version 2 (SMIv2)	
RFC 2598 An Expedited Forwarding PHB	RFC 2616 Hypertext Transfer Protocol – HTTP/1.1
	RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
RFC 3416 Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP)	RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)

4.3.2 CDD562AL/564AL Compatibility

The CDD-56xA/L is compatible with other Comtech EF Data IP modems (referred to hereafter as CDM-IP), provided the modems have similar operating modes and IP options.

CDD-564L IP FW Version	Comtech EF Data IP Modem / IP FW Version	Comments
Version 1.3.1 or later	CDM-570/570L Version 1.4.0 or later	Select the correct compatibility mode when receiving traffic from the CDM-570
Version 1.3.1 or later	CDM-570A/570L Version 1.3.1 or later	

4.4 Typical IP Module Operational Setups

The CDD-56xA/L has several modes of operation. The typical setup examples that follow serve as a means to determine the best mode of operation for the appropriate network topology and Ethernet traffic environment.

4.4.1 IP Module Working Modes

Typical CDM-IP modems support two Working Modes: Managed Switch Mode (formerly easyConnect™) and Router Mode; however, the demodulator only supports Router Mode, so the CDM-IP modem that is transmitting to demodulator must be in Router Mode. Non-IP traffic is not supported in Router Mode.

Router Mode supports three HDLC Addressing Modes: Point-to-Point, Small Network, and Large Network. Separate HDLC Modes allow the user to minimize the HDLC overhead transmitted over the satellite based on the size of their network.

In Router/Point-to-Point Mode, no HDLC address is transmitted, Router/Small Network transmits 1 byte, and Router/Large Network transmits 2 bytes as part of HDLC header for each packet.

In the sections that follow, the functionality of these modes is described in further detail, in order to optimize the Comtech EF Data IP modems in the network, based upon Network Topology and Ethernet Traffic requirements.

The demodulator only supports Router Mode, so the CDM-IP modem that is transmitting to demodulator must be in Router Mode.

The HDLC Address Mode of the Comtech EF Data IP modems must be identical to pass traffic between the TX modems and the demodulator.

Changing the HDLC Address Mode of the demodulator requires the IP Module to be rebooted. Before the user can select a different mode, the demodulator will notify the user that changing the mode will require a reboot.

Working Mode HDLC Address Mode	Network Topology	Ethernet Traffic
Router Mode Point-to-Point	Point-to-Point only Both sites on different LAN subnet	IP v4 only
Router Mode Small Network	Point-to-Point or Point-to-Multipoint (up to 254 sites) All sites on different LAN subnet	IP v4 only
Router Mode Large Network	Point-to-Point or Point-to-Multipoint (up to 32766 sites) All sites on different LAN subnet	IP v4 only

Feature Support - The demodulator also has several standard and optional features to further optimize security, performance and efficiency.

Standard Features	Additional Notes
HDLC Address Mode	Point-to-Point, Small Network, or Large Network
Access Lists	4 Clients by IP or IP Subnet

Standard Features	Additional Notes
Multicast	RX all or specific Multicast streams
IGMP	IGMPv1, IGMPv2
Upgrade by FTP	By local LAN or remotely through satellite (requires a two way connection to demodulator)
Optional Features	Additional Notes
Header Decompression	Must be enabled if any TX modem stream has Header Compression enabled.
Payload Decompression (future)	Must be enabled if any TX modem stream has Payload Compression enabled.
3xDES Decryption (future) (EN version only)	Must be enabled if any TX modem stream has 3xDES Encryption enabled. Up to 8 Decrypt Keys or random

4.4.1.1 Router Working Mode with DVB Overlay

Figure 4-1 shows an example setup using the CDD-562L L-Band Satellite Dual Demodulator at a Hub site to receive two separate return channels.

- The CDD-562L and all CDM-IP modems are in **Point-to-Point Mode**.
- Each remote site has a CDM-IP modem with a default static route.
- The CDD-562L has a default static route directing traffic to the hub router.
- The hub router would have routes defined for each remote network that would be directed to the DVB Encapsulator.

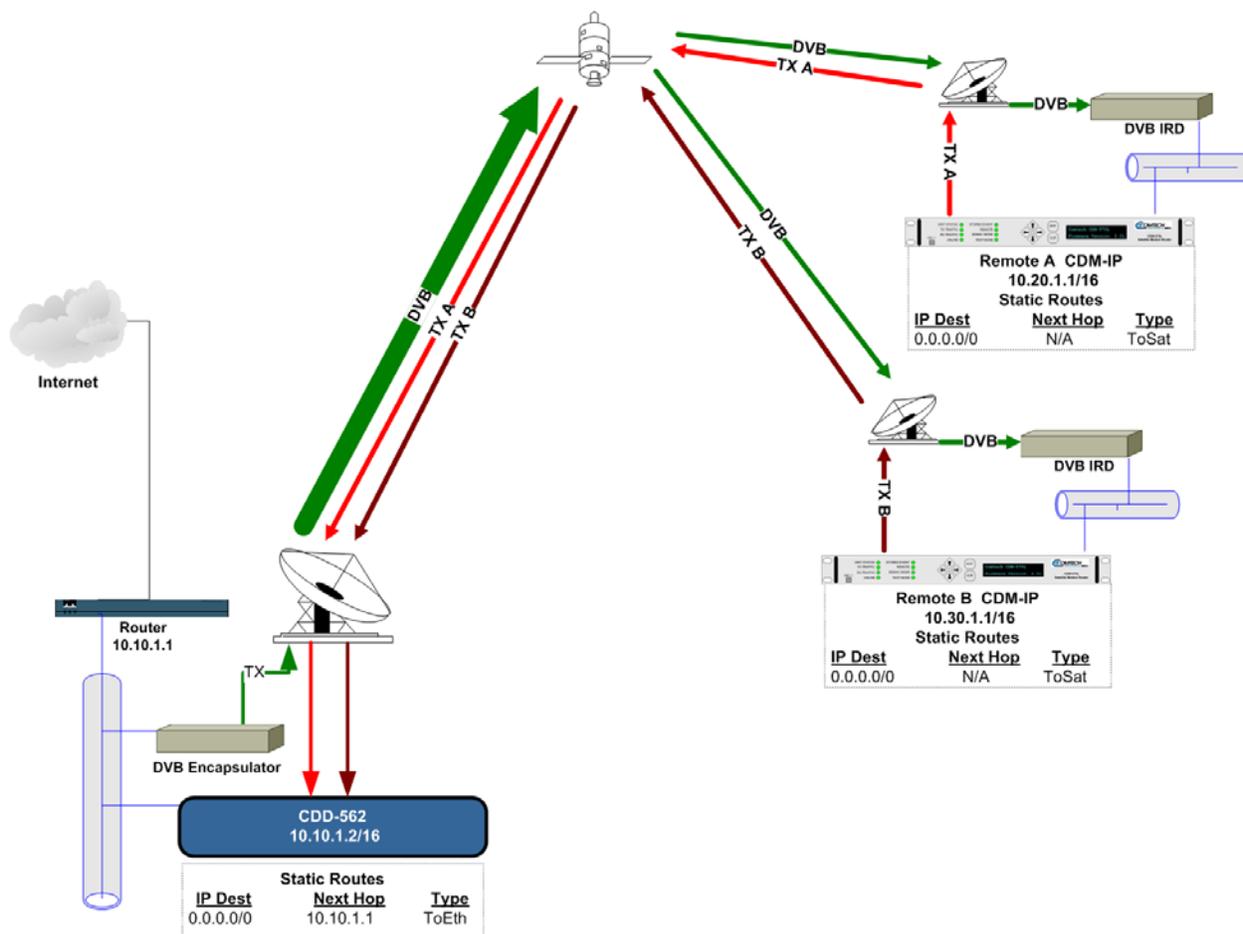


Figure 4-1. (CDD-562L) Router Mode Point-to-Point Diagram

Figure 4-2 shows an example setup using the CDD-564 (70/140 MHz) or CDD-564L (L-Band) Satellite Quad Demodulator at a Hub site to receive three separate return channels.

- The demodulator and all CDM-IP modems are in **Point-to-Point Mode**.
- Each remote site has a CDM-IP modem with a default static route.
- The demodulator has a default static route directing traffic to the hub router.

- The hub router would have routes defined for each remote network that would be directed to the DVB Encapsulator.

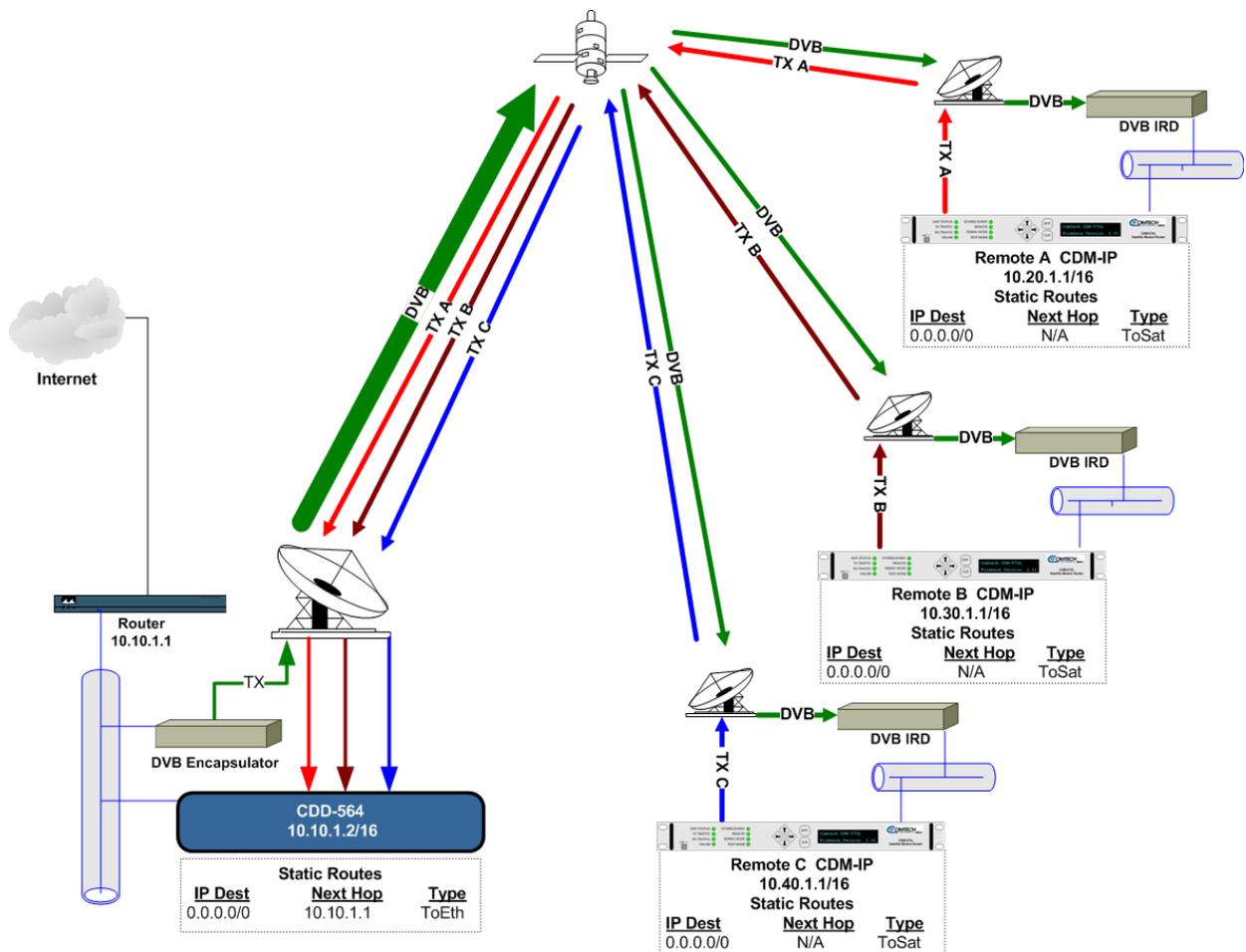


Figure 4-2. (CDD-564/564L) Point-to-Point Router Working Mode Diagram

4.4.1.2 Router Working Mode – Point-to-Multipoint

Figure 4-3 shows a “Star Network” Point-to-Multipoint Configuration, where the Hub CDM-IP modem is transmitting a common TDM carrier to two remote sites with CDM-IP modems. In turn, the Remote CDM-IP is transmitting a link back to the Hub that is received by the CDD-562L L-Band Satellite Dual Demodulator. (TX C is shown, but is not required.)

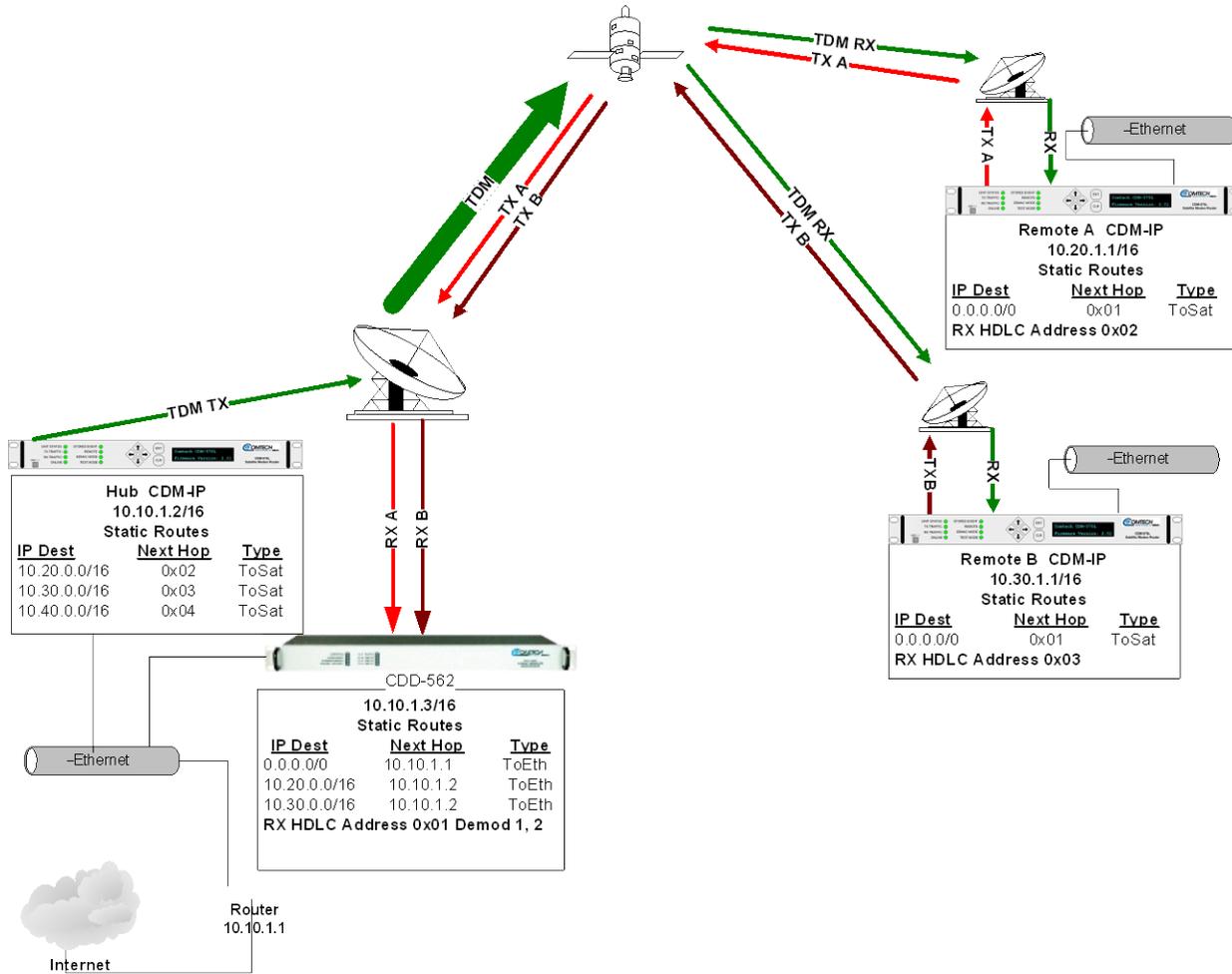


Figure 4-3. (CDD-562L) Point-to-Multipoint Router Working Mode Diagram

Figure 4-4 shows a “Star Network” Point-to-Multipoint Configuration where the Hub CDM-IP modem is transmitting a common TDM carrier to three remote sites with CDM-IP modems. In turn, the Remote CDM-IP is transmitting a link back to the Hub that is received by the CDD-564 (70/140 MHz) or CDD-564L (L-Band) Satellite Quad Demodulator.

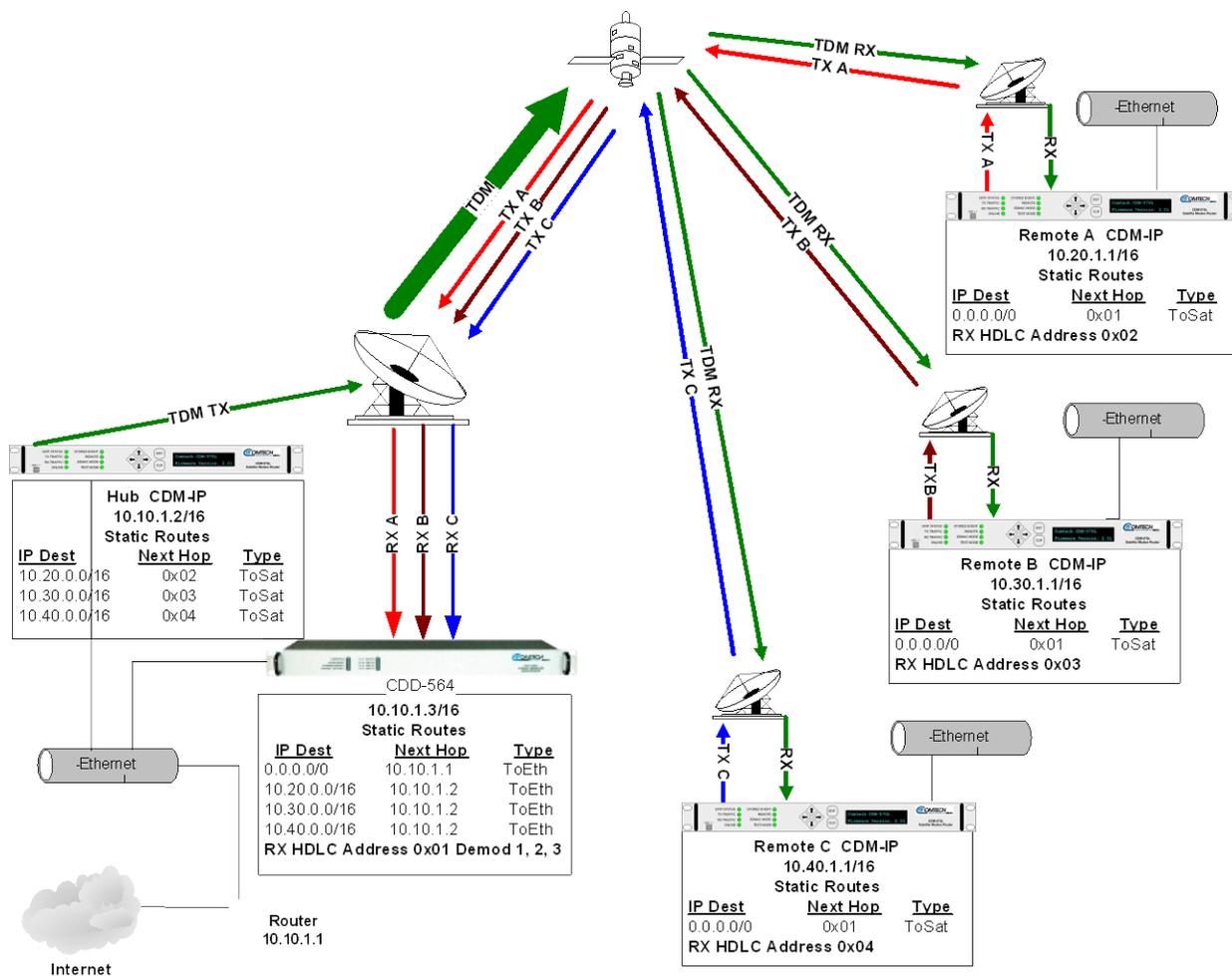


Figure 4-4. (CDD-564/564L) Point-to-Multipoint Router Working Mode Diagram

Since this is a Point-to-Multipoint configuration, HDLC addressing is used so that the traffic not intended for a particular destination can be filtered (Small or Large HDLC Mode). For unicast traffic, it is best to associate a unique HDLC address for each site in the network. In this case:

- The Hub Site is HDLC 0x01
- CDM-IP Remote ‘A’ is HDLC 0x02
- CDM-IP Remote ‘B’ is 0x03
- CDM-IP Remote ‘C’ is 0x04.
- Each CDM-IP modem would select the HDLC address associated with its site as an Rx HDLC Address. Therefore:
 - Both the Hub CDM-IP modem and CDD-564L would have 0x01 as the first RX HDLC Address

- CDM-IP Remote 'A' would have 0x02
- CDM-IP Remote 'B' would have 0x03
- CDM-IP Remote 'C' would have 0x04.

The remote CDM-IP modems only need a single default route to is directed to the Hub HDLC, 0x01. All of the traffic is managed by the static route entries in the hub CDM-IP and demodulator. The demodulator has a default route to the router for Internet access. It also has specific routes for the remote networks which are directed to the Hub CDM-IP. The Hub CDM-IP also has specific routes for the remote networks with the HDLC address associated with each site.

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Chapter 5. UPDATING FIRMWARE

5.1 Updating Firmware via the Internet



NOTE: To ensure optimal performance, it is important to operate the CDD-56xA/L with its latest available firmware.

The CDD-56xA/L Multi-Channel Demodulator eliminates the need for updating firmware by physically replacing EPROMs. Instead, the demodulator uses 'Flash memory' technology internally. This makes the firmware update process very simple. Firmware update archive files may be downloaded from the Internet (from Comtech EF Data's website), or obtained through Comtech EF Data Customer Support via e-mail or on CD by standard mail delivery.

The complete firmware update process is as follows:

- New firmware can be downloaded from Comtech EF Data's website to a user-supplied PC.
- Transfer the firmware update file, via File Transfer Protocol (FTP) upload, from the user PC to the CDD-56xA/L.
- Perform the update, without opening the CDD-56xA/L, using the rear panel interface M&C connections:
- The 10/100 BaseT Ethernet port connects to the Ethernet port of the user PC for user access to SNMP/Telnet/HTTP operations.

Note:

If Dedicated Management is disabled, then you must use the Traffic port for the upgrade process.

If Dedicated Management is enabled, then you must use the M&C port for the upgrade process.

- The Console port connects to an available serial port for user access to the IP Module Command Line Interface (CLI) operations.

See Figure 5-1. A summary of using the rear panel data interfaces with the CDD-56xAL firmware update process follows the figure.



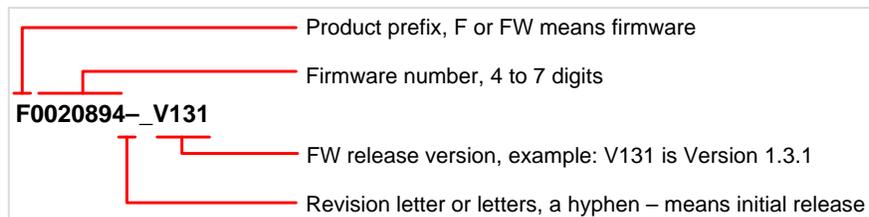
Figure 5-1. CDD-564A/L Rear Panel Connections to User PC

Table 5-1. Rear Panel Connections to User PC

- | | |
|----------|--------------------------------|
| 1 | Factory Test DO NOT USE |
|----------|--------------------------------|
- This DB 9M (Type D 9 pin male) connector is not a standard EIA-232 interface. DO NOT USE.
 - This is for Factory Test use only, and is not intended for customer use. Contact CEFD Product Support before you try to connect any equipment to this interface.
- | | |
|----------|-----------------|
| 2 | 10/100 Ethernet |
|----------|-----------------|
- BaseT Ethernet port, RJ-45 8-pin modular jack
 - Cable:
 - CAT5, user-supplied to an available Ethernet port, via hub or switch or direct connection
 - Uses:
 - Ethernet traffic
 - Management of IP Module functions via SNMP/Telnet/ HTTP
 - Updating IP Module firmware
- | | |
|----------|---------------------|
| 3 | 10/100 M&C Ethernet |
|----------|---------------------|
- Cable:
 - CAT5, user-supplied to an available Ethernet port, via hub or switch or direct connection
 - Uses:
 - Used when Dedicated Management Port is enabled
- | | |
|----------|---------|
| 4 | Console |
|----------|---------|
- Async-Serial EIA-232 DCE port, RJ-11 6-pin modular jack
 - Cable:
 - Use the provided adapter cable to connect to an available 9-pin serial port.
 - Software:
 - A user-supplied terminal emulator program such as HyperTerminal or Tera Term is used for management of demodulator and IP Module functions.
 - Uses:
 - IP Module Command Line Interface (CLI)

5.2 About Firmware Files, Naming, Versions and Formats

All CEFD products are shipped with the latest released firmware version. This example naming schematic shows the firmware download hyperlink F0020894X_V###, where X means the revision letter, and ### means the release version.



The CDD-56xA/L is available with 3xDES decryption, optionally.

The firmware updates listed in Table 5-2 are available from Comtech EF Data.

Table 5-2. Firmware Files, Naming and Versions

Web Hyperlink	EXE/ZIP Filename	Contains Image File (* means the revision letter)
F00208094X_V###	FW-0020894X	FW-0020894*.bin – Ver. 1.3.1 (and earlier) <ul style="list-style-type: none"> • With HDLC Encapsulation • Without 3xDES Decryption option
N/A	Contact CEFD	FW-0020895*.bin – Ver. 1.3.1 (and earlier) <ul style="list-style-type: none"> • With HDLC Encapsulation • With 3xDES Decryption option

Comtech EF Data’s website organizes firmware update files by product type and model/optional configuration.

The firmware download files are available from Comtech EF Data in two archive file formats: *.exe (self extracting) and *.zip (compressed). Some firewalls will not allow downloading of *.exe files. In this case, download the *.zip file instead. If applicable, one version earlier than the latest release is available for download also.

For additional help with compressed file types, refer to the help files provided with the file archiving programs. Supported programs include:

- PKZIP for Windows
- WinZip
- ZipCentral

The program “PKZIP for DOS” is not supported.

To learn how to verify the correct firmware number, see Section 5.3.1.

5.3 Ethernet FTP Upload Procedure

5.3.1 Getting Started: Preparing for the Firmware Download

1. Connect the user PC to the CDD-564A/L 10/100 Ethernet port either via a hub or a switch, or with a direct Ethernet cable connection. See Figure 5-1.
2. Connect the CDD-564A/L Console port to a serial port on the user PC using an adapter cable. Do not use the Factory Test port. See Figure 5-1.
3. Identify and make a note of the product, its firmware number and version number. These are necessary for the download process.
4. Use one of these methods to see the current product M&C version and/or firmware number:
 - a. Using the 10/100 Ethernet port, via HTTP and the IP Module Web Server Interface:
 - i. Click the Maint (Maintenance) tab.
 - ii. Select the Unit Info hyperlink.
 - b. Using the 10/100 Ethernet port, via Telnet and the IP Module Command Line Interface (CLI):
 - i. On the main page, type **O** for Operations and Maintenance.
 - ii. Type **I** for Unit Information.
5. Create a temporary folder or subdirectory on the user PC for the firmware archive download. Any valid, writable drive letter can be used. Use one of these methods:

Use the **Windows Desktop** to create and rename the temporary folder:

- a. Right-Click anywhere on the Windows Desktop to open the popup submenu
- b. Select **New > Folder** to create the temporary folder on the desktop
- c. Right-Click on the new folder
- d. Select **Rename** from the popup submenu
- e. Rename this folder to **temp**, or another convenient name

Use **Windows Explorer** to create and rename the temporary folder:

- a. Select **File > New > Folder** to create a temporary folder in the active folder.
- b. Right-click the new folder
- c. Rename this folder to **temp**, or another convenient name

Use Windows Command-line to create the temporary folder:

- a. On the Windows taskbar, click **Start**
- b. Click **Run...**
- c. In the **Run** window, click **Browse**
- d. In the **Browse** window, click **Create New Folder** or **New Folder**
- e. Right-click the new folder
- f. Rename this folder to **temp**, or another convenient name

Alternately:

- a. Click **Start**
- b. Select **All Programs > Accessories > Command Prompt**
- c. At the Command-line prompt **c:\>**, type **mkdir temp** or **md temp**
The command **mkdir** or **md** means **make directory**.
- d. Click **OK**

Depending on **Windows OS versions prior to Windows 95:**

- a. On the Main Menu, click **MS-DOS Prompt**
- b. Open a Command-line window:
 - a. For Windows 95 or Windows 98, type **command** and press **Enter**.
 - b. For any Windows OS versions later than Windows 98, type **cmd** or **command**, and press **Enter**.
6. Make sure the new folder exists and is ready for the firmware file download.

5.3.2 Downloading and Extracting the Firmware Update

1. Download the correct firmware archive file to the user PC temporary folder.
 - a. Go to www.comtechefdata.com.
 - b. Go to **Home | Support | Software Downloads | Flash & Software Update Files**
 - c. On the **Flash & Software Update Files** page, click **Satellite Modems**
 - d. Click the applicable product hyperlink.
 - e. Refer to Table 5-2 for information about the firmware download hyperlinks, archive files and download image files.
 - f. Click the correct firmware EXE or ZIP download hyperlink (without 3xDES), or contact CEFD Product Support to get the firmware with 3xDES.
 - g. Download the archive file to the temporary folder. The **File Download** window prompts you to select **Open** or **Save**:
 - a. Click **Open** to allow the user-supplied utility program to control the file extraction process
 1. Make sure to extract the firmware files to the temporary folder created earlier
 - b. Click **Save** to open the **Save As** window
 1. Make sure to select the archive *.exe or *.zip file and **Save** it to the temporary folder created earlier
 - c. Otherwise, click **Cancel** to quit the file download process
2. If necessary, extract the firmware files from the downloaded *.exe or *.zip archive file. Extract the firmware files from the archive file with the user-supplied utility program. Extract a minimum of three files.

In these file names, an asterisk * is a substitute for the revision letter of the image file:

 - Without 3xDES:
 - a. FW-0020894*.bin (Ver. 1.3.1 and earlier)
 - b. CDD 56xA/L X.X.X Release Notes.pdf (or a variation of this filename)
 - c. CDD 56xA/L X.X.X Upgrade (or a variation of this filename) – Installation notes
 - With 3xDES:
 - a. FW-0020895*.bin (Ver. 1.3.1 and earlier)
 - b. CDD 56xA/L X.X.X Release Notes.pdf (or a variation of this filename)
 - c. CDD 56xA/L X.X.X Upgrade (or a variation of this filename) – Installation notes
3. Make sure the firmware files were extracted correctly to the temporary folder. Use one of these methods to see the temporary folder's contents.
 - From the Windows Desktop:
 - a. Double-click the temporary folder that was saved to the Windows Desktop
 - b. Or, use Windows Explorer to find the temporary folder
 - i. Double-click the temporary folder

- c. Or, use the **Browse** window to find the temporary folder
 - i. Click **Start > Run... > Browse**
 - ii. Double-click the temporary folder
- Using the Command-line:
 - a. At the Command-line prompt, type `cd c:\temp` to change to the temporary directory created earlier
 - b. Type `dir` to see a list of the files that were extracted to the temporary directory

5.3.3 Bulk Firmware FTP Upload Procedure



NOTE: Read the **ftp_upgrade.doc** included in the *.zip file.

1. Make sure the firmware update has been downloaded to the user PC and is available in the temporary folder.
2. Make sure the user PC is connected to the CDD-56xA/L 10/100 Ethernet port via a hub, or a switch, or with a direct Ethernet cable connection.
3. Make sure the CDD-56xA/L Console port is connected to a serial port on the user PC with an adapter cable.
 - a. Make sure the Remote Control port is not used for this connection.
4. Make sure that the connection and communication between the user PC and the CDD-56xA/L is correct.
 - a. Find the Management IP Address:
 - b. Using serial Console CLI:
 - a. Go to **Interface Config | Ethernet Interface**
 - c. Use Command-line to send a ping command to the modem:
 - a. In Windows:
 1. Click **Start** on the Windows toolbar
 2. Click **Run...**Or, use **Command-line Prompt** or **Command Prompt** in the Start menu
 - b. For Win95 or Win98: type **command** and press **Enter**
 - c. For WinNT, Win2K or WinXP type **cmd** and press **Enter**
 - d. Type **ping xxx.xxx.xxx.xxx** at the Command-line prompt, where xxx.xxx.xxx.xxx is the IP address for the CDD-56xA/L
 - e. Press **Enter**
 - d. Examine the results to make sure the modem is connected and communicating correctly
5. Use Command-line to start an FTP session with the CDD-56xA/L:
 - a. Type **ftp xxx.xxx.xxx.xxx**, where xxx.xxx.xxx.xxx is the IP Address for the unit
 - b. Enter the **Admin User Name** and **Password** to finish the login
 - c. To set the binary transfer mode, type **bin** and press **Enter**
 - d. Type **prompt** and press **Enter**
 - e. To help the file transfer process, type **hash** and press **Enter**
6. Upload the files from the temporary folder on the user PC:
 - a. To start the file transfers, type **put FW-0000###*.bin**, where 0000### is the firmware number, and * is the firmware revision letter
 - b. Press **Enter**

The process runs through several blocks. This can take several minutes. After the firmware update image file is uploaded, it is written to flash memory.

7. Change the boot image selection:

By default, the demodulator boots with the version that has the latest date (**Boot to – Latest**). You can set the **Boot to** parameter to cause the demodulator to boot up using Image #1 or Image #2.

After you change the **Boot to** parameter, you must reset (reboot) the unit from the serial console, the Web Server interface or the CLI/Telnet interface.

After this reset, the firmware upgrade selection is active.

- a. To reset from the Web Server Interface:
 - a. Go to the **Maint | Reboot** page
 - b. Click **Yes, Reboot**
- b. To reset from the CLI/Telnet Main Menu:
 - a. Type **O** for the Operations and Maintenance
 - b. Type **R** for Reset

The firmware update process is finished. The CDD-56xA/L is now operating with its latest firmware.

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Chapter 6. FAST ACTIVATION PROCEDURE

6.1 FAST System Overview

The CDD-56xA/L Multi-Channel Demodulator incorporates a number of optional features. In order to permit a lower initial cost, the unit may be purchased with only the desired features enabled. If, at a later date, the user wishes to upgrade the functionality of a unit, Comtech EF Data provides Fully Accessible System Topology (FAST), a technology which permits the purchase and installation of options through special authorization codes.

FAST Access Codes are unique authorization codes that may be purchased from Comtech EF Data, and then activated in the unit using either the HTTP (Web Server) Interface or the Command Line Interface. Contact a Comtech EF Data sales representative during normal business hours, or via e-mail to sales@comtechefdata.com, to order the desired options.

6.1.1 FAST System Theory

FAST allows an operator to order a unit precisely tailored for the initial application. When service requirements change, FAST allows the operator to upgrade the topology of the unit on-location, within minutes, and without having to remove the unit from the setup. This accelerated upgrade is possible due to FAST's extensive use of the programmable logic devices incorporated into Comtech EF Data products.

6.1.2 FAST Implementation

Comtech EF Data's FAST system is factory-implemented in the demodulator. All FAST options are available through the basic platform unit at the time of order. FAST allows immediate activation of available options – first, upon entry of the register-specific FAST Access Code, and then by setting the desired operational parameters using the HTTP Interface or the CLI.

6.1.3 FAST Accessible Options

Hardware options can be ordered and installed either at the factory or in the field. In the field, the operator can select options that can be easily activated, depending on the current hardware configuration of the unit. The unique, register-specific FAST Access Code that is purchased from Comtech EF Data enables configuration of the available hardware.

6.2 FAST Activation Procedure

6.2.1 FAST Activation via the Command Line Interface (CLI)

See also: Chapter 9. Telnet and CLI Operation.

1. Before you contact Comtech EF Data to order FAST feature upgrades, find and write down the serial number of the demodulator:
 - a. On the CLI **Main Menu**, type **M** to go to the **Satellite Demodulator** page
 - b. Type **F** to go to the **Features** pageThe 9-digit **Serial Number** is shown on the **Features** page

Record the Serial Number: _____

2. See the installed features:
 - a. On the CLI **Main Menu**, type **A** to go to the **Administration** page
 - b. Type **F** to go to the **Feature Configuration** pageOptions are shown as **Available** or **Unavailable**. You can buy any unavailable options as FAST upgrades.
3. To order features, contact a Comtech EF Data sales representative during normal business hours:
 - a. Give the unit Serial Number to the representative
 - b. Identify and buy the desired FAST option(s)
 - c. Get the invoice, the 20-digit FAST Access Code(s), and the FAST option activation instructions
4. Enter the FAST access code(s):
 - a. On the CLI **Main Menu**, type **A** to go to the **Administration** page
 - b. Type **F** to go to the **Feature Configuration** page
 - c. Type **Y** to select the **FAST Feature Code**
 - d. At the prompt, enter the 20-character FAST access codeThe CLI responds with **Fast Feature Code is Accepted. Press Any Key to Continue.**
5. Reboot the unit:
 - a. On the CLI **Main Menu**, type **O** to go to the **Operations and Maintenance** page
 - b. Type **R** to **Reset** (reboot) the unit
6. After the unit has rebooted, examine the installed features to make sure that the FAST Upgrade completed successfully:
 - a. Repeat Step 2; the feature just added during the FAST Upgrade should now show the **Available** status.
 - b. If the feature is **Unavailable**, repeat the FAST Access Code entry procedure.
 - c. If the error persists, contact Comtech EF Data Product Support for help.

6.2.2 FAST Activation via the HTTP (Web Server) Interface

See also: Chapter 10. HTTP Interface

This appendix shows examples of using the HTTP Interface for the CDD-564AL Satellite Multi-Channel Demodulator.

6.2.2.1 Record Serial Number

Use the **Status | Unit Info** page to see the **Demod Serial Number**. Write the Demod Serial Number here:

6.2.2.2 See the Installed Features

Use either of these pages to see installed features:

- **Status | Unit Info** page
- **Admin | FAST** page

Features installed and operational are marked as **Installed**.

6.2.2.3 Acquire/Enter FAST Option Purchase Access Code

Contact a Comtech EF Data sales representative to order FAST Options. The unit's Serial Number is required.

The Comtech EF Data sales representative verifies the order. Comtech EF Data Customer Support provides an invoice and FAST option activation instructions. The instructions include a 20-character FAST Option Purchase Access Code.

From the **Admin | FAST** page, **FAST code** section, enter the FAST Option Purchase Access Code into the applicable **Register** field, and then click **Submit**.

6.2.2.4 Verify FAST Option Availability

If the FAST Option Purchase Access Code is accepted, the page refreshes and the option shows as **Installed**.

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Chapter 7. ETHERNET-BASED REMOTE PRODUCT MANAGEMENT

7.1 Introduction

Ethernet-based Remote Product Management of the CDD-56xA/L Multi-Channel Demodulator is available using the rear panel RJ-45 10/100 BaseT Ethernet Traffic/M&C port.

The M&C port is available only when Dedicated Management Port operation is enabled.

7.2 Ethernet Management Interface Protocols

A user-supplied PC is required for Ethernet-based remote monitor and control (M&C) of the CDD-56xA/L. Three separately-operated protocols are available:

- Simple Network Management Protocol (SNMP)
- Telnet Interface
- HTTP Web Server Interface

7.2.1 Simple Network Management Protocol (SNMP)

SNMP requires these user-supplied items:

- Network Management System (NMS)
- Management Information Base (MIB) File Browser

7.2.2 Telnet Interface

Telnet requires these user-supplied items:

- User PC
- Command-Line Interface (CLI)
- Terminal emulation program installed on the user PC

7.2.3 HTTP Web Server Interface

The Web Server Interface requires these user-supplied items:

- User PC

- Compatible web browser, such as Internet Explorer

7.3 SNMP Interface

The Simple Network Management Protocol (SNMP) is an Internet-standard protocol for managing devices on IP networks. An SNMP-managed network consists of three key components:

- Managed device
- SNMP agent
- Network Management System (NMS)

7.3.1 Managed device

This includes the CDD-56xA/L Multi-Channel Demodulator.

7.3.2 SNMP Agent

This is the software that runs on the CDD-56xA/L. The CDD-56xA/L SNMP Agent supports both **SNMPv1** and **SNMPv2c**.

7.3.3 User-supplied Network Management System (NMS)

This is the software that runs on the manager.

7.3.4 Management Information Base (MIB) Files

MIB files are used for SNMP remote management of a unique device. These MIB files must be compiled in a user-supplied MIB Browser, or compiled on an SNMP Network Monitoring System server.

A MIB file consists of a tree of nodes called Object Identifiers (OIDs). Each OID provides remote management of a particular function.

7.3.4.1 FW-0020899*.mib, MIB file

CDD-564A MIB file consists of all of the OIDs for management of the demodulators functions.

7.3.4.2 FW-0020903*.mib, Traps MIB file

CDD-564A Traps MIB file is provided for SNMPv1 traps.

7.3.5 SNMP Community Strings



CAUTION

In SNMP v1/v2c, the SNMP Community String is sent unencrypted in the SNMP packets. Caution must be taken by the network administrator to ensure that SNMP packets travel only over a secure and private network if security is a concern.

The CDD-56xA/L uses Community Strings as a password scheme that provides authentication before gaining access to the demodulator agent's MIBs. They are used to authenticate users and determine access privileges to the SNMP agent.

For correct SNMP operation, the CDD-56xA/L MIB files must be used with the applicable version of the demodulator M&C. See the CDD-562AL/564A/564AL FW Release Notes for information on the required FW/SW compatibility.

The maximum number of characters for community strings shall not exceed 20. All printable ASCII characters, except '\` and '~' are allowed. No trailing spaces are permitted for community strings.

Any changes made to the IP Parameters are lost if the demodulator is reset or loses power, unless the changes were first saved to permanent storage. The IP Parameters can be saved by a SET of the cdd564SaveParamToFlash OID within the MIB.

Type the SNMP Community String into the user-supplied MIB Browser or Network Node Management software.

The user defines three Community Strings for SNMP access:

Read Community	default = public
Write Community	default = private
Trap Community	default = public

7.3.6 SNMP Traps

The CDD-56xA/L supports both SNMPv1 traps and SNMPv2 notifications. The demodulator can send out SNMP traps when certain events occur in the demodulator.

Use the cdd564aSNMPTrapVersion OID to select which style of traps the demodulator sends. These styles include unit faults, Rx faults and LNB faults. A trap is sent when a fault occurs and when it is cleared.

The CDD-56xA/L supports these MIB-II v1traps/v2 notifications:

Table 7-1 MIB-II SNMPv1 traps

Cold Start	1
Link Up	4
Authentication Failure	5

Table 7-2 MIB-II SNMPv2 notifications

Cold Start	1.3.6.1.6.3.1.1.5.1
Link Up	1.3.6.1.6.3.1.1.5.4
Authentication Failure	1.3.6.1.6.3.1.1.5.5

The CDD-56xA/L supports these Alarms and Faults v1 traps / v2 notifications:

Table 7-3 Alarms and Faults SNMPv1 traps

cdd564aUnitAlarmTrap	6247941
cdd564aRxAlarmTrap	6247942
cdd564aLNBAAlarmTrap	6247943

Table 7-4 Alarms and Faults SNMPv2 notifications

cdd564aUnitAlarmNotification	1.3.6.1.4.1.6247.94.2.1.1
cdd564aRxAlarmNotification	1.3.6.1.4.1.6247.94.2.1.2
cdd564aLNBAAlarmNotification	1.3.6.1.4.1.6247.94.2.1.3

7.3.7 MIB-II

The demodulator agent uses RFC 1213, Management Information Base for Network Management of TCP/IP-based Internets. This is known as “MIB-II” or “Public MIB support.” For detailed OID information, see the MIB file.

The agent uses these Groups:

Table 7-5. MIB-II Support

Group	Comments
System Group	Mandatory for RFC1213
Interface	Mandatory for RFC1213
IP	Mandatory for RFC1213
ICMP	Mandatory for RFC1213
TCP	Mandatory for RFC1213
UDP	Mandatory for RFC1213
SNMP	Mandatory for RFC1213
Address Translation Group	Implemented but depreciated in MIB-II
EGP	Not applicable

7.3.8 Private MIB

The Private MIB holds all the security, feature selection, IP related parameters and all the demodulator specific parameters. For detailed OID information, see the MIB file.

7.3.8.1 Administration Group

This group contains system security, administration and feature configuration parameters. Working Mode, Telnet Timeout and Auto Logout Time are not in any subgroup.

7.3.8.1.1 Access Lists Subgroup

Use this subgroup to define which remote clients can connect to a demodulator when Access List Enforcement is enabled.

For each entry, specify an IP address and a subnet mask to define a unique class of clients that are allowed access to the unit.

7.3.8.1.2 Features Availability

FAST Options include:

- Modem Datarate
- 8PSK/8QAM
- 16QAM
- Turbo
- VersaFEC
- Rolloff
- IP Payload Decompression
- Vipersat
- Vipersat File Streamer
- Payload Decompression
- Header Decompression

7.3.8.1.3 Features Config Subgroup

Use this subgroup to enable/disable a Standard or FAST feature.

Enable or disable standard features by sending a 1 (enable) or 0 (disable). Examples of standard features include: ping reply, telnet, IGMP and multicast forwarding.

Enable or disable Header Decompression per demodulator using the FeaturesTable.



CAUTION

Changing the Working mode between Point-to-Point Mode, Small Network Mode, Large Network Mode, and Vipersat Mode causes the system to reboot. The system configuration is saved before re-booting. Make sure you set the correct value.

7.3.8.1.4 3xDES Decryption Subgroup (EN version only)

This subgroup controls the parameters for the 3xDES feature. Each Receive key length is 192 bits. Enter the Rx DES keys using the DESRxKeyTable.

7.3.8.1.5 SNMP Traps Subgroup

This subgroup controls where SNMP traps are sent and the community string used in sending traps. Either SNMPv1 or SNMPv2 traps can be sent.

7.3.8.2 Configuration Group

7.3.8.2.1 Interface Group

This group controls the parameters of the unit's Ethernet and demodulator interfaces.

7.3.8.2.1.1 Ethernet Interface Subgroup

This subgroup defines the unit's Ethernet interface. These include parameters for setting the Ethernet speed, IP address and IP address subnet prefix length.

7.3.8.2.1.2 Demodulator Interface Subgroup

This subgroup defines the Demodulator's interfaces and each demodulator's HDLC addresses.



CAUTION

HDLC Address Mode has been changed to be read-only. This parameter is now settable through the Working Mode OID (cdd564aWorkingMode) in the Features subgroup.

7.3.8.2.2 Route Table Group

Use this group to control how the packets that the unit receives are routed.

7.3.8.2.3 Protocols Group

Use protocols groups to control networking protocols such as IGMP.

7.3.8.2.3.1 IGMP Subgroup

This subgroup controls the Internet Group Management Protocol (IGMP), which is the standard for IP multicasting in the Internet.

7.3.8.2.3.2 VLAN Brouter Config Subgroup

This subgroup controls the VLAN Brouter operating mode state, and VLAN Brouter Next Hop MAC address.

7.3.8.2.3.3 ARP Config Subgroup

This subgroup controls the ARP Table and entries.

7.3.8.2.4 Demodulator Configuration Group



IMPORTANT NOTE: Every time you change the demodulator parameters using SNMP, you must change these parameters in this sequence:

1. FEC (Forward Error Correction)
2. Demodulation
3. Code Rate
4. Data Rate

Use this group to configure the demodulator parameters.

For detailed OID information, see the MIB file.

7.3.8.2.4.1 Rx Parameters

Use this section to configure the demodulators' parameters.

7.3.8.2.4.2 Alarm Mask Parameters

Use this section to mask the AGC, Eb/No and LNB alarms.

7.3.8.2.4.3 LNB Parameters

Use this section to configure LNB parameters when an LNB is attached to the demodulator.

7.3.8.2.4.4 Utilities Parameters

Use this group to set the unit's time and date, and to set the circuit ID string per demodulator.

7.3.8.3 Maintenance Group

This group contains several miscellaneous operations for the demodulator. Included are the unit information, bulk database configuration and IP PARAM file configuration. The Bulk database configuration defines which image to boot from and into which image to save a new bulk file.

Rebooting the unit is also possible from this group.

7.3.8.4 Status Group

7.3.8.5 Statistics Group

This group collects various statistics on Ethernet interface, satellite interfaces and IP routing.

7.3.8.5.1 IP Routing Statistics Subgroup

This subgroup reports statistics collected by the IP router mechanism.

7.3.8.5.2 Ethernet Statistics Subgroup

This subgroup collects statistics reported on the Ethernet network card.

7.3.8.5.3 Satellite Statistics Subgroup

This subgroup collects statistics reported on the WAN (satellite interface) FPGA.

7.3.8.5.4 Stored Events Log

The event log shows any faults that have occurred in the demodulators. Event entries can also include informational items, such as power on/off.

7.3.8.5.5 Stored Statistics

The statistics log is a table that gathers data about Receive Eb/No. You set the interval for collecting these statistics. Set the interval in 10 minute steps, range: 10 to 90 minutes.

7.3.8.6 Monitor Group

This group reports the demodulator's status, including alarms, receive parameters, event log entries, statistics entries and LNB parameters.

7.3.8.6.1 Unit Monitor

This section reports serial number, software revision, model number and temperature. Any alarms that have been raised for the unit are available also.

7.3.8.6.2 Rx Monitor

This section reports the demodulator's bit error rate (BER), buffer fill state, frequency offset, receive signal level and Eb/No value. Alarms that have been raised on a specific demodulator are reported also.

7.3.8.6.3 LNB Monitor

This section reports LNB unit status, including LNB current, LNB voltage and any alarms.

7.4 Telnet Interface

The CDD-56xA/L has a Telnet interface for equipment M&C via the Command Line Interface (CLI) application. See Chapter 9. TELNET and CLI Operation.

7.5 HTTP Web Server Interface

A user-supplied web browser allows you to fully monitor and control (M&C) the CDD-56xA/L from its HTTP Web Server Interface.

The embedded web application works best with Microsoft's Internet Explorer Version 6.0 or higher.

For more about using the HTTP Interface, see Chapter 10. HTTP Web Server Interface.

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Chapter 8. QUICK START GUIDE

8.1 Introduction

To use this chapter, you must be familiar with the configuration and operation of both the CDM-IP modem and the CDD-564A/L demodulator.

Use this chapter to quickly configure a pair of Comtech EF Data IP-compatible modems using a CDD-564A/L as the demodulator. Hereafter, these modems are called the CDM-IP modems.

Follow this Quick Start Guide, begin with the factory default settings, and you can cause the system to pass traffic within minutes.

8.2 Equipment List

- CDM-IP modems, quantity 2
 - CDM-570
 - CDM-570/A-IP
 - CDM-570L
 - CDM-570A/L-IP
- CDD-564A/L Demodulator, quantity 1
 - Depending on the modems used, you might need to provide equipment to convert 70 MHz IF to L-Band for a duplex connection.
- 10/100 BaseT Ethernet Hub, quantity 2
 - User provided
 - Only 10BaseT operation is supported in Managed Switch Mode (formerly easyConnect™ Mode).
 - RJ-45 crossover Ethernet cables can be substituted to connect PC to CDM-IP modem directly, without using a hub.
- PC with network interface card and terminal emulation program, quantity 2
 - User provided
 - Examples are: PuTTY, Tera Term, etc.
- Console cable, quantity 1
 - Comtech EF Data provided
 - DB-9 to RJ-11
- CAT5 Ethernet cables, quantity 4
 - User provided
- IF cables, quantity 2
 - User provided
 - Connects Tx/Rx between both CDM-IP modems
 - Type BNC for 70/140 MHz operation
 - Type N for L-Band operation

8.3 Steps for Basic Equipment Setup

See Figure 8-2 for the diagram of this basic equipment setup.

1. Connect CDM-IP 1 and CDD-564A/L Demod to PC 1 via the 10/100 BaseT Ethernet Hub 1.
2. Connect CDM-IP 2 to PC 2 via the 10/100 BaseT Ethernet Hub 2.
3. Connect the Tx IF on CDM-IP 1 to RX IF of CDM-IP 2.
4. Connect the Tx IF on CDM-IP 2 to the RX1 IF of CDD-564A/L Demod (RX-1 First Demodulator).
5. Connect the Console cable:
 - a. Connect the DB-9 end to the COM1 or COM2 port of the PC.
 - b. Connect the RJ-11 end to the Console port on the CDM-IP 1 rear panel.
6. Connect CDM-IP 1, CDM-IP 2, and CDD-564A/L Demod to the correct power supply.
7. Set power to ON for all units.

8.4 Steps for Transmit and Receive IF Configuration

Comtech recommends that you use the front panel to set the IF parameters. Command Line Interface (CLI), Telnet, Web interface or SNMP interfaces are not recommended for the quick start configuration.

1. Use the front panel to set all transmit and receive IF parameters for CDM-IP 1, CDM-IP 2 and the CDD-564A/L Demod.
2. Set TxPower to the minimum level.
3. Make sure that CDM-IP 1 is carrier-locked to CDM-IP 2 correctly.
4. Make sure that CDM-IP 2 is carrier-locked to CDD-564A/L Demod correctly.

8.5 Steps for Serial Console Port Command Line Interface Configuration

1. Start the terminal emulation program via Microsoft Windows. (Examples: PuTTY, Tera Term, etc.)
2. Select the correct COM port for the terminal emulation program. This is the port to which the DB-9 end of the console cable is connected.
3. Configure the COM port for:
 - 38,400 bps
 - 8 data bits
 - No parity
 - 1 stop bit
 - No hardware flow control
4. Press **Enter** to log on and see the CLI Main Menu. See Figure 8-1.
5. Go to the applicable submenu or run a command:
 - a. Type the character shown at the right of the menu item.
6. To save any configuration changes,
 - a. Type **S** for Save Parameters to permanent storage.

- b. At the prompt, type **y** to confirm the save.
- 7. To return to the previous menu, type **X**.

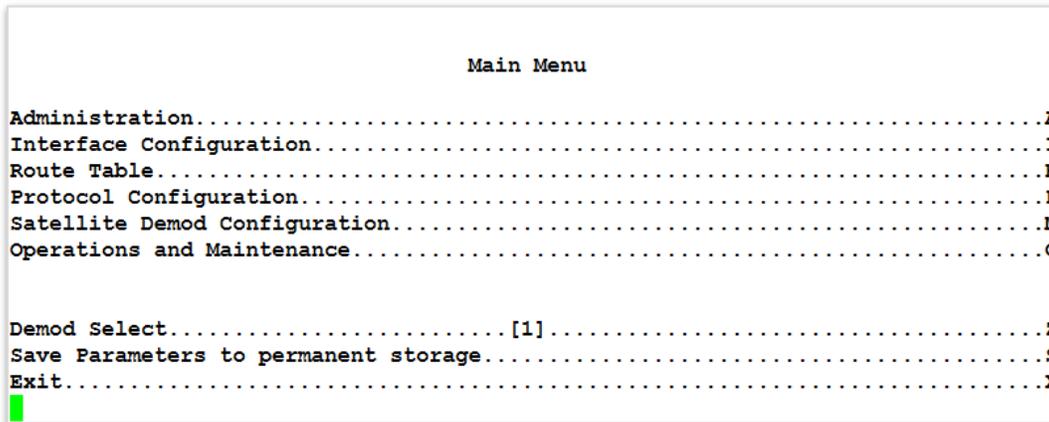
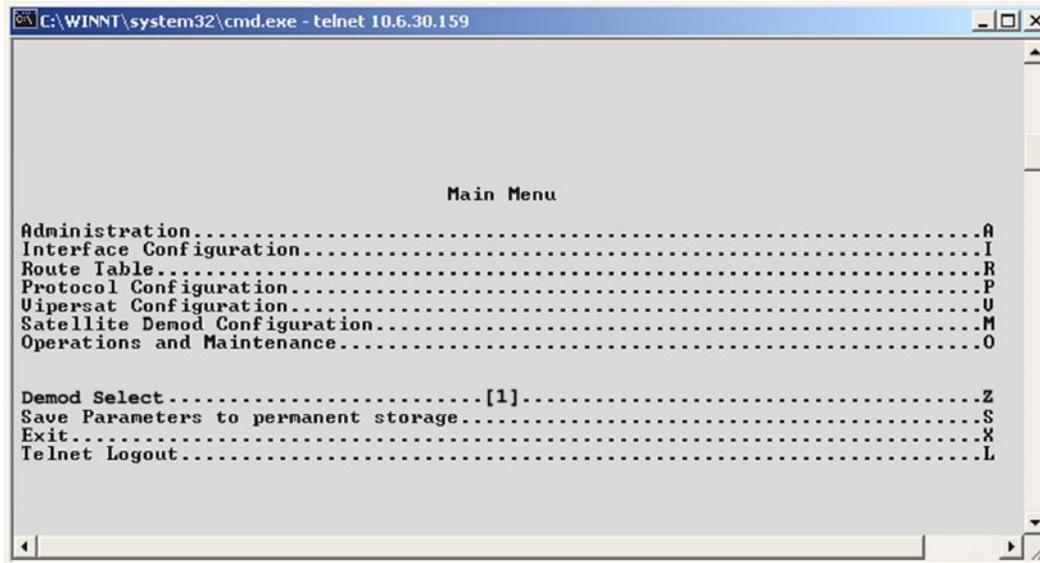


Figure 8-1. CLI Main Menu via Telnet or PuTTY (CDD-564A/L shown)

8.6 Steps to Restore the Factory Default Configuration

You must make sure the unit is in factory default configuration before you continue with the remaining sections in this chapter. If necessary, do these steps to restore the factory default configuration.

1. From the Main Menu, type **O** to go to the Operations and Maintenance submenu.
2. From the Operations and Maintenance submenu, type **D** to go to the Database Operations submenu.
3. From the Database Operations menu, type **D** to start the Restore Factory Default command.
4. At this prompt, type **Y** to confirm and continue:

```
Are you sure you want to restore factory default settings?
```

```
WARNING: Choosing Yes will restore factory defaults and then reboot.
```

This procedure deletes all user configurations and restores the CDD-56xA/L to its factory default configuration.

Next, set up the Router Mode configuration. See Section 8.7.

8.7 Router Mode – Point-to-Point System Configuration

This section tells you how to set up a Router Mode Point-to-Point System Configuration. All steps in this section refer to Figure 8-2.

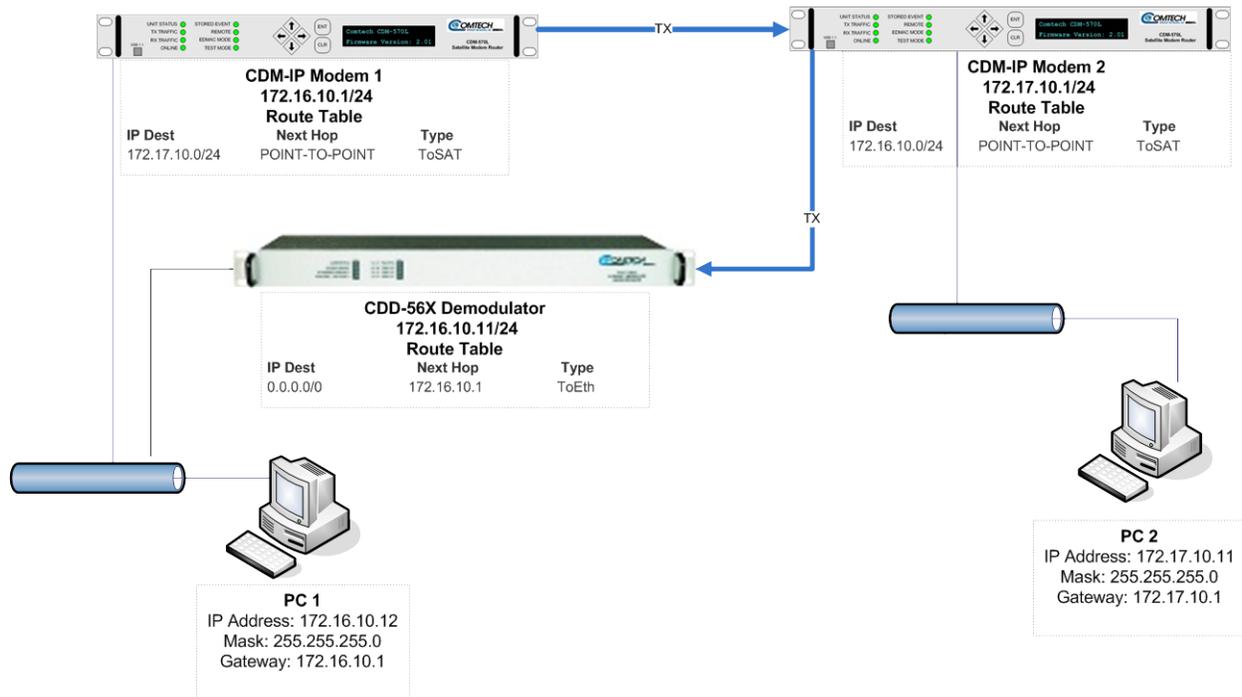


Figure 8-2. Router Mode Point-to-Point System Configuration

8.7.1 Steps for PC Configuration

1. Set the IP address on PC 1 to **172.16.10.11**
2. Set the Mask to **255.255.255.0**
3. Set the PC Gateway to **172.16.10.1**
4. Set the IP address on PC 2 to **172.17.10.11**
5. Set the Mask to **255.255.255.0**
6. Set the PC Gateway to **172.17.10.1**
7. If necessary, reboot the PCs.

8.7.2 Steps to set Router Mode Point-toPoint Operation for the CDM-IP Modems

Do these steps for each of the Satellite Modems, CDM-IP 1 and CDM-IP 2. Step 10 requires a different value for each modem.

1. From the CLI Main Menu, type **A** to go to the Administration submenu.
2. From the Administration submenu, type **C** to select CDM-IP Working Mode.
3. Type **1** to select Router Mode – Point-to-Point.
4. Type **y** to confirm when prompted:

```
Changing Modem working mode requires system Reboot.  
Do you want to continue(Y/N)[Enter :No]
```

5. Wait for the CDM-IP to reboot.

8.7.3 Steps to set Router Mode Point-to-Point Operation for the CDD-564A/L Demodulator

Do these steps for CDD-564A/L Satellite Demodulator:

1. From the **CLI Main Menu**, type **A** to go to the **Administration** submenu.
2. From the **Administration** submenu, type **C** to select **Working Mode**.
3. Type **y** to confirm when prompted:

```
Changing working mode requires system Reboot.  
Do you want to continue(Y/N)[Enter :No]
```

4. Type **1** to select **Router Mode – Point-to-Point**.
5. Wait for the CDD-564A/L to reboot.
6. From the **CLI Main Menu**, type **I** to go to the **Interface Configuration** submenu.

8.7.4 Steps to set the IP Address(es)

1. From the CLI Main Menu, type **I** to go to the Network Interface Configuration submenu.
2. From the Interface Configuration menu, type **E** to go to the Ethernet Interface submenu.
3. Type **I** to select Ethernet IP Addresses.
4. Set the addresses as shown:
CDM-IP 1 to 172.16.10.1
CDD-564A/L to 172.16.10.11
CDM-IP 2 to 172.17.10.1
5. Type **M** to select Ethernet Subnet MaskSubnet Prefix Length.
 - a. Set the length to 24.

8.7.5 Steps to set the IP Stack 3xDES Select Key to ClearRoute Table

8.7.5.1 Do these steps for Satellite Modem CDM-IP 1:

1. From the **CLI Main Menu**, type **R** to go to the **Route Table** submenu.
2. Enter **1** to configure the first route.
3. Enter a meaningful name (e.g., 'test').
4. Set the **IP Address** to **172.17.10.0**
5. Set the **Number of Subnet Bits** to **24**
6. Select **S** for **Interface to which the route is destined**, **<E-Ethernet S-Satellite Enter : S>**
7. Type **E** to go to **Per Route**.
8. Select **No** to disable each of these options: **HdrCompression** and **PayloadCompression**.
9. Select **Clear** to disable **3xDES**.

8.7.5.2 Do these steps for Satellite Modem (CDM-IP) 2:

10. From the **CLI Main Menu**, type **R** to go to the **Route Table** submenu.
11. Enter **1** to configure the first route.
12. Enter a meaningful name (e.g., 'test')
13. Set the **IP Address** to **172.16.10.0**
14. Set the **Number of Subnet Bits** to **24**
15. Select **S** for **Interface to which route is destined to** **<E-Ethernet S-Satellite Enter : S>**.
16. Type **E** to go to **Per Route**.
17. Select **No** to disable each of these options: **HdrCompression** and **PayloadCompression**.
18. Select **Clear** to disable **3xDES**.

8.7.5.3 Do these steps on the CDD-564A/L Demodulator 3:

19. From the **CLI Main Menu**, type **R** to go to the **Route Table** submenu.
20. Enter **1** to configure the first route.
21. Enter a meaningful name (e.g., 'ToCDMIP2').
22. Set the **IP Address** to **172.17.10.0**
23. Set the **Number of Subnet Bits** to **24**
24. Set the **Next-hop IP Address** to **172.16.10.1**

For this example, the CDD-564A/L Demodulator 3 Route Table shows this data:

Route Name	Dest IP/SNet Bits	Next Hop	MultiCast	State
Route001...[ToCDMIP2	172.17.10.0/24	172.16.10.1	N/A	toEth]..1

25. If the Header Decompression Feature is available on this demodulator, do these steps:
 - a. From the **CLI Main Menu**, type **A** to go to the **Administration** submenu.
 - b. From the **Administration** submenu, type **F** to go to the **Features Configuration** submenu.
 - c. **From the Features Configuration** submenu, type **H** to select **RxHeaderCompression**.
 - d. Type **1** to disable **Header Decompression** on **Demod 1**.

8.7.5.4 Steps to do a test of the basic configuration

The basic configuration is finished. The system should be able to:

- Ping PC 1 from PC 2, and vice versa
- Ping CDM-IP 2 from PC 1, and vice versa
- Pass any other data between PC 1 and PC 2

1. From PC 1:

- a. Ping 172.16.10.1 (CDM-IP 1)
- b. Ping 172.16.10.2 (CDD-564A/L DEMOD 3)
- c. Ping 172.17.10.2 (CDM-IP 2)
- d. Ping 172.17.10.11 (PC 2)

2. From PC 2:

- a. Ping 172.17.10.1 (CDM-IP 2)
- b. Ping 172.16.10.1 (CDM-IP 1)
- c. Ping 172.16.10.2 (CDD-564A/L DEMOD 3)
- d. Ping 172.16.10.11 (PC 1)

8.8 Troubleshooting the IP Module

This section tells how to use some of the diagnostic tools that come with the CDM-IP & CDD-564A/L. These tools can help you identify the traffic path going in and out of the modems. Described here are problems that can occur when two CDM-IP modems are set up initially. If these troubleshooting steps do not correct the problem, contact Product Support.

8.8.1 Router Mode Troubleshooting

If the system cannot send traffic in Router Mode, use these troubleshooting steps:

8.8.1.1 No ping response from the locally connected PC to the CDM-IP/CDD-564A/L Ethernet port.

ICMP response is: Request timed out.

1. Verify correct IP address/subnet on PC and CDM-IP/CDD-564A/L.
2. Verify Ethernet connection – cables, hub, etc.
3. Examine the PC, hub, and CDM-IP/CDD-564A/L, the Ethernet activity LED should be lit.
4. Make sure the PC is connected to the CDM-IP using a hub, switch or a RJ45 crossover cable.
5. When the CDM-IP/CDD-564A/L Ethernet port senses an Ethernet connection, the CLI displays:
Ethernet Interface UP
6. If the connection is broken, the CLI displays:
Ethernet Interface DOWN

8.8.1.2 No Ping response from PC 1 to PC 2 or vice versa

ICMP response is: Reply from 172.XXX.10.1 -Destination net unreachable

1. Make sure the PC is connected to the CDM-IP using a hub, switch or a RJ45 crossover cable.
2. When the CDM-IP/CDD-564A/L Ethernet port senses an Ethernet connection, the CLI displays:
Ethernet Interface UP
3. If the connection is broken, the CLI displays:
Ethernet Interface DOWN
4. Verify CDM-IP, CDD-564A/L Route Tables are correct.
5. Verify that the **hdrcomp** and **decomp** are either both enabled or both disabled:
 - a. Go to the **Route Table**, then **Options** page to find whether **hdrcomp** is enabled or disabled.
 - b. On the remote modem, go the **Main** menu, type **A** for **Administration**, then **F** for **Feature**.
 - c. Make sure **decomp** is in the same operational state as **hdrcomp**.

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Chapter 9. TELNET and CLI OPERATION

9.1 Overview

The CLI (Command Line Interface) is a user menu system that facilitates configuration, monitoring and control of the CDD-56xAL Multi-Channel Demodulator. This interface is accessible with a user-provided terminal emulator application such as PuTTY, or over the Ethernet interface using Telnet.

9.1.1 Interface Access

The demodulator does not allow concurrent access to the menu via Telnet and the Console port. If the user connects via Telnet, the demodulator automatically disables the Console port for the duration of the Telnet session.

All Telnet-based menu screens allow a Telnet Logout to end a Telnet session. Additionally, the demodulator automatically ends a Telnet session after a preconfigured period of inactivity (definable from 1 to 60 minutes).

Any changes made to the demodulator IP parameters will be lost if the demodulator is reset or loses power, unless the changes are first saved to permanent storage. This applies to all of the IP parameters. Enter 'S' from any CLI/Telnet Menu screen to save the actively set parameters.

All demodulator parameters configured via the CLI or Ethernet interface will be automatically stored in the demodulator unit non-volatile RAM and will be retained if there is a power loss.

9.1.1.1 For connection via a Terminal Emulator

The user PC should be physically attached to the Console port of the CDD-56xAL. The terminal emulator should be configured to match the Console port setting. The default Console port settings are:

- 38,400 bps
- 8 data bits
- No parity
- 1 stop bit
- No flow control

9.1.1.2 For connection via Telnet

The user PC must have network connectivity to the 10/100 Ethernet port of the CDD-56xAL. This connectivity can be over a local LAN, a remote LAN, or by satellite link from another IP modem. The Ethernet Speed Mode is a configurable parameter of the demodulator and, accordingly, its exact setting can vary between specific installations.

The CLI Interface gives all users the same access: Full Access, No Login.

The Telnet Interface User Access Levels are:

- Admin User: Full Access, all Menus
- Read/Write User: No Access to Admin Menu, Full Access all other Menus
- Read Only User: No Access

The factory defaults for user names/passwords are:

- Admin: comtech/comtech
- Read/Write: opcenter/1234
- Read Only: monitor/1234

9.2 CLI Menu Screens

This section shows most CLI screens as they might appear using the PuTTY terminal emulator application. The screens shown here are only examples. The appearance of your CLI interface will likely vary from these examples, depending on your system configuration and the terminal emulator that you use.

9.2.1 Common Interface Selections/field

These menu functions are common to all CLI screens:

- Demod Select...Z
- Save Parameters to permanent storage...S
- Exit...X

```

                                     Main Menu

Administration.....A
Interface Configuration.....I
Route Table.....R
Protocol Configuration.....P
Satellite Demod Configuration.....M
Operations and Maintenance.....O

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Demod Select, keystroke: Z

- Selects the active receive channel to apply the configuration:
- CDD-564A/L has 4 Rx Channels
- CDD-562AL has 2 Rx Channels.

Save Parameters to permanent storage, keystroke: S

- Allows user to permanently save the current configuration. This configuration is then stored to flash memory and recalled for subsequent operational sessions.

Exit, keystroke: X

- Allows user to exit the current menu and return to its parent menu.

9.2.2 Main Menu

```

                                Main Menu

Administration.....A
Interface Configuration.....I
Route Table.....R
Protocol Configuration.....P
Satellite Demod Configuration.....M
Operations and Maintenance.....O

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

Administration, keystroke: A

- Provides a basic set of standard administrative functions to the demodulator. When connected via Telnet, navigation to this menu is restricted to the Admin user.
- See Section 9.2.2.1

Interface Configuration, keystroke: I

- Allows configuration of the Ethernet and Satellite interfaces.
- See Section 9.2.2.2

Route Table, keystroke: R

- Defines how the demodulator routes packets that it receives on its Ethernet and Satellite interfaces.
- See Section 9.2.2.3

Protocol Configuration, keystroke: P

- Allows configuration of various protocols used by the demodulator. These protocols currently include ARP and IGMP.
- See Section 9.2.2.4

Vipersat Configuration, keystroke: V

- Available only in Router-Vipersat Working Mode
- (Not shown) Viewable/selectable only when the demodulator is used in a Vipersat system.
- See Comtech EF Data publication MN/22137 – Vipersat CDD-56xAL Series Satellite Network Demodulator Router User Guide.

Satellite Demod Configuration, keystroke: M

- Allows configuration and monitoring of the satellite base unit.
- See Section 9.2.2.6

Operations and Maintenance, keystroke: **O**

- Allows configuration of various control and maintenance options for the system. Diagnostic/troubleshooting tools, and Statistics screens are also accessible.
- See Section 9.2.2.7

9.2.2.1 Administration screen

Go to the Administration screen from the Main Menu.

```
Administration

Name/Password Configuration.....P
Access Lists.....A
Feature Configuration.....F
3xDES Configuration (Per Demod).....D
SNMP Configuration.....N
Working Mode.....[Router - Point to Point]..C
Telnet timeout.....[5].....T

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

The Administration screen is restricted to the Admin user when connecting via the Telnet, SNMP or HTTP interface. The Administration screen is available when connected via the Terminal Emulator (serial) connection because there is no login.

Name/Password Configuration, keystroke: **P**

- Set up of the user name and passwords that are required to use the management interfaces, such as Telnet, SNMP, HTTP
- See Section 9.2.2.1.1

Access Lists, keystroke: **A**

- Sets access restrictions to the management interfaces based on the requester's IP address
- See Section 9.2.2.1.2

Feature Configuration, keystroke: **F**

- Opens the Feature Configuration screen
- See Section 9.2.2.1.3

3xDES Configuration (Per Demod), keystroke: **D**

- Determines if 3xDES decryption is enabled on a device and, if so, the 3xDES keys that are used to decrypt traffic
- See Section 9.2.2.1.4

SNMP Configuration, keystroke: **N**

- Sets management parameters for Simple Network Management Protocol
- See Section 9.2.2.1.6

Working Mode, keystroke: **C**

- Selects the IP Module Working Mode. Only Router Mode is supported.
- See Section 0

Managed Switch Multicast Option, keystroke: **E**

- Available only when Managed Switch is the selected Working Mode; Enables or disables the routing of multicast IP traffic over the satellite, or to another device on the local LAN
- See Section 9.1.1.1.1

Telnet timeout, keystroke: **T**

- Sets the minutes of Telnet inactivity allowed before the Telnet session is automatically terminated. Range: 1 through 60 minutes
- See Section 9.2.2.1.8

9.2.2.1.1 Name/Password Configuration screen

Go to the Name/Password Configuration screen from the Administration screen.

```

                                Name/Password Configuration

Admin User/Password..... [comtech/comtech] ..... A
Read/Write User/Password.. [opcenter/1234] ..... W
Read Only User/Password... [monitor/1234] ..... R

Demod Select..... [1] ..... Z
Save Parameters to permanent storage..... S
Exit..... X

```

Use this screen to set the passwords required for access via HTTP, FTP, SNMP and Telnet.

- All Usernames and Passwords are case sensitive.
- There is a minimum of 1 and a maximum of 11 characters.

Any or all of the Usernames and Passwords can be removed by entering **NONE NONE** from the CLI or Telnet.

Removing all Usernames and Passwords allows access to the IP functions only when connected via the Terminal Emulator (serial) connection. This is because there is no login for the CLI.

FTP access is restricted to Admin Username/Password only. FTP is used only to upgrade the IP SOFTWARE or to load or retrieve the IP Parameter file.

Admin User/Password, keystroke: A

- Enter the user name and password with a space delimiter.
- **Example:** <user> <passwd>
- Type **NONE NONE** to erase

Read/Write User/Password, keystroke: W

- Enter the user name and password with a space delimiter.
- **Example:**<user> <passwd>
- Type **NONE NONE** to erase

Read Only User/Password, keystroke: R

- Enter the user name and password with a space delimiter.
- **Example:**<user> <passwd>
- Type **NONE NONE** to erase

9.2.2.1.2 Access Lists screen

Go to the Access Lists screen from the Administration screen.

```
Access Lists
AccessClient1..... [NOT-DEFINED/NA] .....1
AccessClient2..... [NOT-DEFINED/NA] .....2
AccessClient3..... [NOT-DEFINED/NA] .....3
AccessClient4..... [NOT-DEFINED/NA] .....4
Access List Enforcement.. [Disabled] .....E

Demod Select..... [1] .....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Use this screen to limit monitor and control access to the unit from a specified list of authorized clients.

If connecting to the IP modem (or demodulator) remotely, the IP address of the machine used to manage the IP modem must be included in the Access List.

AccessClient1 through AccessClient4, keystroke: 1 through 4

- Sets which remote clients can connect when the Access List Enforcement is enabled. Each entry lets you define a unique class of machines that are allowed access to the unit. For each class, specify an IP Address or a subnet mask.
- For example: To give access to a PC with an IP Address of 10.10.10.1 and any PC on a subnet of 192.168.10.xxx, then define the Access List as:
 - AccessClient1 ...[10.10.10.1/32]
 - AccessClient2.... [192.168.10.0/24]

Access List Enforcement, keystroke: **E**

- Allows or denies access via ping, Telnet, HTTP, FTP and SNMP to a well-defined list of client machines. Access List Enforcement values are **[Enabled]** or **[Disabled]**:
 - If **[Enabled]**, then only those machines specified in the Access Client List are allowed to connect via ping, Telnet, HTTP, and SNMP.
 - If **[Disabled]**, then any client machine can connect via ping, Telnet, HTTP, FTP, and SNMP.
- Type **E** to switch between the two values.

9.2.2.1.3 Feature Configuration screen

Go to the Feature Configuration from the Administration screen to display the current availability for each feature. Any feature marked “Unavailable” is a FAST feature that must be activated with a FAST Option Purchase Access Code.

See also: Chapter 1. Introduction, and Chapter 6. FAST Activation Procedure.

```

Feature Configuration

Ping Reply.....[Enabled].....P
Telnet.....[Enabled].....E
SNMP.....[Enabled].....N
IGMP.....[Enabled].....I
Downlink Route All Available Multicast..[Disabled].....M
Receive 3xDES Decryption.....[Available]
Rx Header Compression (Per Demod).....H
Rx Payload Compression.....[Enabled ].....C
FAST Feature Code 1.....1
FAST Feature Code 2.....2
Vipersat Feature Codes.....[Available]
Vipersat Management.....[Disabled]
Vipersat File Streamer.....[Disabled]
LAN-to-LAN Routing.....[Disabled].....B
Payload Comp Type.....[ALDC]
Number of System Flows.....[20,000 (CDD-564 Compatibility Mode)]..F

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

```

Feature Configuration

Ping Reply.....[Enabled].....P
Telnet.....[Enabled].....E
SNMP.....[Enabled].....N
IGMP.....[Enabled].....I
Downlink Route All Available Multicast..[Disabled].....M
Receive 3xDES Decryption.....[Available]
Rx Header Compression (Per Demod).....H
Rx Payload Compression.....[Enabled ].....C
FAST Feature Code 1.....1
FAST Feature Code 2.....2
Vipersat Feature Codes.....[Available]
Vipersat Management.....[Disabled]
Vipersat File Streamer.....[Disabled]
LAN-to-LAN Routing.....[Disabled].....B

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

Ping Reply, keystroke: **P**

- Switches between **[Enabled]** or **[Disabled]**:

- **[Enabled]** tells the demodulator to respond to ping requests directed to the demodulator Ethernet Interface.
- **[Disabled]** tells the demodulator not to respond to ping requests. This is a security feature to prevent unauthorized parties from using the ping command to find out if a device exists.

Telnet, keystroke: **E**

- Switches between **[Enabled]** or **[Disabled]**:
 - **[Enabled]** allows access via Telnet.
 - **[Disabled]** denies access via Telnet.

SNMP, keystroke: **N**

- Switches between **[Enabled]** or **[Disabled]**:
 - **[Enabled]** tells the demodulator to respond to SNMP requests against the private and public MIB.
 - **[Disabled]** tells the demodulator not to respond to SNMP requests against the private and public MIB.

IGMP, keystroke: **I**

- Switches between **[Enabled]** or **[Disabled]**:
 - The receive portion of a demodulator utilizes the demodulator as an IGMP server.
 - The transmit portion of a demodulator utilizes the demodulator as an IGMP client.
 - The IGMP Information screen configures the demodulator to report an interest to join a Multicast group on an IGMP server.
 - The IGMP protocol regulates the Multicast traffic on a LAN segment to prevent information of no interest from consuming bandwidth on the LAN.

Downlink Route All Available Multicast, keystroke: **M**

- Switches between **[Enabled]** or **[Disabled]**:
 - When **[Enabled]**, the demodulator routes all Multicast packets coming from the Satellite interface to the Ethernet LAN regardless of the Route Table entries.
 - When **[Disabled]**, the demodulator does not automatically forward all Multicast packets. This demodulator will only forward multicast traffic received from the satellite to the Ethernet port if the multicast route exists in the Route Table.

Receive 3xDES Decryption, keystroke: **none, read-only**

- 3xDES is available only in the EN version.
- When Available, the demodulator decrypts packets being received from the Satellite Interface.
- When Unavailable, the demodulator cannot decrypt packets received from the Satellite Interface. This option is auto-sensed by a bit carried in packet headers.

Rx Header Decompression (Per Demod) , keystroke: **H**

- Opens the **Rx Header Decompression (Per Demodulator)** screen.

```

Rx Header Compression [Per Demod]

L2 Rx Header Decompression (Demod-1) ..... [Disabled] ..... A
L2 Rx Header Decompression (Demod-2) ..... [Disabled] ..... B
L2 Rx Header Decompression (Demod-3) ..... [Disabled] ..... C
L2 Rx Header Decompression (Demod-4) ..... [Disabled] ..... D
L3/L4/L5 Rx Header Decompression (Demod-1) .. [Disabled] ..... 1
L3/L4/L5 Rx Header Decompression (Demod-2) .. [Disabled] ..... 2
L3/L4/L5 Rx Header Decompression (Demod-3) .. [Disabled] ..... 3
L3/L4/L5 Rx Header Decompression (Demod-4) .. [Disabled] ..... 4

Demod Select..... [1] ..... Z
Save Parameters to permanent storage..... S
Exit..... X

```

- Set this option to **[Enabled]** or **[Disabled]** for each Rx Channel:
 - **[Enabled]** – enables Header Decompression
 - **[Disabled]** – disables Header Decompression
- When **Enabled**, the system expects received streams to be Header-compressed.
- Note: A CDM-IP modem (or demodulator) must receive all streams as compressed, or as not compressed. The unit cannot distinguish between the two types.

Rx Payload Decompression, keystroke: **C**

- Switches between **[Enabled]** or **[Disabled]**:
- Causes a unit receiving a stream of data that has been payload compressed to be correctly uncompressed. This option is auto-sensed by a bit carried in packet headers.

FAST Feature Code 1 or 2, keystroke: **1 or 2**

- Allows entry of a FAST Option Purchase Access Code; purchase a specific option/upgrade to receive an applicable code from the Comtech EF Data Sales Representative.

Vipersat Feature Codes, keystroke: **F**

- Allows user to enter a Vipersat features activation code that has been provided by Comtech Vipersat for modems (or demodulators) configured to operate under VMS control.

Vipersat Management, keystroke: **V**

- For details on configuration and use of the CDD-56xAL Vipersat feature, see Comtech EF Data publication MN/22137 – Vipersat CDD-56xAL Series Satellite Network Demodulator Router User Guide.

Vipersat File Streamer, keystroke: **R**

LAN-to-LAN Routing, keystroke: **B**

- When LAN-to-LAN Routing is enabled, packets ingress from LAN can be routed (egress) to the LAN port instead of sending the ICMP redirect message. If selected, this prompt shows:
 - “Configuring LAN-to-LAN Routing disables the ICMP redirect Messages. Do you want to continue(Y/N)[Enter :No]”

- o Type ‘Y’ for “Yes” or ‘N’ for No.

Payload Comp Type, keystroke: **none**, **read-only**

Number of System Flows, keystroke: **F**

- CDD-564 Compatibility Mode only.
- Maximum of 20,000 System Flows
- 564A/570A modems can have a maximum of 64,000 system flows. However, the number of system flows for both Tx and Rx modems must match. If the far- and near-end modems’ firmware revisions do not match, then the number of system flows must be set to Compatibility Mode. In Compatibility Mode, the modem with the latest firmware version sets the number of system flows to 20,000.
- This is only available when the unit is in CDM-564A, see Section 9.2.2.6.5.

9.2.2.1.4 3xDES Decrypt Configuration (Per Demod) screen (future)



NOTE: This menu is available only on the CDD-564A-EN and CDD-564AL-EN.

Go to the 3xDES Decrypt Configuration (Per Demod) screen from the Administration screen.

```
Triple DES Decrypt Configuration [Per Demod]

3xDES Status... [Available]
Receive Key 1.. [2222222222222222 4444444444444444 6666666666666666].....1
Receive Key 2.. [2222222222222222 4444444444444444 6666666666666666].....2
Receive Key 3.. [2222222222222222 4444444444444444 6666666666666666].....3
Receive Key 4.. [2222222222222222 4444444444444444 6666666666666666].....4
Receive Key 5.. [2222222222222222 4444444444444444 6666666666666666].....5
Receive Key 6.. [2222222222222222 4444444444444444 6666666666666666].....6
Receive Key 7.. [2222222222222222 4444444444444444 6666666666666666].....7
Receive Key 8.. [2222222222222222 4444444444444444 6666666666666666].....8

Demod Select..... [1] .....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Use this screen to see if 3xDES decryption is enabled on a device. If it is enabled, define the 3xDES keys. These keys are used to decrypt traffic.

3xDES Status, keystroke: **none**, **read-only**

- Shows status as [Available] or [Unavailable]:
 - o Status shows as Available when the 3xDES feature is installed.
 - o Status shows as Unavailable when the 3xDES feature is not installed.

Receive Key 1 through Receive Key 8, keystroke: **1 through 8**

- These 3xDES keys are used to decrypt traffic being received from the Satellite Interface. The key is entered in HEX format (48 digits max).
- The keys specified for one receive channel are completely independent for the 3xDES keys specified for other receive channels.



NOTE: On the bottom of each CLI Menu, the **Demod Select** number shows the receive channel for which you are setting parameters.

A 24 Byte [192-bit] 3xDES key is actually a combination of 3 single DES keys of 8 Bytes [64-bits]. The CLI shows the Key with a space separating the Key into 3 sections.

In the screen example, Transmit Key 1 is shown as:

```
2222222222222222 4444444444444444 6666666666666666
```

Consider the first section as Key1A, the second as Key1B, and the third as Key1C. Data is first encrypted with Key1A, then decrypted with Key1B, and encrypted again with Key1C.

If you set all the three Keys the same, (like 48 '1's OR all the characters in DES key the same) the cumulative effect of 3xDES is just a single DES. When data is first encrypted with Key1A, and decrypted with Key1B, we get the original data. When encrypted again with Key1C, the result is a total effect of a single DES key.

Because of this possibility, you must enter unique, 64-bit keys. If any two sections of the Key match, the demodulator responds with this message:

```
Invalid Key - Please Re-enter
```

Also, the least significant bit of each byte in a 24-Byte [192-bit] 3xDES key is reserved for the DES Algorithm for parity. Entries of 1, 3, 5, 7, 9, B, D or F have all the corresponding bit positions masked.

So, a Key entry of this:

```
1111111133333333 5555555577777777 99999999BBBBBBBB
```

becomes this:

```
1010101032323232 5454545476767676 98989898BABABABA
```

9.2.2.1.5 SNMP Configuration screen

Go to the SNMP Configuration screen from the Administration screen.

```
SNMP Configuration

SNMP Read Community..... [public]..... R
SNMP Write Community..... [private]..... W
SNMP Trap Community..... [public]..... T
SNMP Trap Destination #1..... [NOT-DEFINED]..... D
SNMP Trap Destination #2..... [NOT-DEFINED]..... 2
SNMP Trap Version..... [SNMPv1]..... V
SNMP Enable Authentication Trap.. [Disabled]..... A
SNMP System Contact..... []..... C
SNMP System Name..... [CDD564A]..... N
SNMP System Location..... []..... O
SNMP Stats..... P

Demod Select..... [1]..... Z
Save Parameters to permanent storage..... S
Exit..... X
```

Use this screen to set management parameters for Simple Network Management Protocol.

SNMP Read Community, keystroke: **R**

- (GET community) Allows GET operations to all portions of the demodulator Controller and Quad Demodulator MIBs.

SNMP Write Community, keystroke: **W**

- (SET community string) Allows SET operations to all portions of the demodulator Controller and Quad Demodulator MIBs.

SNMP Trap Community, keystroke: **T**

- Defines Community String that will be set in the Community field of all outgoing traps. This field on the trap PDU may be checked by the network manager application to determine if the trap came from a “trusted” agent.

SNMP Trap Destination #1, keystroke: **D**

- IP address where all traps/notifications will be sent. If a network management application is running in the network, it should be configured to receive traps and its IP address should be entered here. Supports 2 – Trap Destinations.

SNMP Trap Destination #2, keystroke: **2**

- IP address where all traps/notifications will be sent. If a network management application is running in the network, it should be configured to receive traps and its IP address should be entered here. Supports 2 – Trap Destinations.

SNMP Trap Version, keystroke: **V**

- Sets which notification is sent, either SNMPv1 or SNMPv2.

SNMP Enable Authentication Trap, keystroke: **A**

- Switches between **[Disabled]** or **[Enabled]**
- Controls whether a MIB2 authentication trap is sent when a PDU with an invalid community string is encountered.
 - A community string is invalid when it does not match the Admin, Read Write, or Read Only community strings.

SNMP System Contact, keystroke: **C**

- User-defined SNMP Contact information.

SNMP System Name, keystroke: **N**

- User-defined SNMP Name information.

SNMP System Location, keystroke: **O**

- User-defined SNMP Location information.

SNMP Stats, keystroke: **P**

- Shows statistics for SNMP agent operations: number of IN SNMP packets, number of OUT SNMP packets, number of OUT Traps, etc.

9.2.2.1.6 Working Mode



NOTE: The CDD-56xAL demodulator only supports Router Mode.

On the Administration screen, type **C** for the Working Mode parameter:

```
Administration

Name/Password Configuration..... P
Access Lists..... A
Feature Configuration..... F
3xDES Configuration (Per Demod)..... D
SNMP Configuration..... N
Working Mode..... [Router - Point to Point]... C
Telnet timeout..... [5]..... T

Demod Select..... [1]..... Z
Save Parameters to permanent storage..... S
Exit..... X
c

Please enter a value for the Working Mode
Press ESC to abort

Changing Modem working mode requires system Reboot.

Do you want to continue (Y/N) [Enter :No] █
```



CAUTION

Changing the Working Mode causes the unit to reboot.

At the prompt, type ‘**Y**’ to proceed, and then select the desired **Working Mode**.

- 1 -- Router – Small Network
- 2 -- Router – Large Network
- 3 -- Router – Point to Point
- 4 -- Router – Vipersat

Otherwise, press the [ESC] or [Enter] keys to stop the command and return to the Administration screen.

9.2.2.1.7 Telnet Timeout

On the Administration screen, type **T** for the Telnet Timeout parameter:

```
Administration

Name/Password Configuration.....P
Access Lists.....A
Feature Configuration.....F
3xDES Configuration (Per Demod).....D
SNMP Configuration.....N
Working Mode.....[Router - Point to Point]...C
Telnet timeout.....[5].....T

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
t

Please enter a value for the Telnet timeout
Press ESC to abort

Enter the Telnet timeout in minutes
Valid ranges are from 1 to 60
█
```

Telnet timeout sets the maximum number of minutes of Telnet inactivity before the Telnet session is automatically ended by the demodulator. The range is 1 through 60 minutes.

The demodulator does not allow concurrent access to the menu via Telnet and the console port. If you connect via Telnet, the demodulator automatically disables the console port for the duration of the Telnet session. Also, the demodulator automatically ends a Telnet session after the period of inactivity set with this parameter.

9.2.2.2 Interface Configuration screen

Go to the Interface Configuration screen from the Main Menu.

```
Interface Configuration

Ethernet Interface.....E
Satellite/HDLC Interface.....H

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

Ethernet Interface, keystroke: **E**

- Opens Ethernet Interface screen.

Satellite/HDLC Interface, keystroke: **H**

- Opens Satellite/HDLC Interface screen.

9.2.2.2.1 Ethernet Interface screen

Go to the Ethernet Interface screen from the Interface Configuration screen.

```

                                Ethernet Interface
Mgmt MAC Address.....[00-06-B0-05-64-23]
Traffic Port Speed/Mode.....[Auto].....E
Mgmt IP Address.....[192.168.1.5].....I
Mgmt Subnet Prefix Length....[ 24  ].....M
DM/Red Traffic MAC Address....[00-06-B0-05-64-22]
DM/Red Traffic IP Addr.....[192.168.2.20].....L
DM/Red Traffic Subnet Prefix..[ 24  ].....B
Traffic Port Actual Speed....[100 Mb/sec Full Duplex]
Dedicated Management Port....[Enabled].....D

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

Mgmt MAC Address, keystroke: **none, read-only**

- The MAC Address sets the hardware destination MAC Address. This address is used when an Ethernet packet goes to the demodulator Ethernet Interface that is used for management over Web/SNMP. This address is unique, and is assigned permanently at the factory.

Traffic Port Speed/Mode, keystroke: **E**

- The Traffic Port Speed/Mode can vary among installations. The default setting of Auto allows the Ethernet port to automatically negotiate its link speed on power-up.
- Selections are:
 - 1 -- Auto
 - 2 -- 10 MB/sec Half Duplex
 - 3 -- 100 MB/sec Half Duplex
 - 4 -- 10 MB/sec Full Duplex
 - 5 -- 100 MB/sec Full Duplex

Mgmt IP Address, keystroke: **I**

- This is the IP Address assigned to the Ethernet Interface used for management over Web/SNMP. This is the same as Traffic IP when Dedicated Management Port is enabled.
 - Enter the IP address in aaa.bbb.ccc.ddd format

Mgmt Subnet Prefix Length, keystroke: **M**

- Specifies the Subnet Mask assigned to the Ethernet Interface.
 - Enter the subnet mask prefix length (valid range is from 8 to 30).

DM/Red Traffic MAC Address, keystroke: **none, read-only**

- The DM/Red Traffic MAC Address sets the hardware destination MAC Address that is used when DM/Redundancy is enabled. This address is unique, and is assigned permanently at the factory.

DM/Red Traffic IP Addr, keystroke: **L**

- You can configure this only when either Dedicated Management Port or Redundancy is enabled. Otherwise, Traffic IP and Management IP addresses are the same.
- This is the IP Address assigned to the DM/Red Traffic.
 - Enter the IP address in aaa.bbb.ccc.ddd format

DM/Red Traffic Subnet Prefix, keystroke: **B**

- Specifies the Subnet Mask assigned to the DM/Red Traffic
 - Enter the subnet mask prefix length (valid range is from 8 to 30).

Traffic Port Actual Speed, keystroke: **none, read-only**

- Shows the Traffic Port status: actual speed, whether the link is up or down

Dedicated Management Port, keystroke: **D**

- Switches between **[Disabled]** or **[Enabled]**
- When Dedicated Management Port is enabled, the M&C Ethernet Port is activated. Web/SNMP/FTP upgrades will operate only through the M&C port.
- This is available only in CDD-564A compatibility mode. See Section 9.2.2.6.5.

9.2.2.2.2 Satellite/HDLC Interface screen

Go to the Satellite/HDLC Interface screen from the Interface Configuration screen.

```

                                     Satellite/HDLC Interface
HDLC Addr Mode..... [Point-To-Point Mode]
Receive HDLC Channel Addresses (Per Demod)..... H
Demod Select..... [1]..... Z
Save Parameters to permanent storage..... S
Exit..... X

```

HDLC Addr Mode, keystroke: **none, read-only**

- Point-To-Point Mode – In this mode, no HDLC address is used over the satellite link. It can only be used for pure Point-to-Point configurations.
- Small Network Mode (up to 254 addresses) - In this mode, the demodulator expects a single-byte HDLC address over the satellite link (0x1 – 0xFE).
- Large Network Mode (up to 32766 addresses) - In this mode, the demodulator expects a two-byte HDLC address over the satellite link (0x1 – 0xFFFE).

Receive HDLC Channel Addresses (Per Demod), keystroke: **H**

- Opens the Receive HDLC Channel Addresses (Per Demod) screen.
- See Section 9.2.2.2.1

9.2.2.2.1 Receive HDLC Addresses (Per Demod) screen

Go to the Receive HDLC Addresses (Per Demod) screen from the Satellite/HDLC Interface screen.

```
Receive HDLC Channel Addresses (Per Demod)

HDLC Addr 1.....[NOT-USED].....1
HDLC Addr 2.....[NOT-USED].....2
HDLC Addr 3.....[NOT-USED].....3
HDLC Addr 4.....[NOT-USED].....4
Delete HDLC Addr.....D

Demod Select..... [1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Use this screen to define up to four HDLC addresses per receive channel that can carry user information on the Satellite Interface. You can use it to delete an HDLC address as well.

- The CDD-564A/L has four Receive channels;
- The CDD-562AL has two Receive channels.

HDLC Addr 1 through HDLC Addr 4, keystroke: **1 through 4**

- For HDLC addresses in hex <1 - 7FFE, enter = 0001>
- Point-To-Point Mode: HDLC addresses are not used in this mode.
- Small Network Mode (up to 254 addresses) - The user is limited to valid addresses between the values of 0x01 and 0xFE.
- Large Network Mode (up to 32766 addresses) - The user is limited to valid addresses between the values of 0x0001 and 0x7FFE.

Delete HDLC Addr, keystroke: **D**

- Select and delete an HDLC address entry

9.2.2.3 Route Table Configuration screen

Go to the Route Table Configuration screen from the Main Menu.

```

                                Configuring the Route Table
                                Dest IP/SNet Bits  Next Hop          MultiCast State
Route001... [DFG                0.0.0.0/0          192.168.21.101  N/A          Inval]..1
Route002... [UNKNOWN] .....2
Route003... [UNKNOWN] .....3
Route004... [UNKNOWN] .....4
Route005... [UNKNOWN] .....5
Route006... [UNKNOWN] .....6
Route007... [UNKNOWN] .....7
Route008... [UNKNOWN] .....8
Base..... [1] .....B
Delete.....D
Display.....P
DL Mcast... [Disabled]
AddFilter.....A
DelFilter.....R

Demod Select..... [1] .....Z
Save Parameters to permanent storage.....S
Exit.....X

```



CAUTION

Do not operate a CDM-IP modem satellite link where both IP modems have a Default Route to the satellite.

About the CAUTION note: if both IP modems had this Route Table entry:

IP Dest	Next Hop	Type
0.0.0.0/0	Point-to-Point	ToSat

Any traffic forwarded by an IP modem that did not have a valid IP host at the remote LAN would then be resent by the remote IP modem. This traffic would continue to be forwarded until the TTL expired. This “routing loop” limits the performance of the IP modem by wasting satellite bandwidth.

Route001 through Route008, keystroke: 1 through 8

- The screen shows eight routes at a time.
- System can be configured up to 256 routes.
- Sets routing parameters for the packets the IP Module receives. This is similar to using the 'route add' command. For each route, you must set:
 - A unique route name; the name cannot contain any whitespace
 - The destination address of an IP packet of interest

- The number of network addresses governed by this destination entry (subnet mask)
- The Next Hop IP address; this is the IP address where the packet is routed for additional processing. It must be on the same subnet as the Ethernet interface.
- Optionally: If entering a multicast address (224.0.0.0-239.255.255.255) as the destination IP address, then these parameters are requested:
 - Route Multicast packets from Satellite to Ethernet? [y/n]
 - Specify if multicast packets that match the provided IP address will be routed from the Satellite to Ethernet. “No” means that the packets will be discarded.
 - Multicast Routes always have a subnet length of 32 and the next hop is 0.0.0.0 because it is not applicable.
 - The IP Module allows you to specify only one default route.
Destination IP = 0.0.0.0 Subnet Length = 0.
 - The default route can be defined to send traffic to an IP Address on the same subnet as the Ethernet interface. This causes all packets that do not match any other route to be sent to the destination you specified for additional processing.

Base, keystroke: B

- See up to 8 different routes per screen. Select a base address to control which 8 routes are shown. For example, to see Routes 32-40, then set a Base value of 32.

Delete Route, keystroke: D

- Select and delete a Route Name

Display, keystroke: P

- Shows all of the routes in the system. This includes automatically-generated routes.

```

P
Route Name      DestIP/SnetBits  Next Hop      HDLC Flags      FPorts
-----
0 lanTLocalNet  192.168.2.0/24   0.0.0.0       0 ..I.L....E2
1 lanTBCast0    192.168.2.0/32   0.0.0.0       0 ..I..B....E2
2 lanTBCast1    192.168.2.255/32 0.0.0.0       0 ..I..B....E2
3 lanTIP        192.168.2.20/32  0.0.0.0       0 ..IO.....E2
4 lanFBCast     255.255.255.255/320 0.0.0.0       0 ..IO.....2
5 unmatchMCastF 224.0.0.0/4      0.0.0.0       0 ..I...M....2
6 lanLocalIP    247.255.255.255/320 0.0.0.0       0 ..I....F...2
7 vmsmcastMgmtI 239.4.5.6/32     0.0.0.0       255UDI...M..S.2
8 stdmamCastMgm 239.1.2.3/32     0.0.0.0       255UDI...M..S.2
9 codecastMcast 239.1.2.4/32     0.0.0.0       255UDI...M..S.2
10lanDMLocalNet 192.168.1.0/24   0.0.0.0       0 ..I.L....E1
11lanDMBCast0   192.168.1.0/32   0.0.0.0       0 ..I..B....E1
12lanDMBCast1   192.168.1.255/32 0.0.0.0       0 ..I..B....E1
13lanDMIP       192.168.1.5/32   0.0.0.0       0 ..IO.....E1
14DFG          0.0.0.0/0        192.168.21.101 0 .....2

flag description: U - Ether to Sat MultiCast, D - Sat to Ether MultiCast
I - Automatic O - My IP L - Local Network B - Broadcast M - MultiCast
F - Filter everything that matches S - Satellite route, E - Ethernet Route
P - Per Port filter Route 1=Mgmt Eth Port(etsec1) 2=Traffic Eth Port(etsec0)

Press Any Key to Continue
    
```

Downlink Mcast, keystroke: **none, read-only**

- Shows Read-only status of Downlink Multicast as **[Enabled]** or **[Disabled]**.
- This is enabled or disabled on the Administration | Feature Configuration screen.

9.2.2.4 Protocol Configuration screen

Go to the Protocol Configuration screen from the Main Menu.

```
Protocol Configuration Page

IGMP.....I
ARP.....A
Brouter Mode.....B

Demod Select..... [1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

IGMP, keystroke: **I**

- Opens the IGMP Information screen.
- See Section 9.2.2.4.1

ARP, keystroke: **A**

- Opens the ARP Table Utilities screen.
- See Section 9.2.2.4.2

Brouter Mode, keystroke: **B**

- Opens the (VLAN) Brouter Configuration screen.
- See Section 9.2.2.4.3

9.2.2.4.1 IGMP Information screen

Go to the IGMP information screen from the Protocol Configuration screen.

```
IGMP Information

IGMP..... [Enabled]
View IGMP Table.....V
Modem as Server: IGMP query period..... [30].....Q
Modem as Server: IGMP max. response time..... [28].....R
Modem as Server: Num. missed responses before leaving IGMP group.. [5].....M

Demod Select..... [1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Use this screen to see the IGMP clients that are actively listening to content from the demodulator. This screen also helps to see how the Ethernet Interface is configured, either to receive requests to join IGMP groups or to announce groups for others to join.

IGMP, keystroke: **none**, read-only

- Shows IGMP status as **[Enabled]** or **[Disabled]**.

View IGMP Table, keystroke: **V**

- Reports the client subscription content to the demodulator using the IGMP protocol. Use it to see which services are being used, and the minimum time before a service will be terminated.

Modem as Server: IGMP query period, keystroke: **Q**

- Requests that a server periodically publish the Multicast IP Addresses that it can service to users on the LAN. The IGMP query period sets the time interval (in seconds) between each of these queries for membership.

Modem as Server: IGMP max. response time, keystroke: **R**

- Sets the time interval that the demodulator must wait before it assumes that no parties are interested in the content published via an IGMP query. This interval is set in seconds. The maximum response time that is accepted by the demodulator is 25 seconds.

Modem as Server: Number of missed responses before leaving IGMP group, keystroke: **M**

- Sets the number of membership queries that go unanswered from LAN clients before the Ethernet Interface no longer forwards data for that IGMP group.
 - For example: a demodulator has the IGMP query period set to 60 seconds, and the number of missed responses is set to 3. If a client joins an IGMP group, then the service to that group continues until no clients respond to a query from the demodulator for a period of $60 \times 3 = 180$ seconds.

9.2.2.4.2 ARP Table Utilities screen

Go to the ARP Table Utilities screen from the Protocol Configuration screen.

```

                                ARP Table Utilities
                                IP                Layer2
Entry0001.....[UNKNOWN].....1
Entry0002.....[UNKNOWN].....2
Entry0003.....[UNKNOWN].....3
Entry0004.....[UNKNOWN].....4
Entry0005.....[UNKNOWN].....5
Entry0006.....[UNKNOWN].....6
Entry0007.....[UNKNOWN].....7
Entry0008.....[UNKNOWN].....8
Delete ARP Entry.....D
Display Arp Tbl.....A
Flush ARP Table.....F
Base.....[1].....B

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

Use this screen to see and edit the ARP table defined by the demodulator. It allows up to 256 static IP→MAC ARP entries.

Entry001 through Entry008 (256), keystroke: 1 through 8

- The menu screen shows 8 ARP definitions at a time on the demodulator.
- User can define up to 256 ARP definitions.
- Define up to 256 static ARP definitions on the demodulator. A static ARP definition is:
 - Unicast IP Address – This IP Address is used as a lookup into the ARP table when the demodulator needs to resolve a MAC or HDLC Address.
 - Restrictions:
 - IP Address must be on the same subnet as the Ethernet Interface.
 - IP Address must be a valid Unicast address (Not Multicast, broadcast, etc.)
 - MAC Address – The MAC Address defines the hardware destination MAC Address that is used when an Ethernet packet is destined for an IP machine from the demodulator.

Delete ARP Entry, keystroke: D

- Deletes a Static ARP entry. Prompts for the IP address of the ARP entry to delete.

Display ARP Tbl, keystroke: A

- Shows the entire IP to MAC ARP table in blocks of 10 ARP entries. This includes both static and dynamic ARP entries.

```

                                ARP Table Utilities
                                IP                Layer2
Entry0001..... [UNKNOWN].....1
Entry0002..... [UNKNOWN].....2
Entry0003..... [UNKNOWN].....3
Entry0004..... [UNKNOWN].....4
Entry0005..... [UNKNOWN].....5
Entry0006..... [UNKNOWN].....6
Entry0007..... [UNKNOWN].....7
Entry0008..... [UNKNOWN].....8
Delete ARP Entry.....D
Display Arp Tbl.....A
Flush ARP Table.....F
Base..... [1].....B

Demod Select..... [1].....Z
Save Parameters to permanent storage.....S
Exit.....X
a
-----
IP Address           MAC Address         Flags
-----
                                Press Any Key to Continue

```

- Press the **Enter** key to see the next 10 entries, or press the **ESC** key to return to ARP Table Utilities screen.

Flush ARP Table, keystroke: F

- Deletes all of the dynamic entries in the ARP table. This is equivalent to executing the standard UNIX command “arp -d” on each address reported in an “arp -a” command.
- The command only deletes the dynamic ARP entries. The static ARP entries are not deleted.

Base, keystroke: B

- Use this to see up to 8 different Static ARP definitions per screen.
- To make it easier to edit a subset of the 256 possible entries, select a base address to control which 8 ARP entries are shown.
 - For example, to edit static ARP Entries 32-40, then set a Base value of 32.

9.2.2.4.3 (VLAN) Brouter screen

Go to the Brouter Configuration screen from the Protocol Configuration screen.

```

                                Brouter Configuration

VLAN Brouter Mode.....[Disabled].....B
VLAN Brouter Next Hop MAC.....[01-02-03-04-05-06].....N
VLAN Brouter Remote Mode Enable..[Disabled].....R
VLAN Filtering.....[Disabled].....F
VLAN ID 1.....[0000].....1
VLAN ID 2.....[0000].....2
VLAN ID 3.....[0000].....3
VLAN ID 4.....[0000].....4
VLAN ID 5.....[0000].....5
VLAN ID 6.....[0000].....6
VLAN ID 7.....[0000].....7
VLAN ID 8.....[0000].....8
VLAN ID 9.....[0000].....9
VLAN ID 10.....[0000].....A

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

VLAN Brouter Mode, keystroke: **B**

- Requirement: Header Decompression must be purchased and available
- Switches between **[Disabled]** or **[Enabled]**
- **[Enabled]** causes VLAN tagged packets to be forwarded when in Router mode

VLAN Brouter Next Hop MAC, keystroke: **N**

- Enter a Next Hop MAC address in 01-02-03-04-05-06 format.

VLAN Brouter Remote Mode Enable, keystroke: **R**

- Switches between **[Disabled]** or **[Enabled]**
- If **[Enabled]**, IP traffic received from the WAN interface is not forwarded back to the WAN interface, even though the route table matches.

VLAN Filtering, keystroke: **F**

- Switches between **[Disabled]** or **[Enabled]**
- If **[Enabled]**, allows:
 - Filtering of "Brouted" Packets:
 - Bridging of VLAN destination packets
 - Routing of non-VLAN traffic using static route table information

VLAN ID 1 through VLAN ID 10, keystrokes: **1** through **9**, **A** for **10**

- Enter a valid ID in the range of 0000 to 4095.

9.2.2.5 Vipersat Configuration screen



NOTE: This screen is operational only when the demodulator is used in a Vipersat Management System (VMS).

Go to the Vipersat Configuration screen from the Main Menu.

```

                                Vipersat Configuration
STDMA Mode.....T
Automatic Switching.....A
Unit Role.....[Remote].....R
Expansion Unit.....[Yes].....E
Network ID.....[1].....B
Unit Name.....[ ].....N
Receive Multicast Address.....[239.4.5.6].....U
Managing IP Address.....[NOT-DEFINED].....I
Home State Revert.....[Disabled]
Dynamic Power Control Config.....C
Set Home State Parameters (Per Demod).....H
Vipersat Summary.....D
Vipersat Migration.....M
UDP Port Base Address.....[49152 [0xC000]].....U
ALERTS.....[No Alerts]

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

See Comtech EF Data publication MN/22137 – Vipersat CDD-56xAL Series Satellite Network Demodulator Router User Guide.

9.2.2.6 Satellite Demod Configuration screen

Go to the Satellite Demodulator screen from the Main Menu.

```

                                     Satellite Demodulator

Modem Type..... [CDD-564AL]
Configuration..... C
Monitor..... M
Information..... I
Features..... F
Utilities..... U

Demod Select..... [1]..... Z
Save Parameters to permanent storage..... S
Exit..... X
█
```

Modem Type, keystroke: **none**, read-only

- Shows the unit model

Configuration, keystroke: **C**

- Opens the Configuration screen.
- See Section 9.2.2.6.1.1

Monitor, keystroke: **M**

- Opens the Monitor screen.
- See Section 9.2.2.6.2

Information, keystroke: **I**

- Opens the Information screen.
- See Section 9.2.2.6.3

Features, keystroke: **F**

- Opens the Features screen.
- See Section 9.2.2.6.4

Utilities, keystroke: **U**

- Opens the Utilities screen.
- See Section 9.2.2.6.5

9.2.2.6.1 Configuration screen

Go to the Configuration screen from the Satellite Demodulator screen.

```
Configuration
Rx Configuration (Per Demod).....R
Alarm Masks Configuration (Per Demod).....A
LNB Configuration (Per LNB).....N

Demod Select..... [1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Rx Configuration (Per Demod), keystroke: **R**

- Opens the Rx Configuration (Per Demod) screen.
- See Section 9.2.2.6.1.1

Alarm Masks Configuration (Per Demod), keystroke: **A**

- Opens the Alarm Masks Configuration (Per Demod) screen.
- See Section 9.2.2.6.1.2

LNB Configuration (Per LNB), keystroke: **N**

- Opens the LNB Configuration (Per Demod) screen, if an LNB is detected.
- See Section 9.2.2.6.1.3

9.2.2.6.1.1 Rx Configuration (Per Demod) screen

Go to the Rx Configuration screen from the Configuration screen.

You can set the parameters for each demodulator. Use **Demod Select... Z** to change the demodulator before you set the other parameters.

```

                                Rx Configuration (Per Demod)
Frequency..... [1200.0000] ..... Q
Data Rate..... [10200.000] ..... D
Symbol Rate..... [2988.571]
FEC..... [VersaFEC] ..... T
Code Rate..... [VersaFEC CCM 16-QAM 0.853] ..... R
Demodulation..... [16QAM] ..... M
Spectrum Inversion.. [Normal] ..... U
Data Inversion..... [Normal] ..... I
Descrambling..... [On-Default] ..... B
Acquisition Range... [010] ..... W
Eb/No Alarm Point... [02.0] ..... P
Clock Inversion..... [Normal] ..... A
Filter Rolloff..... [0.35] ..... E

Demod Select..... [1] ..... Z
Save Parameters to permanent storage..... S
Exit..... X

```

Frequency, keystroke: Q

- L-Band
- Valid range for Rx Frequency is from 950 to 1950 MHz.

Data Rate, keystroke: D

- Valid range for Rx Data Rate is from 16 to 10239.0050 Kbps.
- Note: High data rate (>5000Kbps) is a FAST Feature you can purchase from Comtech EF Data

FEC, keystroke: T

- Select one Decoder Type:
 - 1 – Uncoded
 - 2 – TURBO
 - VersaFEC
 - ULL
- Note: Selection 2 (TURBO) available only with the CDD-564L.

Code Rate, keystroke: **R**

- Select one Decoder Rate:

1 – 5/16	8 – VersaFEC CCM BPSK 0.488	13 – VersaFEC CCM 8-QAM 0.576	22 – VersaFEC ULL BPSK 0.493
2 – 21/44		14 – VersaFEC CCM 8-QAM 0.642	23 – VersaFEC ULL QPSK 0.493
3 – 1/2	9 – VersaFEC CCM QPSK 0.533	15 – VersaFEC CCM 8-QAM 0.711	24 – VersaFEC ULL QPSK 0.654
4 – 3/4	10 – VersaFEC CCM QPSK 0.631	16 – VersaFEC CCM 8-QAM 0.780	25 – VersaFEC ULL QPSK 0.734
5 – 7/8	11 – VersaFEC CCM QPSK 0.706		
6 – 0.95	12 – VersaFEC CCM QPSK 0.803	17 – VersaFEC CCM 16-QAM 0.644	
7 – 1/1		18 – VersaFEC CCM 16-QAM 0.731	
		19 – VersaFEC CCM 16-QAM 0.780	
		20 – VersaFEC CCM 16-QAM 0.829	
		21 – VersaFEC CCM 16-QAM 0.853	

Demodulation, keystroke: **M**

- Select Rx Demodulation type:
 - 1 – BPSK
 - 2 – QPSK
 - 3 – 8PSK
 - 4 – 16QAM
 - 5 – 8QAM
- Note: Selections 1, 2, 3 available only with the CDD-564L.

Spectrum Inversion, keystroke: **U**

- Select one:
 - 1 – Normal
 - 2 – Inverted

Data Inversion, keystroke: **I**

- Select one:
 - 1 – Normal
 - 2 – Inverted

Descrambling, keystroke: **B**

- Select one:
 - 1 – Off
 - 2 – On-Default
 - 3 – On-IESS-315

Acquisition Range, keystroke: **W**

- Valid ranges are from 1 to 200 kHz:

- 1 to 32HKz if symbol rate < 625Ksymbol on CDD-564L
- 1 to 32HKz on CDD-564

Eb/No Alarm Point, keystroke: **P**

- Valid range is from 0.0 to 16.0.

Clock Inversion, keystroke: **A**

- Select one:
 - 1 – Normal
 - 2 – Inverted

Filter Rolloff, keystroke: **E**

- Select one:
 - 1 – 0.35
 - 2 – 0.12

9.2.2.6.1.2 Alarm Masks Configuration (Per Demod) screen

Go to the Alarm Masks Configuration (Per Demod) screen from the Configuration screen.

```
Alarm Masks Configuration (Per Demod)

Rx AGC      Mask.. [Active] .....D
Eb/No      Mask.. [Active] .....E
LNB        Mask.. [Active] .....J

Demod Select..... [1] .....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Rx AGC (Auto Gain Control) Mask, keystroke: **D**

- Select **[Active]** or **[Masked]**.

Eb/No Mask, keystroke: **E**

- Select **[Active]** or **[Masked]**.

LNB Mask, keystroke: **J**

- Select **[Active]** or **[Masked]**, if an LNB is detected.

9.2.2.6.1.3 LNB Configuration (Per LNB) screen

Go to the LNB Configuration (Per Demod) screen from the Configuration screen.

You can set the parameters for each LNB. Use **Demod Select... Z** to change the demodulator before you set the other parameters.

```

                                LNB Configuration (Per LNB)

LNB DC Supply Voltage..... [Off] ..... P
LNB 10MHz Reference..... [On ] ..... R
LNB Current Alarm Lower Limit (mA).. [ 0 ] ..... C
LNB Current Alarm Upper Limit (mA).. [ 0 ] ..... H
LNB LO Frequency (MHz)..... [00000-] ..... F
LNB Voltage..... [00.0]
LNB Current..... [000]

Demod Select..... [1] ..... Z
Save Parameters to permanent storage..... S
Exit..... X

```

LNB DC Supply Voltage, keystroke: P

- Select one:
 - 1 – Off
 - 2 – 13 Volts
 - 3 – 18 Volts

LNB 10MHz Reference Enable, keystroke: R

- Switches between **[On]** or **[Off]**:

LNB Current Alarm Lower Limit (mA), keystroke: C

Valid range is from 10 to 400 mA.

LNB Current Alarm Upper Limit (mA), keystroke: H

Valid range is from 50 to 600 mA.

LNB LO Frequency (MHz), keystroke: F

Valid range is from 0 to 65000 MHz. Enter 0 to disable.

LNB Voltage, keystroke: none, read-only

Shows active LNB voltage values for the selected LNB, if an LNB is detected.

LNB Current, keystroke: none, read-only

Shows active LNB current values for the selected LNB, if an LNB is detected.

9.2.2.6.2 Monitor screen

Go to the Monitor screen from the Satellite Demodulator screen.

```
Monitor

Rx Parameters.....R
Stored Events (Per Demod).....E
Link Statistics (Per Demod).....T

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Rx Parameters, keystroke: **R**

- Opens the Receive Parameters (Per Demod) screen.
- See Section 9.2.2.6.2.1

Stored Events (Per Demod), keystroke: **E**

- Opens the Stored Events (Per Demod) screen.
- See Section 9.2.2.6.2.2

Link Statistics (Per Demod), keystroke: **T**

- Opens the Link Statistics (Per Demod) screen.
- See Section 9.2.2.6.2.3

9.2.2.6.2.1 Rx Parameters screen

Go to the Rx Parameters screen from the Monitor screen.

```
Rx Parameters          Demod#1  Demod#2  Demod#3  Demod#4
-----
Rx Alarm              Unlock   Unlock   Unlock   Unlock
Rx Eb/No (dB)        Unlock   Unlock   Unlock   Unlock
Rx Signal Level (dBm) <-99     <-99     <-99     <-99
Rx Freq Offset (kHz)  Unlock   Unlock   Unlock   Unlock
Rx BER                Unlock   Unlock   Unlock   Unlock
LNB Current (mA)     N/A     N/A     N/A     N/A
LNB Voltage (volts)  N/A     N/A     N/A     N/A

Unit Alarm            No Faults

                          Press Any Key to Continue
```

This is a read-only screen. It shows a summary of the status or operating statistics for each demodulator:

- Rx Alarm
- Rx Eb/No (dB)
- Rx Signal Level (dBm)
- Rx Freq Offset (kHz)
- Rx BER
- LNB Current (mA)
- LNB Voltage (volts)
- Unit Alarm

Press any key to go back to the previous screen.

9.2.2.6.2.2 Stored Events (Per Demod) screen

Go to the Stored Events (Per Demod) screen from the Monitor screen.

```
Stored Events (Per Demod)

Number Of Unviewed Stored Events.. [048]
Jump To First Stored Event.....J
View Next 5 Stored Events.....V
Clear All Stored Events.....C

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

Number of Unviewed Stored Events, keystroke: none, read-only

- Shows the number of events not yet seen.
- Shows five events at a time. Once seen, the total changes accordingly.

Jump to First Stored Event, keystroke: J

- Resets the internal Event Index to 1; so you can go back to see the events again.

View Next 5 Stored Events, keystroke: V

- Shows the next five events, starting from the internal Event Index.

Clear All Stored Events, keystroke: C

- Deletes all stored events from the NVRAM buffer.

9.2.2.6.2.3 Link Statistics (Per Demod) screen

Go to the Link Statistics (Per Demod) screen from the Monitor screen.

```
Link Statistics (Per Demod)

Number Of Unviewed Link Statistics.. [000]
Jump To First Link Statistic.....J
View Next 5 Link Statistics.....V
Clear All Link Statistics.....C
Statistics Logging Interval (min)... [Off].....I

Demod Select..... [1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Number of Unviewed Link Statistics, keystroke: **none**, read-only

- Shows the number of statistics not yet seen.
- Shows five statistics at a time. Once seen, the total changes accordingly.

Jump to First Link Statistics, keystroke: **J**

- Resets the internal Statistics Index to 1; so you can go back to see the statistics again.

View Next 5 Link Statistics, keystroke: **V**

- Shows the next five statistics, starting from the internal Statistics index.

Clear All Link Statistics, keystroke: **C**

- Deletes all Link Statistics from the NVRAM buffer.

Statistics Logging Interval (min), keystroke: **I**

- Sets the period of time for which the statistics are measured. Choose from 10 to 90 minutes in 10-minute steps. Choose **OFF** to disable the feature.

9.2.2.6.3 Information screen

Go to the Information screen from the Satellite Demodulator screen.

```

                                Information

Remote Control Port..[Bauds-19200   Format: 8-N-1]

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

This is a read-only screen. It shows the operating parameters for the serial remote control port that is configured to use with the interface to the Factory Test Serial Port.

9.2.2.6.4 Features screen

Go to the Features screen from the Satellite Demodulator screen.

```

Modem Information
-----
Model Number           CDD-564AL
Turbo Option           Turbo Installed
VersaFEC Option        VersaFEC Installed
Data Rate Option       Up to 10239.0 kbps
Higher-order Modulation 8-PSK/8-QAM and 16QAM
Rolloff Option         Optimized Filter Rolloff Installed
Serial Number

                                Press Any Key to Continue

```

This screen is read-only. It shows the features and other data specific to the unit in use. Press any key to go back to the Satellite Demodulator screen.

9.2.2.6.5 Utilities screen

Go to the Utilities screen from the Satellite Demodulator screen.

```

                                Utilities
Time.....[10:38:53].....T
Date.....[09/12/03].....D
Internal Reference Adjust...[+000].....F
Circuit ID (Per Demod).....[].....I
Recenter Buffer (Per Demod).....C
Compatibility Mode.....[CDD-564A Mode].....A

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

Time, keystroke: **T**

- Set the time on the unit, in 24-Hour format: HH:MM:SS
 - HH = hours
 - MM = minutes
 - SS = seconds

Date, keystroke: **D**

- Set the date in DD/MM/YY format:
 - DD = day
 - MM = month
 - YY = year

Internal Reference Adjust, keystroke: **F**

- Adjust the Internal Reference Clock Frequency, range is: -999 to +999.

Circuit ID (Per Demod), keystroke: **I**

- Enter the Circuit Identifier per receive channel for each demodulator:
 - Any text, 24 characters maximum

Recenter Buffer (Per Demod), keystroke: **C**

- Recenter the internal receive data buffer for each demodulator.

Compatibility Mode, keystroke: **A**

- Select one:
 - 1 – CDD-564 Mode
 - 2 – CDD-564A Mode – this mode allows you to set up Dedicated Management Port and 64,000 System Flows.

9.2.2.7 Operations and Maintenance screen

Go to the Operations and Maintenance screen from the Main Menu.

```
Operations and Maintenance

Unit Uptime.....[0 days  0 hours 11 mins  9 secs]
Unit Information.....I
IP Module Boot From.....[Latest].....B
Upgrade To.....[Oldest].....U
Codecast Multicast Address..[239.1.2.4].....M
PARAM Image.....[Image 1].....C
Statistics.....T
Event Log.....E
Database Operations.....D
Reset.....R
Diagnostics.....G
M&C Interface.....F

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Unit Up Time, keystroke: none, read-only

- Shows the elapsed time the unit has been running continuously since its last reboot.

Unit Information, keystroke: I

- Opens the Unit Information screen, which shows details about the unit's operational firmware.
- See Section 9.2.2.7.1.

IP Module Boot From, keystroke: B

- Sets which version of the IP Module firmware will be loaded upon boot-up. This includes Application, FPGA and FFPGA.
 - 0=Latest – Boots the newest firmware package based upon date.
 - 1=Image1 – Boots the firmware package loaded into the first slot in permanent storage.
 - 2=Image2 – Boots the firmware package loaded into the second slot in permanent storage.

Upgrade To, keystroke: U

- Sets which installed firmware package that the IP Module overwrites when upgrading with a new firmware package. This includes Application, FPGA and FFPGA.
 - 0=Oldest – Overwrites the oldest firmware package based upon date.
 - 1=Image1 – Overwrites the firmware package loaded into the first slot in permanent storage.
 - 2=Image2 – Overwrites the firmware package loaded into the second slot in permanent storage.

Codecast Multicast Address, keystroke: **M**

- Configures the IP Multicast Address for the Codecast protocol.
 - Format aaa.bbb.ccc.ddd
 - Range for aaa: 224 through 239
- The IP Module can install the firmware updates on multiple units using the Codecast protocol. This makes upgrading units easier in bigger networks.

PARAM Image, keystroke: **C**

- Identifies the PARAM file that is loaded on bootup.
 - 1=Factory – Uses the internal, hard-coded factory default parameters.
 - 2=PARAM – Last saved Parameter file.

Statistics, keystroke: **T**

- Opens the Statistics Menu.
- See Section 9.2.2.7.2.

Event Log, keystroke: **E**

- Opens the Event Log screen.
- See Section 9.2.2.7.3.

Database Operations, keystroke: **D**

- Opens the administrative Database Operations screen.
- See Section 9.2.2.7.4.

Reset, keystroke: **R**

- Reboots the Unit. This has the same effect as stopping and starting power for the unit.

Diagnostics, keystroke: **G**

- Opens the Diagnostics screen.
- See Section 9.2.2.7.5.

M&C Interface, keystroke: **F**

- Gives you access to the demodulator's available remote commands and queries.
- Once the M&C Interface is selected, a Controller-to-Target remote command or query takes this form at the '#' prompt:
 - Start of Packet '<'
 - Address Delimiter '/'
 - Target Address (1-4 characters, 0001 – 0004)
 - 3-character Instruction Code (e.g., RFQ)
 - Instruction Code Qualifier – Command '=' or Query '?'
- Example: M&C CLI INTERFACE
 - (X=Exit) #<1/RFQ?

- >0001/RFQ=1200.0000
- When finished, type **X** to exit the M&C Interface and go back to the Operations and Maintenance screen.
- See also: Appendix D. CDM/CDD NMCS Remote Product Management Protocol



CAUTION

The M&C Interface is reserved for CEFD use only. It is not intended for customer use.

9.2.2.7.1 Unit Information screen

The Unit Information screen is available from the Operations and Maintenance screen.

```
i
System time is TUE DEC 09 10:40:03 2003

Temperature: 32 Celsius.
Booted using Bulk #1.
Using configuration parameters from PARAM.

Type          | Date      Time | Name                | Rev   | Len
Boot          | 3/09/2015 18:10 | FW-0020900-        | 1.3.1 | 1048576
IP Bulk #1    | 3/09/2015 18:10 | FW-0020894-        | 1.3.1 | 6669716
IP Bulk #2    | 3/09/2015 18:10 | FW-0020894-        | 1.3.1 | 6669716
EVENTLOG      | 12/09/2003 10:28 | eventlog           | 2.1.4 | 30720
PARAM         | 12/09/2003 10:27 | console            | 1.3.1 | 8160

Press Any Key to Continue
```

The screen shows read-only information:

- **System time is**
 - Shows the system time in “DAY MONTH DATE hh:mm:ss YEAR” format
- **Temperature:**
- **Booted using Bulk #X**
 - Shows Image # from which the unit currently boots
 - By default will be the **Latest**, unless “Boot From” is set to **Image #1** or **Image #2**
- **Using configuration parameters from PARAM**
 - Shows PARAM file from which the unit is configured
 - By default, this file is the PARAM file from Flash memory, or Factory Default if no parameter file is found in Flash memory.
 - Type
 - Boot
 - IP Bulk #1

- IP Bulk #2
- EVENTLOG
- PARAM
- Date Time
 - Build Date and Time
- Name
 - CEFD FW#
- Rev
 - Revision #
- Len
 - Size of each FW file



NOTE:

- There is a single Boot FW file.
- The Bulk file contains all of the FW files for the unit. Two slots are available.
- The FPGA files are subsets of the Bulk FW.

EVENTLOG

- Shows the date/time that the EVENTLOG file was last updated.

PARAM

- Shows the date/time that the PARAM1 file was last updated/saved. This also shows what user interface was used to update/save the PARAM file last time.
 - From CLI – shows ‘console’
 - From Web – shows ‘http’
 - From Telnet – shows Telnet user login name
 - From SNMP – shows ‘snmp’

Press any key to return to the previous CLI menu screen.

9.2.2.7.2 Statistics Menu

Go to the Statistics Menu from the Operations and Maintenance screen.

All data shown on this screen updates every 6 seconds automatically.

```
Statistics Menu

IP Statistics.....R
Ethernet Statistics.....E
WAN Statistics (Per Demod).....W
CPU Statistics.....U
VLAN Statistics.....V
Clear all statistics.....C

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

IP Statistics, keystroke: R

- Shows Statistics for IP Routing and allows counters to be reset.
- See Section 9.2.2.7.2.1

Ethernet Statistics, keystroke: E

- Shows Statistics for the Ethernet Port and allows counters to be reset.
- See Section 9.2.2.7.2.2.

WAN Statistics (Per Demod), keystroke: W

- Shows Statistics for the WAN (HDLC) Port for each selected demodulator, and allows counters to be reset.
- See Section 9.2.2.7.2.3

CPU Statistics, keystroke: U

- Shows the CPU usage as a percentage.
- See Section 9.2.2.7.2.4

VLAN Statistics, keystroke: V

- Shows Statistics for the VLAN, in groups of eight.
- See Section 0

Clear all statistics, keystroke: C

- Resets all statistics counters.

9.2.2.7.2.1 IP Statistics screen

Go to the IP Statistics screen from the Statistics Menu.

```

                                Statistics for IP Routing

From Ethernet - Total.....[ 62  ]
To Ethernet   - Total.....[ 0   ]
To Ethernet   - Unicasts...[ 0   ]
To Ethernet   - Multicasts..[ 0   ]
To Ethernet   - Broadcasts..[ 0   ]
From Satellite - Total.....[ 0   ]
From Endstation - Total.....[ 3   ]
To Endstation - Total.....[ 42  ]
Received IGMP Packets.....[ 0   ]
Received IP Options Packets...[ 0   ]
Reset All Counters.....C
Filter/Drop Statistics.....F

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

This screen shows the total numbers of packets routed or dropped in the IP Module.

From Ethernet – Total, keystroke: **none, read-only**

- Shows Ethernet Statistics, Rx Good Frames

To Ethernet - Total, keystroke: **none, read-only**

- Shows Ethernet Statistics, Tx Good Frames

To Ethernet – Unicasts, keystroke: **none, read-only**

- Shows Unicast packets to LAN

To Ethernet – Multicasts, keystroke: **none, read-only**

- Shows Multicast packets to LAN

To Ethernet – Broadcasts, keystroke: **none, read-only**

- Shows Broadcast packets to LAN

From Satellite – Total, keystroke: **none, read-only**

- Shows WAN Statistics, Rx HDLC Packet Count

From Endstation – Total, keystroke: **none, read-only**

- Shows Packets sent from demodulator

To Endstation – Total, keystroke: **none, read-only**

- Shows Packets directed to demodulator

Received IGMP Packets, keystroke: **none, read-only**

- Shows Internet Group Management Packets received (used for management of multicast traffic).

Received IP Options Packets, keystroke: **none, read-only**

- Shows number of IP Options packets received.

Reset All Counters, keystroke: **C**

- Resets all WAN, Ethernet and IP Routing statistics to zero.

Filter/Drop Statistics, keystroke: **F**

- Opens the Filter Statistics screen.
- See Section 0

9.2.2.7.2.1.1 Filter/Drop Statistics screen

Go to the Filter/Drop Statistics screen from the Statistics Menu | IP Statistics screen.

```

                                Filter Statistics

Filtered - Boot.....[ 3  ]
Filtered - Flow Descriptor.....[ 0  ]
Filtered - Unknown Reason Code.....[ 0  ]
Filtered - Flow Correlator.....[ 0  ]
Filtered - Management Path.....[ 0  ]
Filtered - Wan Scaling.....[ 0  ]
Filtered - Ping.....[ 0  ]
Filtered - Access Control.....[ 0  ]
Filtered - Vipersat MCP.....[ 0  ]
Filtered - Vipersat UCP.....[ 0  ]
Filtered - Codeload.....[ 0  ]
Filtered - Multicast.....[ 0  ]
Filtered - Bad Packet.....[ 0  ]
Filtered - Route.....[ 0  ]
Filtered - Vipersat Remote.....[ 0  ]
Filtered - QoS Rule.....[ 0  ]
Filtered - Vipersat Loop.....[ 0  ]
Filtered - Bad Header Len.....[ 0  ]
Filtered - Bad Data Ptr.....[ 0  ]
Filtered - MAC Split Err.....[ 0  ]
Filtered - L3Type Err.....[ 0  ]
Filtered - Local Destination.....[ 0  ]
Filtered - Redundancy Err.....[ 0  ]
Filtered - ICMP Filter.....[ 0  ]
Filtered - Port Err.....[ 0  ]
Filtered - Per port route rule.....[ 0  ]
Filtered - VLAN Mismatch.....[ 0  ]
Filtered - VLAN Tag/Untagging Failed..[ 0  ]
Filtered - Dedicated Mgmt Access.....[ 0  ]
Filtered - Total.....[ 3  ]
Dropped - Bad IP Header Checksum.....[ 0  ]
Dropped - Bad Buffer Length.....[ 0  ]
Dropped - Bad IP Version.....[ 0  ]
Dropped - TTL Expired.....[ 0  ]
Dropped - No Route.....[ 20 ]
Dropped - No ARP Entry.....[ 0  ]
Dropped - Filtered Multicast.....[ 0  ]
Dropped - Multicast Disable Group....[ 0  ]
Dropped - Router Queue Full.....[ 0  ]
Dropped - Total.....[ 20  ]
Reset All Counters.....C

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
  
```

This read-only screen shows the total number of packets filtered or dropped in the IP Module.

Filtered – Boot

- Packets are filtered while booting.

Filtered – Flow Descriptor

- Packets are filtered because of a Multicast packet classified as UNICAST packet.

- Packets are filtered because an Off-line modem is receiving packets from WAN port.

Filtered – Unknown Reason Code

- Packets dropping because of reasons unknown

Filtered – Flow Correlator

- Packets are filtered because of incorrect establishment of SAT-to-SAT traffic. This counter is seen typically on the out-bounding Hub modem in point-to-multipoint setup.

Filtered – Management Path

- Not used.

Filtered – WAN Scaling

- Internal Error occurred during WAN scaling sub process in processing packet.

Filtered – Ping

- Ping packets were received but PING feature was disabled.

Filtered – Access Control

- Packets are received while “Access List” control is enabled but IP address does not match the access list database.

Filtered – Vipersat MCP

- Internal Error occurred while processing Vipersat Multi command messages.

Filtered – Vipersat UCP

- Internal Error occurred while processing Vipersat Uni-command messages.

Filtered – Codeload

- Internal error occurred while processing Codeload messages.

Filtered – Multicast

- A multicast packet is received but there is no application associated with it.

Filtered – Bad Packet

- Malformed packet is received. This may be due to internal or external error.

Filtered – Route

- Applies to Vipersat Remote only – when a packet is received from the WAN and the Route Table contains a route to transmit that packet to the WAN, the packet will be filtered to prevent a routing loop.

Filtered – Vipersat Remote

- Packet filtered due to QoS Rule configured to filter.

Filtered – QoS Rule

- Packet filtered due to QoS Rule configured to filter.

Filtered – Vipersat Loop

- Packet filtered due to Vipersat loop (a modem configured as a Vipersat Remote Expansion unit and default route set to 0.0.0.0/0).

Filtered – Bad Header Len

- Filtered due to packets received with less than 14 bytes of L2 header.

Filtered – Bad Data Ptr

- Internal error occurred while accessing the packet data.

Filtered – MAC Split Err

- Not currently used.

Filtered – L3Type Err

- Not currently used.

Filtered – Local Destination

- Packet received with destination MAC as modem MAC and destination IP is not modem IP while modem is operating in bridge mode (EasyConnect)

Filtered – Redundancy Err

- Applies to Offline modem in 1:1 Redundancy
- Packets will be received on the WAN port by the both Offline unit and Online unit, only Online unit is allowed to forward the packets. Indicates packets received by Offline unit from WAN port that were filtered because unit is Offline.

Filtered – ICMP Filter

- This is the same as “Filtered Ping”, except this will update in easyConnect mode.

Filtered – Port Err

- Non-IP or ARP packets are targeted to End-station. (End-station will not allow any non-IP packets.)

Filtered – Per port route rule

- In 1:1 Redundancy Easy connect mode – a packet received with modem destination MAC, but the IP does not match the traffic IP or management IP.
- In Router mode - per port WAN filtered mode is ON.

Filtered – VLAN Mismatch

- VLAN brouter mode, if the incoming packet’s VLAN ID is not matched to the VLAN table.

Filtered – VLAN Tag/Untagging Failed

- Packets that the VLAN tag can be removed from or added to the packet (internal processing errors).

Filtered – Dedicated Mgmt Access

- Packets dropped because of invalid physical ingress port and packet type association. Example: Packet from Traffic Port trying to access the Management subnet is restricted and filtered.

Filtered – Total

- Total Filtered Packets

Dropped – Bad IP Header Checksum

- Total Dropped Packets due to incorrect IP Header Checksum.

Dropped – Bad Buffer Length

- IP length (as specified in packet header) was greater than payload received in the Ethernet packet. This would indicate the packet was truncated before arriving).

Dropped – Bad IP Version

- Total Dropped IP Version 6 Packets (IP Module only supports IP Version 4).

Dropped – TTL Expired

- Total Dropped Packets due to Time To Live counter expired (TTL limits the number of hops, or seconds, before a packet reaches it's destination).

Dropped – No Route

- Total Dropped Packets due to no Route for the destination in the IP Module Route Table. These are packets that are directed to the IP Module's MAC address and the IP Module will reply to the sender with a ICMP 'Destination net unreachable' message.

Dropped - No ARP Entry

- Total Dropped Packets due to no ARP entry in IP Module ARP Table. For example, if a IP Module receives packets from the satellite for a host that is not in the ARP table, the IP Module will send an ARP request. If there is no response, the packets will be dropped.

Dropped – Filtered Multicast

- Total Dropped Multicast Packets received from the satellite due to no SAT→LAN or

Dropped – Multicast Disable Group

- Multicast packet was dropped because, although route existed, IGMP is being used, and there is no client requesting forwarding of this traffic or due to a IGMP "leave group" message.

Dropped – Router Queue Full

- Indicates that the router task is dropping packets due to being full. Represents a graceful drop process when the processor performance is being overdriven.

Dropped – Total

- Total Dropped Packets

Reset All Counters, keystroke: C

- Type **C** to reset all WAN, Ethernet and IP Routing statistics to zero.

9.2.2.7.2.2 Ethernet Statistics screen

Go to the Ethernet Statistics screen from the Statistics Menu. These read-only screens show the total number of IP packets received from and sent to the Ethernet interface.

```

                                Ethernet Statistics

Ethernet Port.....[Traffic Port].....P
Total Pkts Received....[      82]
Rx Unicast Pkts.....[       0]
Rx Broadcast Pkts.....[      50]
Rx Multicast Pkts.....[      32]
Rx Pause Frames.....[       0]
Bytes Received.....[   13153]
Total Receive Errors....[       0]
Rx Current Data Rate....[       0]
Rx Average Data Rate....[       0]
Rx Maximum Data Rate....[       9]
Rx Current Pkt Rate....[       0]
Rx Average Pkt Rate....[       0]
Rx Maximum Pkt Rate....[       8]

                                Press Any Key to Continue
```

```

Total Pkts Transmitted..[       0]
Tx Unicast Pkts.....[       0]
Tx Broadcast Pkts.....[       0]
Tx Multicast Pkts.....[       0]
Tx Pause Frames.....[       0]
Bytes Transmitted.....[       0]
Tx Current Data Rate....[       0]
Tx Average Data Rate....[       0]
Tx Maximum Data Rate....[       0]
Tx Current Pkt Rate....[       0]
Tx Average Pkt Rate....[       0]
Tx Maximum Pkt Rate....[       0]

                                Press Any Key to Continue
```

```

Rx FCS Error.....[       0]
Rx Alignment Error.....[       0]
Rx Undersize.....[       0]
Rx Fragments.....[       0]
Rx Jabber.....[       0]
Rx Oversize.....[       0]
Rx Discards.....[       0]
Tx Single Collision....[       0]
Tx Multiple Collision...[       0]
Tx Excessive Collision..[       0]
CLEAR.....C

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

Ethernet Port, keystroke: **P**

- Select which port (1 Traffic, 2 Management, 3 WAN) for which the Ethernet statistics are shown

Total Pkts Received

- Shows total number of bytes received by this Ethernet interface.

Rx Unicast Pkts

- Number of Unicast Ethernet packets received

Rx Broadcast Pkts

- Number of broadcast Ethernet packets received

Rx Multicast Pkts

- Number of multicast Ethernet packets received

Rx Pause Frames

- Number Ethernet Pause frames received

Bytes Received

- Total number of bytes received

Total Receive Errors

- Total number of packets received with errors

Rx Current Data Rate

- Current receive data rate

Rx Average Data Rate

- Average receive data rate

Rx Maximum Data Rate

- Maximum receive data rate

Rx Current Pkt Rate

- Current rate of received packets per second

Rx Average Pkt Rate

- Average rate of received packets per second

Rx Maximum Pkt Rate

- Maximum rate of received packets per second

Total Pkts Transmitted

- Total number of packets transmitted

Tx Unicast Pkts

- Total number of Unicast packets transmitted

Tx Broadcast Pkts

- Total number of Broadcast packets transmitted

Tx Multicast Pkts

- Total number of Multicast packets transmitted

Tx Pause Frames

- Number Ethernet Pause frames transmitted

Bytes Transmitted

- Total number of bytes transmitted

Tx Current Data Rate

- Current transmit data rate

Tx Average Data Rate

- Average transmit data rate

Tx Maximum Data Rate

- Maximum transmit data rate

Tx Current Pkt Rate

- Current rate of transmitted packets per second

Tx Average Pkt Rate

- Average rate of transmitted packets per second

Tx Maximum Pkt Rate

- Maximum rate of transmitted packets per second

Rx FCS Error

- Shows number of aligned frames discarded due to an FCS error

Rx Alignment Error

- Shows number of frames that are both misaligned and contain an FCS error

Rx Undersize

- Total frames received with a length of less than 65 octets but with a valid FCS

Rx Fragments

- Total frames received with a length of less than 65 octets and with an invalid FCS

Rx Jabber

- Total frames received with a length of more than maxsize octets but with an invalid FCS

Rx Oversize

- Total frames received with a length of more than maxsize octets but with a valid FCS

Rx Discards

- Shows number of frames discarded

Tx Single Collision

- Shows number of transmitted frames that encountered only one collision

Tx Multiple Collision

- Shows number of transmitted frames that encountered more than one collision

Tx Excessive Collision

- Shows number of transmitted frames that encountered 16 consecutive collisions

CLEAR, keystroke: **C**

- Type **C** to reset all Ethernet statistics to zero.

9.2.2.7.2.3 WAN Statistics screen

Go to the WAN Statistics screen from the Statistics Menu.

```

                                WAN Statistics (Per Demod)

WAN Rx Bad Addr Count.....[0      ]
WAN Rx Pkt Proc CRC Error Count.....[0      ]
WAN Rx Abort/Octet Error Count.....[0      ]
WAN Rx Overrun Count.....[0      ]
WAN Rx HDLC CRC Error Count.....[0      ]
WAN Rx HDLC Payload Bytes.....[0      ]
WAN Rx HDLC Header Bytes.....[0      ]
WAN Rx HDLC Packet Count.....[0      ]
WAN Rx Err Invalid Flow Id.....[0      ]
WAN Rx Err SAR Reassemble.....[0      ]
WAN Rx Err Hdr Decomp.....[0      ]
WAN Rx Err Mem Alignment.....[0      ]
WAN Rx Err Bad Crc.....[0      ]
WAN Rx DMA Reclaim.....[0      ]

..

CLEAR.....C

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

This read-only screen shows the total number of IP packets received from and sent to the Ethernet Interface. These statistics are given for each Demodulator [**Receive Channel**], as set by the **Demod Select** option, which you must select first.

WAN Rx Bad Addr Count

- The count of received frames that did not match any of the 4 HDLC addresses or the broadcast address, configured for this Receive channel

WAN Rx Pkt Proc CRC Error Count

- Count of received frames that failed packet processor CRC check.

WAN Rx Abort/Octet Error Count

- Count of aborted frames and octet error frames.

WAN Rx Overrun Count

- Count of received frames that exceeded max frame length of 2K bytes in length (Or) overflowed the HDLC buffer.

WAN HDLC CRC Error Count

- Number of received frames that failed HDLC CRC check.

WAN Rx HDLC Payload Count

- The count of payload bytes that were received over satellite link excluding any frame overhead.

WAN Rx HDLC Header Count

- The count of HDLC header bytes received over satellite link including control, HDLC address, Flow ID, and CRC.

WAN Rx HDLC Packet Count

- Number of packets received over satellite link.

WAN Rx Err Invalid Flow Id

- Number of packets which the flow identifier has been corrupted, does not fall into the range of acceptable values.

WAN Rx Err SAR Reassemble

- Number of packets unable to correctly reassemble a segmented packet.

WAN Rx Err Hdr Decomp

- Number of packets unable to correctly decompress the header information. A mismatch in header compression on the Transmit and Receive sides can trigger this count.

WAN Rx Err Mem Alignment

- Number of packets discarded (caused by memory corruption).

WAN Rx Err bad CRC

- Number of corrupted packets indicated by CRC check.

WAN Rx DMA Reclaim

- Number of times ran out of buffer descriptors to store the received packets.

WAN Tx DMA Reclaim

- Number of times ran out of buffer descriptors to store the transmitted packets.

CLEAR, keystroke: C

- Type **C** to reset all WAN statistics to zero for the selected demodulator.

9.2.2.7.2.4 CPU Statistics screen

Go to the CPU Statistics screen from the Statistics Menu.

```
                                CPU Statistics

CPU Usage (% Percentage) .. [6]

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
█
```

CPU Usage (% Percentage), keystroke: **none, read-only**

- Shows the CPU usage as a percentage.

9.2.2.7.2.5 VLAN Statistics screen

Go to the VLAN Statistics screen from the Statistics Menu.

This screen shows data only when the unit is in one of the router modes and VLAN Brouter Mode is [Enabled].

VLAN Statistics						
	ID	to-WAN	from-WAN	to-Eth	from-Eth	
VLANStat01.....	[1	0	0	0	0]	1
VLANStat02.....	[1	0	0	0	0]	2
VLANStat03.....	[UNKNOWN]					3
VLANStat04.....	[UNKNOWN]					4
VLANStat05.....	[UNKNOWN]					5
VLANStat06.....	[UNKNOWN]					6
VLANStat07.....	[UNKNOWN]					7
VLANStat08.....	[UNKNOWN]					8
From Management VLAN..	[0					
To Management VLAN...	[0					
Clear.....						C
Base.....	[1]					B
Demod Select.....	[1]					Z
Save Parameters to permanent storage.....						S
Exit.....						X

VLANStatXX, keystroke: **none, read-only**

- Shows the VLAN Statistics in groups of eight (8).

From Management VLAN, keystroke: **none, read-only**

- VLAN ID to be used for accessing modem M&C

To Management VLAN, keystroke: **none, read-only**

- VLAN ID to be used for accessing M&C network nodes (PC)

Clear, keystroke: **C**

- Resets all VLAN Statistics.

Base, keystroke: **B**

- Sets which group of up to 8 consecutive statistics to show. Enter the first number the group of eight as the Base starting number.
 - For example: To see VLANStat25 through VLANStat32, enter a Base value of 25.

9.2.2.7.3 Event Log screen

Go to the Event Log screen from the Operations and Maintenance screen.

```
Event Log

Logging Feature..[Enabled].....F
Logging Level...[All Information].....E
View Log.....V
Clear Log.....C

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

Use this screen to capture all IP Module events to a log.

Logging Feature, keystroke: **F**

- Switches between **[Enabled]** or **[Disabled]**

Logging Level, keystroke: **E**

- Select the logging level:
 - 1 – Errors Only
 - 2 – Errors and Warnings
 - 3 – All Information

View log, keystroke: **V**

- See the log of most recent events. Press any key to scroll through the events, or press **ESC** to exit the log.

```
v
Type Date Time Category Description
-----
Infor 12/09/2003 10:28:22 Boot Configuring router using PARAM file
Infor 12/09/2003 10:28:22 Boot System booted at TUE DEC 09 10:28:19 2003
Infor 12/09/2003 10:27:37 Boot Reboot - User Requested
Infor 12/09/2003 10:27:37 Database Write PARAM file to flash
Infor 12/09/2003 10:03:50 Boot Configuring router using PARAM file
Infor 12/09/2003 10:03:50 Boot System booted at TUE DEC 09 10:03:47 2003
Infor 12/08/2003 17:06:41 Boot Configuring router using PARAM file
Infor 12/08/2003 17:06:41 Boot System booted at MON DEC 08 17:06:38 2003
Infor 12/02/2003 15:55:15 Boot Configuring router using PARAM file
Infor 12/02/2003 15:55:15 Boot System booted at TUE DEC 02 15:55:12 2003
Infor 12/02/2003 15:54:31 Boot Reboot - User Requested
Infor 12/02/2003 15:54:31 Database Write PARAM file to flash
Infor 12/02/2003 15:42:36 Database Traffic IP fetch new IP = 192.168.2.20
Infor 12/02/2003 15:21:14 Boot Configuring router using PARAM file
Infor 12/02/2003 15:21:14 Boot System booted at TUE DEC 02 15:21:11 2003
Infor 11/27/2003 14:37:28 Database Write PARAM file to flash
Infor 11/27/2003 14:37:24 Boot Configuring router using PARAM file

Press Any Key to Continue
```

- All events show this data:
 - Type – Error, Warning, or Information
 - Date/Time – Note: During Bootup, multiple Boot Events will be created, but a Date/Time will only be seen when the Bootup has completed.
 - Category – Boot, Database, FTP logins, upgrade file transfers, Ethernet Link status change.
 - Description – Event details

Clear log, keystroke: **C**

- Type **C** to delete the contents of the log.

9.2.2.7.3.1 FTP Retrieval of the Event Log file

You can retrieve the full Event log file by FTP. Retrieve this file via FTP by specifying the filename **param1**.

Using the Admin-level login, type the command **get eventlog**.

Use a text viewer to see the retrieved Event log. This example is similar to the data you will see:

```
54      Information      05/21/2004 10:12:04 C:/Comtech/ftp/ftpCallbacks.c
1041    FTP                FTP Connected - 'User: comtech' logged in
53      Information      05/21/2004 09:07:40 C:/Comtech/cimmib/cimMib.c
520     Database          Set system clock to FRI MAY 21 09:07:40 2004
52      Information      Unknown      Unknown    C:/Comtech/startup/usrAppInit.c
534     Boot              Configuring router using PARAM file
51      Information      Unknown      Unknown    C:/Comtech/startup/usrAppInit.c
364     Boot              Detected Framer Module II.
50      Information      05/21/2004 08:57:42 C:/Comtech/cimmib/cimMib.c
520     Database          Set system clock to FRI MAY 21 08:57:42 2004
49      Information      Unknown      Unknown    C:/Comtech/startup/usrAppInit.c
534     Boot              Configuring router using PARAM file
48      Information      Unknown      Unknown    C:/Comtech/startup/usrAppInit.c
364     Boot              Detected Framer Module II.
47      Information      05/21/2004 08:13:02 C:/Comtech/ftp/ftpCallbacks.c
180     FTP                Disconnected FTP
46      Information      05/21/2004 07:58:06 C:/Comtech/ftp/ftpCallbacks.c
540     FTP                FTP Transfer complete
45      Information      05/21/2004 07:58:04 C:/Comtech/ftp/ftpCallbacks.c
863     FTP                Image has been saved to FLASH
44      Information      05/21/2004 07:57:40 C:/Comtech/ftp/ftpCallbacks.c
1041    FTP                FTP Connected - 'User: comtech' logged in
43      Information      05/21/2004 06:55:14 C:/Comtech/telnetd/telnetd.c
421     Telnet             Telnet disconnected
42      Information      05/21/2004 06:54:26 C:/Comtech/telnetd/telnetd.c
385     Telnet             Connected host 10.6.6.94
41      Information      05/21/2004 06:38:02 C:/Comtech/ftp/ftpCallbacks.c
180     FTP                Disconnected FTP
40      Information      05/21/2004 06:23:07 C:/Comtech/ftp/ftpCallbacks.c
540     FTP                FTP Transfer complete
39      Information      05/21/2004 06:23:06 C:/Comtech/ftp/ftpCallbacks.c
863     FTP                Image has been saved to FLASH
38      Information      05/21/2004 06:22:43 C:/Comtech/ftp/ftpCallbacks.c
1041    FTP                FTP Connected - 'User: comtech' logged in
```

9.2.2.7.4 Database Operations screen

Go to the Database Operations screen from the Operations and Maintenance screen.

```
Database Operations

Restore Factory Defaults.....R
Load Parameters from permanent storage.....P
Automatically Save PARAM after CONFIG change..[Yes].....A

Demod Select.....[1].....Z
Save Parameters to permanent storage.....S
Exit.....X
```

The User Configuration File allows you to overwrite the values set in the Factory Configuration File, or to customize a demodulator without deleting the factory-set operating parameters. Use this screen to see, save or erase an existing User Configuration File for the demodulator.

The demodulator uses these files to initialize when power is set on.

Restore Factory Default, keystroke: **R**

- Restores the demodulator settings to “safe” values as set by the factory.

Load Parameters from permanent storage, keystroke: **P**

- Overwrites the current configuration of the demodulator with the configuration last saved to permanent storage.
- If the demodulator is put into an undesirable state, use **P** to “undo” the configuration change.



CAUTION

This “undo” function works only if the undesirable configuration was not saved.

Automatically Save PARAM after CONFIG change, keystroke: **A**

- Switches between [Yes] or [No]
- Retrieve this file if using FTP. See Section 9.2.2.7.3.1, FTP Retrieval of the Event Log file.

9.2.2.7.5 Diagnostics screen



CAUTION

Do not use the Dump Packets Diagnostics Utilities when the demodulator is on a live network.

Go to the Diagnostics screen from the Operations and Maintenance screen.

```

                                Diagnostics Page

Dump Packets received from Satellite Interface... [No] .....R
Dump Packets transmitted to Ethernet Interface... [No] .....U
Dump Packets received from Ethernet Interface... [No] .....V
Dump Packets received by Router..... [No] .....B
Dump Packets sent to EndStation..... [No] .....G
Dump Packets received from EndStation..... [No] .....H
Ping..... P
Traceroute..... A
Command Line Debug Prompt..... D

Demod Select..... [1] .....Z
Save Parameters to permanent storage..... S
Exit..... X

```

The Dump Packet Utilities shows a hexadecimal representation of each packet. You must not use it when the demodulator is on a live network.

Dump Packets received from Satellite Interface, keystroke: R

- Switches between [Yes] or [No].
- [Yes] causes the IP Module to dump a hexadecimal representation of each packet that it receives from the Satellite Interface.
- [No] stops a packet dump in progress.

Dump Packets transmitted to Ethernet Interface, keystroke: U

- Switches between [Yes] or [No].
- [Yes] causes the IP Module to dump a hexadecimal representation of each packet that is transmitted to the Ethernet Interface.
- [No] stops a packet dump in progress.

Dump Packets received from Ethernet Interface, keystroke: V

- Switches between [Yes] or [No].
- [Yes] causes the IP Module to dump a hexadecimal representation of each packet that it receives from the Ethernet Interface.
- [No] stops a packet dump in progress.

Dump Packets received by Router, keystroke: **B**

- Is not applicable when in easyConnect™ mode.
- Switches between **[Yes]** or **[No]**.
- **[Yes]** causes the IP Module to dump a hexadecimal representation of each packet that is received by the routing engine.
- **[No]** stops a packet dump in progress.

Dump Packets sent to EndStation, keystroke: **G**

- Switches between **[Yes]** or **[No]**.
- **[Yes]** causes the IP Module to dump a hexadecimal representation of each packet that is received or destined for the demodulator only.
- **[No]** stops a packet dump in progress.

Dump Packets received from EndStation, keystroke: **H**

- Do this to see what type of packets this unit generates internally.
- Switches between **[Yes]** or **[No]**.
- **[Yes]** causes the IP Module to dump a hexadecimal representation of each packet that is sourced from this unit and destined for some other device.
- **[No]** stops a packet dump in progress.

Ping, keystroke: **P**

- Enter the IP address in aaa.bbb.ccc.ddd format to ping on the same subnet as CDD-56x unit.

Traceroute, keystroke: **A**

- Enter the IP address in aaa.bbb.ccc.ddd format

Command Line Debug Prompt, keystroke: **D**

- Enter the password to access the debug command line.



CAUTION

This **Command Line Debug Prompt** option is reserved for use by qualified Comtech personnel only.

Chapter 10. HTTP Web Interface

Web pages shown in this chapter are examples of the HTTP Web Interface. Web pages shown are examples only.

10.1 Introduction

You can fully monitor and control a CDD-56xAL with a user-supplied web browser and the embedded HTTP Web Interface. The HTTP Web Interface works best with Microsoft's Internet Explorer Version 6.0 or higher.

10.1.1 Open the HTTP Web Interface

Type the CDD-56xAL IP Address into the Address area of the user-supplied web browser:



The Login window opens and prompts you to type a User name and Password.



The default user names and passwords are:

Admin:	comtech/comtech
Read/Write:	opcenter/1234
Read Only:	monitor/1234

User accessibility levels are:

- Admin User - Full Access, all web pages
- Read/Write User - No Access to Admin web pages, Full Access all other web pages
- Read Only User - No Access to Admin web pages, Read Access all other web pages

10.1.2 Navigation

This manual uses a convention to show the depth of navigation required to open a referenced page:

Top Level Tab | Page Tab | Page Tab

For example: **Home** | **Contact** means click the top-level **Home** tab, then click the secondary **Contact** page tab.



10.1.3 Page Sections

Each web page is divided into sections. A page can have one section, or multiple sections. The title for a page section tells you something about its content.



10.1.4 Action Buttons

A page or page section can have one or multiple action buttons. The label on an action button describes its function. Examples: **Submit**, **Refresh**, etc.



All action buttons either:

- Save the configuration changes to Flash memory.

- or -

- Cause an update of the page's visible contents.

Configuration changes generally do not take effect until the changes have been saved to Flash memory.



NOTE: Always make sure to click the action button before you open another web page. If the action button is not clicked first, changes are lost when you open a different web page.

10.1.5 Drop-down menus

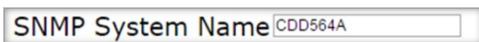
Drop-down menus show the selections available for a specific setting.



Move the cursor to the drop-down tab, and then click the tab. The drop-down opens and shows a list of the available settings. Move the cursor to the correct setting, and then left-click to select that setting.

10.1.6 Text Boxes

Use text boxes to enter alphanumeric data.



Click inside the text box. Type the data. Press **Enter** when done.

10.2 HTTP Web Interface Page Hierarchy

The HTTP Web Interface has multi-level navigation tabs. In this diagram, the top level tabs are shown in blue at the top of the columns. Second and third level tabs are listed under their top level tabs:

Home	Admin	Configuration	Status
Home	Access	Demod*	Demod Status*
Contact	SNMP	LAN*	System Logs*
	Working Mode	ARP	Events Log*
	Features*	Routing	Statistics Log*
	Firmware	Routes	Unit Info
	FAST	IGMP	Traffic Statistics
	Save	WAN*	Ethernet
	Reboot	Decryption*	Router
		HDLC*	WAN*
		Utilities*	Clear Counter
		LNB*	Performance

Table 10-1. CDD-564A/L HTTP Web Interface Page Hierarchy

Most of the pages are system-level; that is, applicable to operations for the whole unit.

* Pages that have the demodulator selection function; parameter settings are for the selected demodulator.



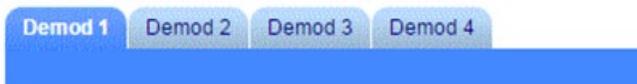
NOTE: The LNB page is available only for L-Band demodulators.

10.2.1 Select a Demodulator

The CDD-562AL HTTP Web Interface pages have two demodulator channels available.

The CDD-564A/L HTTP Web Interface pages have four demodulator channels available.

Some web pages require you to select a demodulator channel number before using the functions of that page. Any changes you make are applicable to the selected demodulator only. This demodulator selection has no effect on system-level web pages.



10.3 Home pages

10.3.1 Home | Home

Click the **Home** tab from any location in the HTTP Web Interface to return to this top-level page.



Figure 10-1. CDD-56xAL Home page example

10.3.2 Home | Contact

Use this page to see contact information for Comtech EF Data.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Contact

Home Admin Configuration Status

Home Contact

VIA	Sales	Service
	sales@comtechefdata.com	esc@comtechefdata.com
	(480) 333-2177	1-866-472-3963
	(480) 333-2540	(480) 333-2500

For product information online, please visit our website at : www.comtechefdata.com

Now available on CD-ROM:

- Product Data Sheets
- Software Demos
- Application Notes
- Manuals
- Contact information, and more

To request a CD-ROM, call (480) 333-2473 or email: sales@comtechefdata.com

Figure 10-2. Home | Contact page

10.4 Admin (Administrative) pages

The Admin | Access page is available for the Administrator login only.

The Administrator uses these pages to see and set up user names, passwords, the email server and the host IP Addresses. These are required for communication with the HTTP Web Interface.

10.4.1 Admin | Access

Use this page to set up and maintain the parameters required for communication with the HTTP Web Interface.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Access

Home Admin Configuration Status
Access SNMP Working Mode Features Firmware FAST Save Reboot

System Account Access Information

Admin Name Admin Password
Read/Write Name Read/Write Password
Read Only Name Read Only Password

Host Access List

Access List **Be sure to include yourself!**
IP 1 / Mask / IP 2 / Mask /
IP 3 / Mask / IP 4 / Mask /

Figure 10-3. Admin | Access page

System Account Access Information

Admin, Read/Write, Read Only Names and Passwords

The factory defaults are:

Admin	comtech/comtech
Read/Write	opcenter/1234
Read Only	monitor/1234

The **Name** and **Password** fields accept any alphanumeric combination with a maximum length of 10 characters.

Host Access List

IP (#) / Mask

The **Host Access List** sets which remote clients can connect when the Access List is Enabled.

Each entry sets an IP address and a subnet mask to define a unique class of machines that are allowed access.

For example, to give access rights to a PC that has an IP Address of 10.10.10.1 and to any PC on a subnet of 192.168.10.xxx, then the Access List is defined as:

IP 1 / Mask: 10.10.10.1/32

IP 2 / Mask: 192.168.10.0/24

An IP address of 0.0.0.0 means the Access List is not defined or is not applicable.

Access List:

Use the **Access List** to give access rights via HTTP and SNMP to a set list of client machines. From the drop-down list, select **Enable** or **Disable**.



CAUTION

If the **Access List** is **Disabled**, then any client machine can connect via HTTP and SNMP.

When ready, click **Submit Access** to save and activate these changes.



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

10.4.2 Admin | SNMP

The Admin | SNMP page is available for the Administrator login only.

Use this page to set administration parameters for the Simple Network Management Protocol (SNMP).

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: SNMP

Home Admin Configuration Status
Access SNMP Working Mode Features Firmware FAST Save Reboot

SNMP

Simple Network Management

Authentication Trap

Read Community String Trap IP 1

Write Community String Trap IP 2

SNMP System Contact

Trap Version

SNMP System Name Trap Community String

SNMP System Location

Submit SNMP

Figure 10-4. Admin | SNMP page



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

SNMP

Simple Network Management

Click **Enabled** or **Disabled**.

Read, Write, Trap Community Strings

Each Community String can have a minimum of 0, to a maximum of 20, alphanumeric characters.

The factory defaults for these strings are:

- **Read Community String** **public**
- **Write Community String** **private**
- **Trap Community String** **comtech**

SNMP System Contact, SNMP System Name, SNMP System Location

Enter the SNMP System contact data.

Authentication Trap

Click **Enabled** or **Disabled**.

Trap IP 1, Trap IP 2

Enter these SNMP addresses.

Trap Version

Use the drop-down list to select **SNMPv1** or **SNMPv2**.

When finished, click **Submit SNMP** to save and activate these changes.

10.4.3 Admin | Working Mode

Use this page to set the Working Mode for the active demodulator.

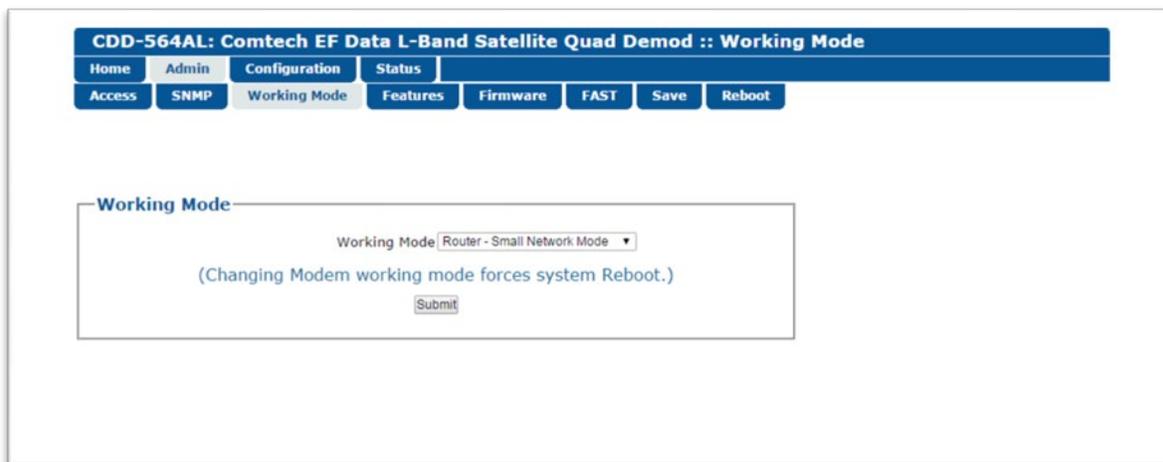


Figure 10-5. Admin | Working Mode page

Working Mode

Select an available Working Mode, and then click **Submit**.

- **Router – Small Network Mode:** Small Network Mode supports up to 255 remotes, as allowed using HDLC addressing. Select this mode to set the demodulator to be on independent IP subnets; this mode requires adding static routes to pass traffic between them.

- **Router – Large Network Mode:** This mode is similar to Small Network Mode, the exception being that a maximum of 32,766 remotes are allowed on a single shared satellite outbound carrier.
- **Router – Point-to-Point Mode:** Select for use in a Point-to-Point SCPC link where there are different IP subnets on either side of the link.
- **Router – Vipersat Mode:** See Comtech EF Data publication MN/22137 – Vipersat CDD-56xAL Series Satellite Network Demodulator Router User Guide

10.4.4 Admin | Features

Use this page to set operating parameters for the demodulator’s standard and optional features.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Features

Home Admin Configuration Status Access SNMP Working Mode **Features** Firmware FAST Save Reboot

Features - Standard

Telnet Downlink Route All Available Multicast

Ping Reply LAN-to-LAN Routing

Payload Comp Type Number of System Flows

Telnet Timeout minutes (1-60)

Web Auto Logout Time minutes (0-15; 0 disables Auto Logout)

Features - Optional

IGMP

Vipersat STDMA

Vipersat File Streamer

Vipersat Management

Vipersat Auto Switching

Rx Header Decompression

Demod 1 Demod 2 Demod 3 Demod 4

L2 Rx Header Decompression

L3/L4/L5 Rx Header Decompression

Figure 10-6. Admin | Features page

Features – Standard

Telnet

Select **Enable** or **Disable**.

Ping Reply

Select **Enable** or **Disable**.

Payload Comp Type

Select **ALDC**.

Telnet Timeout

Enter a number of minutes. Range is 1 through 60.

Downlink Route All Available Multicast

Select **Enable** or **Disable**.

LAN-to-LAN Routing

Select **Enable** or **Disable**.

Number of System Flows

Select a number:

- 20,000
- 64,000

Web Auto Logout Time

Enter a number of minutes. Range is 0 through 15. A value of 0 disables **Web Auto Logout Time**.

When finished, click **Submit** to save and activate these changes.

Features – Optional

For each of these optional features, select **Enable** or **Disable** from the drop-down list:

- **IGMP**
- **Vipersat STDMA**
- **Vipersat File Streamer**
- **Vipersat Management**
- **Vipersat Auto Switching**

If a feature is not available, its drop-down list does not work.

When finished, click **Submit** to save and activate these changes.

Rx Header Decompression

For the selected demodulator, set these parameters:

L2 RX Header Decompression

Select **Enabled** or **Disabled**.

L3/L4/L5 RX Header Decompression

Select **Enable** or **Disable**.

When finished, click **Submit** to save and activate these changes.



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

10.4.5 Admin | Firmware

This page shows the firmware data for the installed images. Use it to change the Boot From firmware image and to upgrade to a different firmware image.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Packet Processor Firmware						
Home	Admin	Configuration	Status			
Access	SNMP	Working Mode	Features	Firmware	FAST	Save Reboot
Firmware						
Bootrom	Boot		2/20/2015 14:10		FW-0020900-	1.3.1r 1048576
Image 1	IP Bulk #1		2/20/2015 14:10		FW-0020894-	1.3.1r 6689912
Image 2	IP Bulk #2		2/20/2015 14:10		FW-0020894-	1.3.1r 6689912
Software Revision	<input type="text" value="1.3.1r"/>					
Boot From	Latest ▾					
Upgrade To	Oldest ▾					
<input type="button" value="Submit"/>						

Boot From

Select the Boot From firmware image:

- Latest
- Image 1
- Image 2

Upgrade To

Select the firmware image to upgrade to:

- Oldest
- Image 1
- Image 2

10.4.6 Admin | FAST

Use this page to enter purchased FAST codes to activate new FAST options. See also: Appendix C. FAST Activation Procedure.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: FAST	
Home	Admin
Configuration	Status
Access	SNMP
Working Mode	Features
Firmware	FAST
Save	Reboot

FAST code	
Register 1	<input type="text"/> <input type="button" value="Submit"/>
Register 2	<input type="text"/> <input type="button" value="Submit"/>

Equipment ID	
Serial Number:	
Modem model number:	CDD-564AL
Data Rate option:	Up to 10239 kbps
8PSK/8QAM option:	Installed
16QAM option:	Installed
Turbo option:	Turbo Installed
VersaFEC option:	Installed
Rolloff option:	Installed
Rx 3xDES Decryption:	Installed
Rx Header Compression option:	Installed
Rx Payload Compression option:	Installed
Vipersat option:	Installed
Vipersat File Streamer option:	Installed

FAST Code

Register 1

Enter the purchased FAST code applicable for Register 1, then click **Submit** to save the code to the register.

Register 2

Enter the purchased FAST code applicable for Register 2, then click **Submit** to save the code to the register.

Equipment ID

This read-only section shows the modem's model number and installed FAST features.

10.4.7 Admin | Save

Use this page to save all configuration changes made during this session to Flash memory.

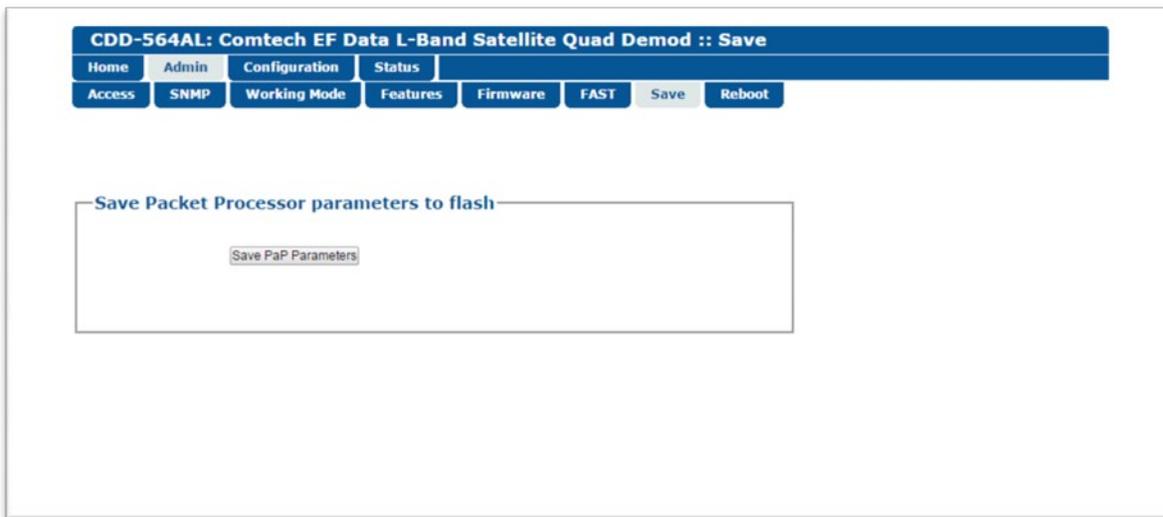


Figure 10-7. Admin | Save page

Click **Save PaP Parameters** to save the configuration changes to Flash memory.

These updates are permanent until you start and save a new batch of settings changes.



Any changes made to the demodulators will be lost upon reset or power loss, unless the changes are saved to permanent storage. This applies to all of the demodulator and IP parameters.

10.4.8 Admin | Reboot

Use this page to cause the demodulator to reboot immediately.



Figure 10-8. Admin | Reboot page

10.5 Configuration pages

10.5.1 Configuration | Demod

Use this page to see and set up demodulator (Rx) operating parameters for each demodulator. See also: Chapter 9. Telnet and CLI Operation.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Demod Configuration

Home Admin Configuration Status
Demod LAN ARP Routing WAN Utilities LNB

Demod 1 Demod 2 Demod 3 Demod 4

Receive

Frequency	1200.0000	MHz	FEC Type	VersaFEC
Data Rate	10200.000	kbps (Synchronous)	Demodulation Type	16QAM
Symbol Rate	2988.571	ksps	FEC Code Rate	Rate 5/16 (Turbo Only)
Spectrum	Normal		Data Invert	Normal
De-Scrambler	On (Normal)		Clock Invert	Normal
Sweep Width	10	kHz (+/-)	Rx Filter Rolloff Factor	0.35
Eb/No Alarm Pt	2.0	dB		

Submit

Alarm Mask

Rx AGC	Active	LNB	Masked	Eb/No	Masked
--------	--------	-----	--------	-------	--------

Submit

Figure 10-9. Configuration | Demod page

Receive

Frequency

Enter the Frequency value in MHz.

Data Rate

Enter the Data Rate value in kbps.

Symbol Rate

The Symbol Rate value is shown in ksps.

Spectrum

Select **Normal** or **Inverted**.

De-Scrambler

Select from: **On (Normal)**, **Off** or **IESS-315**

Sweep Width

Enter the value in kHz.

Eb/No Alarm Pt

Enter the Eb/No Alarm Point value in dB.

FEC Type

Select the Forward Error Correction type:

- Uncoded
- TPC
- VersaFEC
- ULL

Demodulation Type

Select the Demodulation type:

- BPSK
- QPSK
- 8PSK
- 16QAM
- 8QAM

FEC Code Rate

Select the Forward Error Correction code rate.

5/16*	VersaFEC CCM BPSK 0.488	VersaFEC CCM 8-QAM 0.576	VersaFEC ULL BPSK 0.493
21/44*		VersaFEC CCM 8-QAM 0.642	VersaFEC ULL QPSK 0.493
1/2	VersaFEC CCM QPSK 0.533	VersaFEC CCM 8-QAM 0.711	VersaFEC ULL QPSK 0.654
	VersaFEC CCM QPSK 0.631	VersaFEC CCM 8-QAM 0.780	VersaFEC ULL QPSK 0.734
3/4	VersaFEC CCM QPSK 0.706		
7/8	VersaFEC CCM QPSK 0.803	VersaFEC CCM 16-QAM 0.644	
0.95*		VersaFEC CCM 16-QAM 0.731	
1/1***		VersaFEC CCM 16-QAM 0.780	
		VersaFEC CCM 16-QAM 0.829	
		VersaFEC CCM 16-QAM 0.853	

* means Turbo only

*** means uncoded or no FEC

Data Invert

Select the Data Invert setting.

- Normal
- Inverted

Clock Invert

Select the Clock Invert setting.

- Normal
- Inverted

Rx Filter Rolloff Factor

Select the **Rx Filter Rolloff Factor** value.

- 0.05
- 0.10
- 0.15
- 0.20
- 0.25
- 0.35

When finished, click **Submit** to save and activate these changes.

Alarm Mask

Rx AGC

Select **Masked** or **Active**.

LNB

Select **Masked** or **Active**. Available only for L-Band demodulators.

Eb/No

Select **Masked** or **Active**.

When finished, click **Submit** to save and activate these changes.

10.5.2 Configuration | LAN

Use this page to set LAN configuration parameters.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: LAN

Home Admin Configuration Status

Demod LAN ARP Routing WAN Utilities LNB

Network Configuration

IP Address/Mask: 192.168.1.5 / 24 MAC Address: 0006B0056422
Traffic IP Address/Mask: 192.168.1.5 / 24 Traffic MAC Address: 0006B0056422
Dedicated Management Port: **Disabled**

Port Configuration

Port Traffic Mode & Speed: Auto Actual Negotiated Port Speed: 100 Mbps Full Duplex

VLAN Brouter

VLAN Brouter Mode: Disable VLAN Brouter Next Hop MAC Address: 010203040506
VLAN Remote Mode: Disable VLAN Filtering: Disable

Demod 1 Demod 2 Demod 3 Demod 4

VLAN ID 1: 0 VLAN ID 2: 0
VLAN ID 3: 0 VLAN ID 4: 0
VLAN ID 5: 0 VLAN ID 6: 0
VLAN ID 7: 0 VLAN ID 8: 0
VLAN ID 9: 0 VLAN ID 10: 0



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

Network Configuration

IP Address/Mask

Enter the IP Address/Mask for Ethernet Interface.

Traffic IP Address/Mask

Enter the IP Address/Mask for the Traffic Ethernet Port; only applicable when Dedicated Management Port is enabled.

Dedicated Management Port

Read-only; shows the status of the Dedicated Management Port.

MAC Address

Read-only, shows the MAC Address for the Ethernet Interface.

Traffic MAC Address

Read-only, shows the MAC Address for the Traffic Ethernet Port.

When finished, click **Submit** to save and activate these changes.

Port Configuration

Port

Read-only

Mode & Speed

Use the drop-down list to select a value:

- Auto
- 10 Mbps Half Duplex
- 100 Mbps Half Duplex
- 10 Mbps Full Duplex
- 100 Mbps Full Duplex

Actual Negotiated Port Speed

Read-only

When finished, click **Submit Port Config** to save and activate these changes.

VLAN Brouter

The VLAN Brouter feature allows VLAN tagged packets to be forwarded when in Brouter mode.

VLAN Brouter Mode

Select **Enable** or **Disable**.

VLAN Remote Mode

Select Enable or Disable.

VLAN Brouter Next Hop MAC Address

When VLAN Brouter Mode is enabled, enter the Next Hop MAC Address. VLAN tagged packets are directed to this address.

VLAN Filtering

Select **Enable** or **Disable**.

When finished, click **Submit** to save and activate these changes.

VLAN ID 1 through VLAN ID 10

For a selected demodulator, enter a valid ID in the range of 0000 to 4095 into the applicable **VLAN ID** text boxes.

When finished, click **Submit** to save and activate these changes.

10.5.3 Configuration | ARP

Use this page to see or edit the unit's ARP parameters.

The screenshot shows the ARP configuration page for the CDD-564AL. The page title is "CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: ARP". The navigation menu includes Home, Admin, Configuration, Status, Demod, LAN, ARP, Routing, WAN, Utilities, and LNB. The main content area is divided into four sections:

- ARP Table (Edit)**: A table with columns for Index, IP, MAC, and Type. The first entry has Index 1, IP 192.168.1.14, MAC 00:0e:0c:ab:7c:85, and Type Dynamic. A "Submit Changes" button is below the table.
- Add Static ARP**: A form with fields for Index (2), IP, and MAC, and an "Add Entry" button.
- Delete Static ARP**: A form with a field for "Enter Entry Index to Delete" and a "Delete Entry" button.
- Flush Dynamic ARP**: A warning message in red text: "Warning! Click on this will flush all Dynamic ARP entries". Below the warning is a "Flush ARP Table" button.



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

ARP Table (Edit)

Use this page section to see existing entries in the ARP Table. When more than one ARP entry exists, you can edit the current Static ARP entries directly.

Index

Read-only. The internal table index that is assigned automatically.

IP

Read-only. The **IP** address for the selected ARP Table entry.

MAC

Read-only. The **MAC** address for the selected ARP Table entry.

Type

Read-only. The entry **Type** for the selected Index number: Dynamic or Static.

Click **Submit Changes** to save and activate these changes.

Add Static ARP

IP

Enter the **IP Address** in the format: XXX.XXX.XXX.XXX

MAC

Enter the **MAC Address** in the format: YY:YY:YY:YY:YY:YY

Click **Add Entry** to add an entry to the ARP Table.

Delete Static ARP

Enter Entry Index to Delete

Enter the Index number for the entry to be deleted from the ARP Table.

Click **Delete Entry** to delete the entry from the ARP Table.

Flush Dynamic ARP

Click **Flush ARP Table** to delete the Dynamic ARP entries from the ARP Table.

10.5.4 Configuration | Routing | Routes

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Routes

Home Admin Configuration Status
Demod LAN ARP Routing WAN Utilities LNB
Routes IGMP

Route Table (Edit)

Index	Name	Dest. IP/Mask	Interf.	Next Hop IP	Multicast Options
1	DFG	0.0.0.0 / 0	toEthernet	192.168.21.101	N/A

Submit Changes

Add New Route

Index	Name	Dest. IP/Mask	Interf.	Next Hop IP	Multicast Options
2		/	toEthernet		N/A

Add Entry

Delete Route

Enter Route Index to Delete

Delete Entry



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

Route Table (Edit)

Use this page section to change existing entries in the Route Table.

Name

Change the name for the Route Table Entry. The name must be unique and cannot have any whitespace.

Dest. IP/Mask

Change the address that sets the route to the destination network.

Interf.

The Interface is fixed at “toEthernet”. You cannot change it.

Next Hop IP

Change the the **Next Hop IP** to set the locally-attached router's IP address to be used for routing to the destination network. This is applicable when there is another subnet addressed to the modem on the LAN side.

Depending on the active Working Mode, set the address within these ranges:

- Point-to-Point – No HDLC address
- Small Network – 0x1 to 0xFE
- Large Network – 0x1 to 0xFFFFE

Multicast Options

Select the applicable option:

- N/A
- Forward
- Filter

When finished, click **Submit Changes** to save and activate these changes.

Add New Route

Use this page section to add a new route to the Route Table.

Name

Enter a name for the Route Table Entry. The name must be unique and cannot have any whitespace.

Dest. IP/Mask

Enter an address that sets the route to the destination network.

Interf.

The Interface is fixed at "toEthernet". You cannot change it.

Next Hop IP

Use the Next Hop IP to set the locally-attached router's IP address to be used for routing to the destination network. This is applicable when there is another subnet addressed to the modem on the LAN side.

Depending on the active Working Mode, set the address within these ranges:

- Point-to-Point – No HDLC address
- Small Network – 0x1 to 0xFE
- Large Network – 0x1 to 0xFFFFE

Multicast Options

Select the applicable option:

- N/A
- Forward
- Filter

When finished, click **Add Entry** to save the entry to the Route Table.

Delete Route

Use this page section to delete a route from the Route Table.

Enter Route Index to Delete

Enter the Index number for the Route to be deleted, then click **Delete Entry** to delete the entry from the Route Table.

10.5.5 Configuration | Routing | IGMP

Use this page to set the Internet Group Management Protocol (IGMP) configuration parameters.

The screenshot shows a web interface for configuring IGMP. At the top, there is a navigation menu with buttons for Home, Admin, Configuration, Status, Demod, LAN, ARP, Routing, WAN, Utilities, LNB, and Routes. The main content area is titled "CDD-564A as Server" and contains the following configuration options:

- IGMP: Enabled
- IGMP Query Period: 30 sec (1-600)
- IGMP Maximum Response Time: 28 sec (1-598)
- Missed Responses before leaving IGMP Group: 5 (1-30)

Below the configuration options is a "Submit" button. Underneath is a section titled "IGMP Table" which contains a table with the following headers: Index, TTL, Client State, Src Entry, and Group Entry. A "Refresh" button is located below the table.



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

CDD-56xAL as Server

IGMP

Read-only; if enabled, the IP Module responds to IGMP queries for the configured multicast routes on the transmit side and generates IGMP queries on the receive side.

IGMP Query Period

Enter the query period length in seconds; Range is 1 through 600 seconds.

IGMP Maximum Response Time

Enter a maximum response time value; Range is 1 through 598 seconds. You must set this value to one second less than the set IGMP Query Period.

Missed Responses before leaving IGMP Group

Enter the allowable number of missed responses; Range is 1 through 30.

When finished, click **Submit** to save and activate these changes.

IGMP Table

This read-only window shows the IGMP groups that are active on the demodulator. Data shown includes:

- Index
- TTL (Time to Live) for the entry
- Client State: Idle, Active or Closing
- SRC Entry
- Group Entry

Click **Refresh** to update the data shown.

10.5.6 Configuration | WAN | Decryption

This page is available only if the 3xDES FAST feature was purchased and activated, along with the EN version of firmware.

See also: Chapter 9. Telnet and CLI Operation.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: HDLC

Home Admin Configuration Status
Demod LAN ARP Routing WAN Utilities LNB
Decryption HDLC

HDLC
HDLC Address Mode: Small Network Mode

Demod 1 Demod 2 Demod 3 Demod 4

Receive HDLC Addresses

Channel 1
Channel 2
Channel 3
Channel 4

Network Mode Address Ranges:
Large Network Mode: 1 - 32766
Small Network Mode: 1 - 254

Delete HDLC Address
Delete HDLC Address: Select 1..4 to delete



CAUTION

If you do not save these parameter changes to permanent storage, they will be lost when the unit is reset or loses power. To save these changes to permanent storage, go to the **Admin | Save** page and click **Save PaP Parameters**.

HDLC

HDLC Address Mode

Read-only; shows the active HDLC Address Mode.

- **Small Network Mode** – The Small Network Mode supports up to 255 remotes, as allowed, using HDLC addressing. Select the unit to be on independent IP subnets; requires adding static routes to pass traffic between them.
- **Large Network Mode** – This mode is similar to Small Network Mode, except that a maximum of 32,766 remotes are allowed on a single, shared, satellite outbound carrier.

Receive HDLC Addresses

Channels 1 through 4

For each selected demodulator, set an address for the applicable channels.

Ranges are:

- Large Network Mode: 1 through 32766
- Small Network Mode: 1 through 254

When finished, click **Submit** to save these changes.

Delete HDLC Address

Delete HDLC Address

Select the HDLC address to be deleted, then click **Delete**.

10.5.8 Configuration | Utilities

Use this page to configure utility functions.

The screenshot shows the 'Utilities' configuration page for the CDD-564AL. The page has a blue header with the title 'CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Utilities'. Below the header is a navigation menu with buttons for 'Home', 'Admin', 'Configuration', 'Status', 'Demod', 'LAN', 'ARP', 'Routing', 'WAN', 'Utilities', and 'LNB'. The 'Utilities' section is highlighted. It contains four configuration fields, each with a 'Submit' button: 'Set Time(hh:mm:ss)' with the value '13:45:59', 'Set Date(dd/mm/yy)' with the value '10/11/03', 'Compatibility Mode' with a dropdown menu set to 'CDD-564A.Mode', and 'Internal Reference Adjustment' with the value '0' and a range of '(-999 to 999)'. Below these fields is a horizontal bar with four tabs: 'Demod 1', 'Demod 2', 'Demod 3', and 'Demod 4'. The 'Demod 1' tab is selected and highlighted in blue. Underneath the 'Demod 1' tab, there are two more configuration fields: 'Circuit ID' and 'Statistics Log Interval' (set to 'Disabled'), each with a 'Submit' button. A 'Re-Center Buffer' button is also present below the 'Statistics Log Interval' field.

Figure 10-10. Configuration | Utilities page

Utilities

Set Time(hh:mm:ss)

Enter a time in HH:MM:SS format.

- HH = hour, 00 to 23
- MM = minutes, 00 to 59
- SS = seconds, 00 to 59

Click **Submit** to save this change.

Set Date(dd/mm/yy)

Enter a date in DD/MM/YY international format.

- DD = day, 01 to 31
- MM = month, 01 to 12
- YY = year, 00 to 99
- Click **Submit** to save this change.

Compatibility Mode

Select the Compatibility Mode: CDD-564 or CDD-564A.

Click **Submit** to save this change.

Internal Reference Adjustment

Enter the Internal Reference Adjustment value; Range is -999 through 999.

Click **Submit** to save this change.

Utilities settings per demodulator:

Circuit ID

For the selected demodulator, enter a Circuit ID string, 24 characters maximum.

Click **Submit** to save this change.

Statistics Log Interval

For the selected demodulator, select **Disabled**, or a number of minutes, Range: 10 to 90 minutes, in 10-minute steps.

Click **Submit** to save this change.

Re-Center Buffer

For the selected demodulator, click **Re-Center Buffer** to cause re-centering of the Plesiochronous/Doppler buffer.

10.5.9 Configuration | LNB (L-Band Demodulators only)

You can control and monitor a maximum of four Low-Noise Block Down Converters (LNBs) connected to the L-Band CDD-56xAL units. This depends on which unit is in use, and the number of configured modulators on that unit.

When an LNB is installed, use this page to configure its operating parameters and to see the LNB status for L-Band operation.

The screenshot shows the 'LNB Control' configuration page. At the top, there is a navigation bar with tabs for 'Home', 'Admin', 'Configuration', and 'Status'. Below this is a secondary navigation bar with tabs for 'Demod', 'LAN', 'ARP', 'Routing', 'WAN', 'Utilities', and 'LNB'. The 'LNB' tab is selected. Underneath, there are four tabs for 'Demod 1', 'Demod 2', 'Demod 3', and 'Demod 4'. The main content area is titled 'LNB Control' and contains the following fields:

- LNB DC Supply Voltage: (dropdown menu)
- LNB 10MHz REFERENCE: (dropdown menu)
- LNB Current Alarm Lower Limit: mA (10 to 400)
- LNB Current Alarm Upper Limit: mA (50 to 600)
- LNB LO Frequency: MHz (High (-) dropdown menu)

A 'Submit' button is located at the bottom of the configuration area.

Figure 10-11. Configuration | LNB page

LNB Control

Select a demodulator, then set these parameters:

LNB DC Supply Voltage

Select **Off**, or 13 or 18 volts.

LNB 10MHz Reference

Select **On** or **Off**.

LNB Current Alarm Lower Limit

Set the value in mA; Range is 10 through 400.

LNB Current Alarm Upper Limit

Set the value in mA; Range is 50 through 600.

LNB LO Frequency

Set the Low Oscillator frequency in MHz, and select **High(-)**, or **Low(+)**.

When finished, click **Submit** to save and activate these changes.

10.6 Status pages

10.6.1 Status | Demod Status

Use this page to see read-only status data for the selected demodulator.

Demod Status			
Rx Eb/No:	Demod Unlocked	Unit Alarm:	No Fault
Rx Signal Level:	<-99 dBm	Rx Alarm:	Demod Unlocked
Rx Freq Offset:	Demod Unlocked	Temperature:	31 °C
Rx BER:	Demod Unlocked	LNB Alarm:	No Fault
LNB Current:	N/A		
LNB Voltage:	N/A		

Figure 10-12. Status | Demod Status page

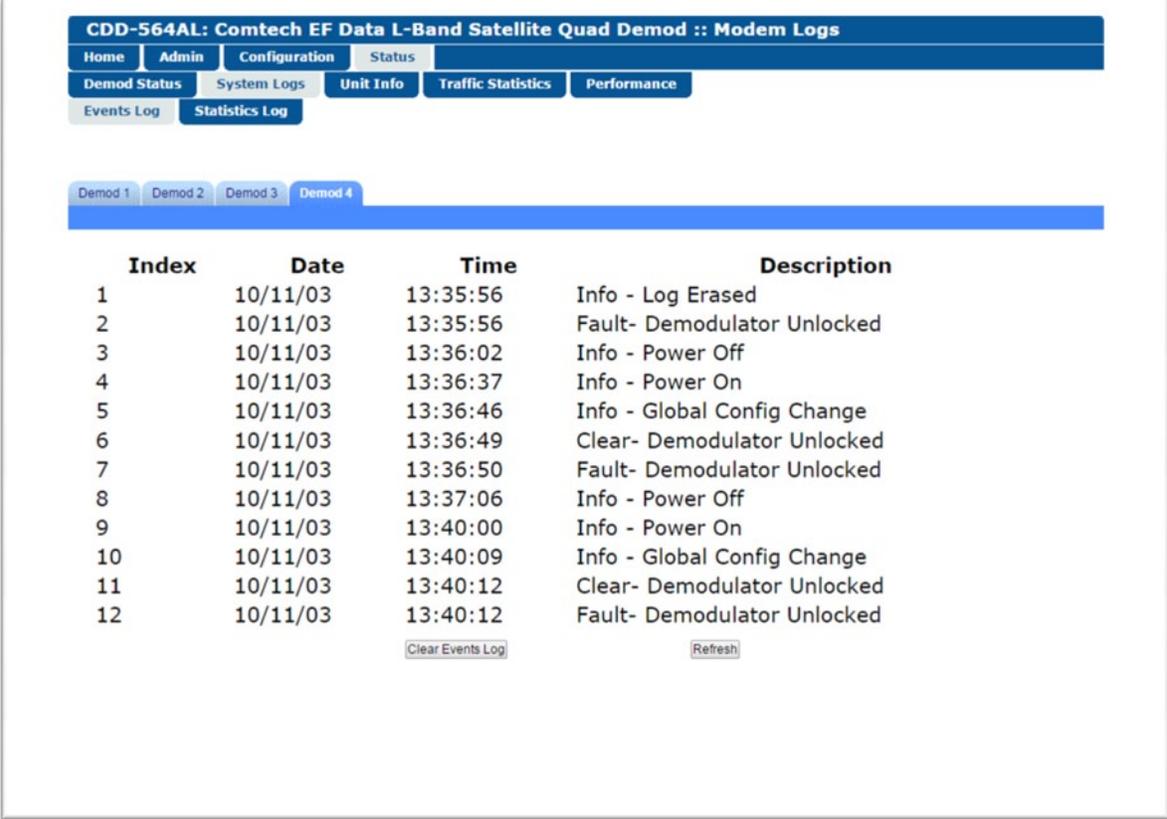
Demod Status

- Rx Eb/No
- Rx Signal Level
- Rx Freq Offset
- Rx BER
- LNB Current – available only for L-Band Demodulators
- LNB Voltage – available only for L-Band Demodulators
- Unit Alarm
- Rx Alarm
- Temperature
- LNB Alarm – available only for L-Band Demodulators

Click **Refresh** to show the most recent status.

10.6.2 Status | System Logs | Events Log

Use this page to see the log of system Events for a selected demodulator. You can clear the Events Log from this page as well.



The screenshot shows the 'Modem Logs' page for 'CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod'. The page has a navigation menu with 'Home', 'Admin', 'Configuration', and 'Status'. Under 'Status', there are sub-menus for 'Demod Status', 'System Logs', 'Unit Info', 'Traffic Statistics', and 'Performance'. The 'System Logs' menu is active, showing 'Events Log' and 'Statistics Log'. Below the navigation, there are tabs for 'Demod 1', 'Demod 2', 'Demod 3', and 'Demod 4', with 'Demod 4' selected. The main content is a table with columns 'Index', 'Date', 'Time', and 'Description'. The table contains 12 rows of log entries. At the bottom of the table, there are two buttons: 'Clear Events Log' and 'Refresh'.

Index	Date	Time	Description
1	10/11/03	13:35:56	Info - Log Erased
2	10/11/03	13:35:56	Fault- Demodulator Unlocked
3	10/11/03	13:36:02	Info - Power Off
4	10/11/03	13:36:37	Info - Power On
5	10/11/03	13:36:46	Info - Global Config Change
6	10/11/03	13:36:49	Clear- Demodulator Unlocked
7	10/11/03	13:36:50	Fault- Demodulator Unlocked
8	10/11/03	13:37:06	Info - Power Off
9	10/11/03	13:40:00	Info - Power On
10	10/11/03	13:40:09	Info - Global Config Change
11	10/11/03	13:40:12	Clear- Demodulator Unlocked
12	10/11/03	13:40:12	Fault- Demodulator Unlocked

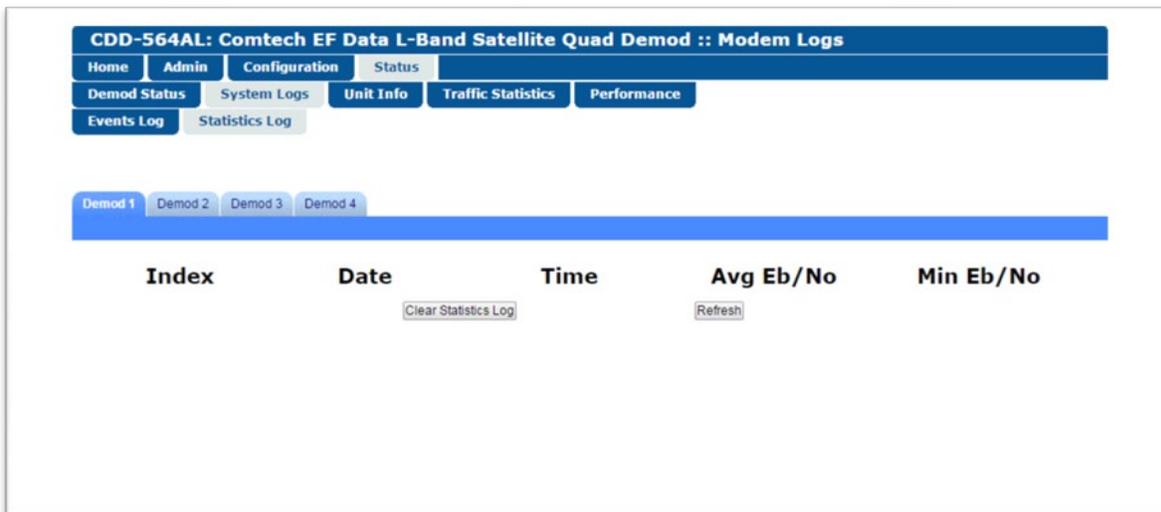
Figure 10-13. Status | System Logs | Events Log page

Click **Refresh** to show the most recent data.

Click **Clear Events Log** to delete the events from the log for the selected demodulator.

10.6.3 Status | System Logs | Statistics Log

Use this page to see the log of System Statistics for a selected demodulator. You can clear the Statistics Log from this page as well.

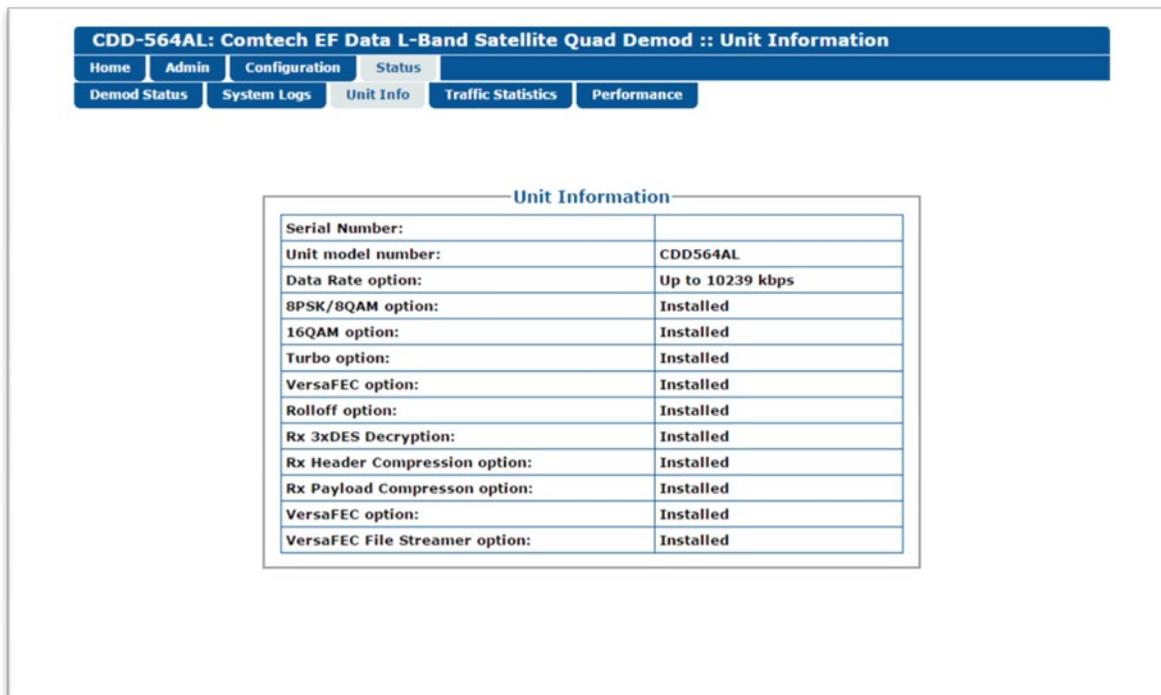


Click **Refresh** to show the most recent data.

Click **Clear Statistics Log** to delete the statistics from the log for the selected demodulator.

10.6.4 Status | Unit Info

Use this page to see **read-only** identification and option status data for the CDD-56xAL unit.



10.6.5 Status | Traffic Statistics | Ethernet

Use this page to see **read-only** statistics, performance and error data for Receive and Transmit Ethernet traffic. You can clear or refresh the statistics as well.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Ethernet Statistics

Home
Admin
Configuration
Status

Demod Status
System Logs
Unit Info
Traffic Statistics
Performance

Ethernet
Router
WAN
Clear Counter

Clear Ethernet Statistics

Clear Refresh

Ethernet Statistics

Receive Statistics	Traffic port	Management port	WAN port
Total Packets Received	2771	0	3448
Unicast Packets	2575	0	3448
Broadcasts Packets	132	0	0
Multicasts Packets	64	0	0
Ethernet Pause Frames	0	0	0
Bytes Received	436308	0	1967326
Total Receive Errors	0	0	0
Receive Performance			
Current Data Rate (kbps)	1	0	0
Avg Data Rate (kbps - 5 minutes)	4	0	26
Max Data Rate (since last clear)	114	0	1022
Current Packets/s	1	0	0
Avg Packets/s (5 minutes)	3	0	5
Max Packets/s (since last clear)	98	0	163
Transmit Statistics			
Total Packets Transmitted	3448	0	2771
Unicast Packets	3448	0	2575
Broadcasts Packets	0	0	132
Multicasts Packets	0	0	64
Ethernet Pause Frames	0	0	0
Bytes Transmitted	1967326	0	436308
Transmit Performance			
Current Data Rate (kbps)	0	0	1
Avg Data Rate (kbps - 5 minutes)	26	0	4
Max Data Rate (since last clear)	1022	0	109
Current Packets/s	0	0	1
Avg Packets/s (5 minutes)	5	0	3
Max Packets/s (since last clear)	163	0	98

Error Details

Receive Errors	Traffic port	Management port	WAN port
LAN FCS Error	0	0	0
Alignment Error	0	0	0
Undersize	0	0	0
Fragments	0	0	0
Jabber	0	0	0
Oversize	0	0	0
InDiscards	0	0	0
Transmit Errors			
Single Collision	0	0	0
Multiple Collisions	0	0	0
Excessive Collisions	0	0	0

Click **Refresh** to show the most recent data. Click **Clear** to delete the statistics.

10.6.6 Status | Traffic Statistics | Router

Use this page to see **read-only** router counters and dropped and filtered packets data for Router traffic. Clear or refresh the statistics as well.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: Router Statistics
Home | Admin | Configuration | Status

Demod Status | System Logs | Unit Info | Traffic Statistics | Performance
Ethernet | Router | WAN | Clear Counter

Clear Statistics

Router Counters

Description	Packets
From Ethernet - Total	2776
To Ethernet - Total	3499
To Ethernet - Unicast	3499
To Ethernet - Multicast	0
To Ethernet - Broadcast	0
From Satellite - Total	0
From Endstation - Total	3500
To Endstation - Total	2739
Received IGMP Packets	0
Received IP Options Packets	0

Dropped Packets

Description	Packets
Bad IP Header Checksum	0
Bad Buffer Length	0
Bad IP Version	0
TTL Expired	0
No Route	37
No ARP Entry	0
Filtered Multicast	
Multicast Disable Group	0
EasyConnect Multicast Option	
Router Queue Full	0
Total Dropped	37

Filtered Packets

Description	Packets
Boot	1
Flow Descriptor	0
Unknown Reason Code	0
Flow Correlator	0
Management Path	0
Wan Scaling	0
Ping	0
Access Control	0
Vipersat MCP	0
Vipersat UCP	0
CodeLoad	0
Multicast	0
Bad Packets	0
Route	0
Vipersat Remote	0
QoS Rule	0
Vipersat Loop	0
Bad Header Len	0
Bad Data Ptr	0
MAC Split Err	0
L3Type Err	0
Local Destination	0
Redundancy Err	0
ICMP Filter	0
Port Err	0
Per port route rule	0
Total Filtered	1

Click **Refresh** to show the most recent data. Click **Clear** to delete the statistics.

10.6.7 Status | Traffic Statistics | WAN

For a selected demodulator, use this page to see **read-only** counters and errors data for Receive WAN traffic. You can clear or refresh the statistics as well.

CDD-564AL: Comtech EF Data L-Band Satellite Quad Demod :: WAN Statistics

Home Admin Configuration Status
Demod Status System Logs Unit Info Traffic Statistics Performance
Ethernet Router WAN Clear Counter

Demod 1 Demod 2 Demod 3 Demod 4

Clear Statistics
Clear Refresh

Rx Counters

Description	Counters
HDLC Bad Address Count	0
Pkt Processor CRC Error Count	0
Abort/Octet Error Count	0
Overrun Count	0
HDLC CRC Error Count	0
HDLC Payload Bytes	0
HDLC Header Bytes	0
HDLC Packet Count	0
DMA Reclaim	0

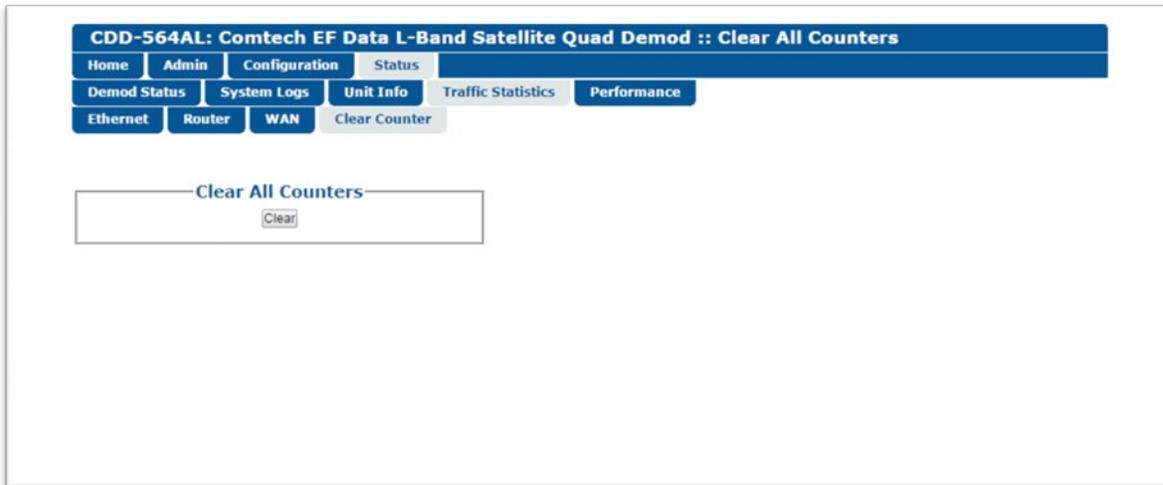
Rx Errors

Description	Errors
Invalid Flow Id Errors	0
SAR Reassemble Errors	0
Header Decompression Errors	0
Memory Alignment Errors	0
Bad CRC Errors	0

Click **Refresh** to show the most recent data. Click **Clear** to delete the statistics.

10.6.8 Status | Traffic Statistics | Clear Counter

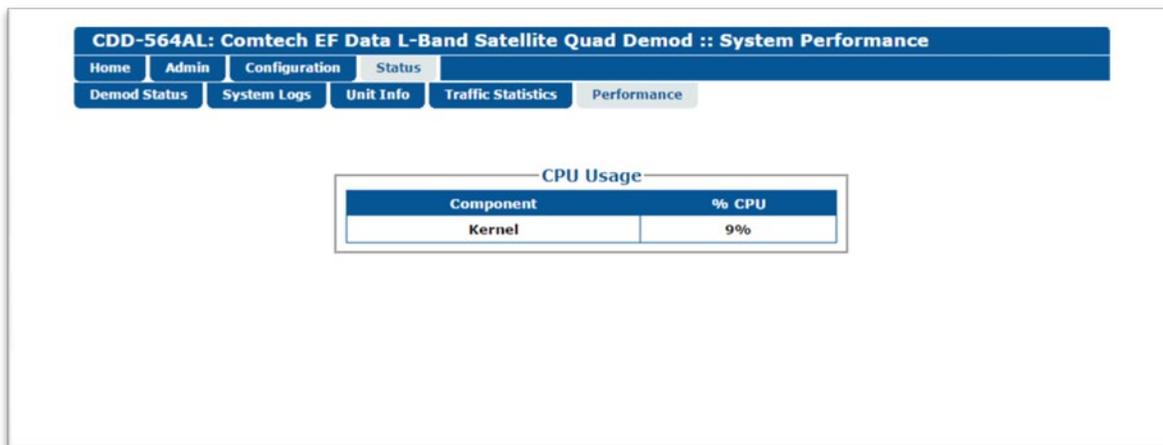
Use this page to delete all the statistics data for all of the Traffic Statistics, including Ethernet, Router and WAN statistics.



Click **Clear** to delete all of the Traffic Statistics.

10.6.9 Status | Performance

Use this page to see CPU usage performance data for the CDD-56xAL unit.



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Appendix A. Forward Error Correction (FEC) Options

A.1 Overview

The CDD-56xA/L Satellite Demodulator is equipped with VersaFEC (short-block LDPC) and Turbo Product Code (TPC) Forward Error Correction encoders/decoders.

Turbo Product 0.95 Code Rate (TPC) is available via an optional plug-in card.

While the performance of LDPC is exceptional in terms of coding gain, its higher latency is considered disadvantageous in some applications. For this reason, Comtech EF Data and Comtech AHA Enterprise Products Group have jointly developed a family of short-block LDPC codes called **VersaFEC®**. (The name VersaFEC is a trademark registered to Comtech AHA Enterprise Products Group.)

VersaFEC FEC is ideal for lower data rates that demand the shortest possible latency, and is available as a FAST option. It represents the best Forward Error Correction technology currently available, and is offered with a sufficient range of code rates and modulation types that link performance can be optimized under almost any conditions.

A.2 Turbo Product Codec (FAST Option)

Turbo coding is an FEC technique, developed within the last few years, which delivers significant performance improvements compared to more traditional techniques. Two general classes of Turbo Codes have been developed, Turbo Convolutional Codes (TCC), and Turbo Product Codes (TPC, a block coding technique). Comtech EF Data has chosen to implement an FEC codec based on TPC. A Turbo Product Code is a 2 or 3 dimensional array of block codes. Encoding is relatively straightforward, but decoding is a very complex process requiring multiple iterations of processing for maximum performance to be achieved.

Unlike the popular method of concatenating an RS codec with a primary FEC codec, Turbo Product Coding is an entirely stand-alone method. It does not require the complex interleaving/ de-interleaving of the RS approach, and consequently, decoding delays are significantly reduced. Furthermore, the traditional concatenated RS schemes exhibit a very pronounced threshold effect – a small reduction in E_b/N_0 can result in total loss of demod and decoder synchronization. TPC does not suffer from this problem – the demod and decoder remain synchronized down to the point where the output error rate becomes unusable. This is considered to be a particularly advantageous characteristic in a fading environment.

A.2.1 TPC Overview

In the past few years there has been an unprecedented resurgence in interest in Forward Error Correction (FEC) technology. The start of this new interest has its origins in the work done by Claude Berrou et al, and the 1993 landmark paper, Near Shannon Limit Error Correcting Coding and Decoding – Turbo Codes. FEC is considered an essential component in all wireless and satellite communications in order to reduce the power and bandwidth requirements for reliable data transmission.

Claude Shannon, considered by many to be the father of modern communications theory, first established the concept of Channel Capacity in his 1948 paper A Mathematical Theory of Communication. This places an absolute limit on how fast it is possible to transmit error-free data within a channel of a given bandwidth, and with given noise conditions within that channel. He concluded that it would only be possible to approach this limit through the use of source encoding – what is familiar today as Forward Error Correction.

Shannon postulated that if it were possible to store every possible message in the receiver, finding the stored message that most closely matched the incoming message would yield an optimum decoding method. However, for all but the shortest bit sequences, the memory required for this, and the time taken to perform the comparisons, makes this approach impractical. For all practical purposes, the memory requirement and the decoding latency become infinite.

For many years, there were few advances in the quest to approach the Shannon Limit. The Viterbi algorithm heralded a major step forward, followed in the early 1990s by the concatenation of a Viterbi decoder with Reed-Solomon hard-decision block codes. It remained clear, however, that the Shannon Limit was still an elusive target.

Berrou's work on Turbo Codes showed, through the use of an ingeniously simple approach (multiple, or iterative decoding passes) that it is possible to achieve performance close to the Shannon Limit. Berrou's early work dealt exclusively with iteratively-decoded convolutional codes (Turbo Convolutional Coding, or TCC), but in time the iterative approach was applied to a particular class of block codes called Product Codes – hence Turbo Product Coding (TPC). TPC exhibits inherently low decoding latency compared with TCC, and so is considered much more desirable for 2-way, interactive satellite communications applications.

In August 1999, Comtech became the first company in the world to offer satellite modems that incorporate TPC. Since its inception, Comtech has continued to develop and refine its implementation of TPC in its products, and now offers a comprehensive range of code rates (from Rate 5/16 to Rate 0.95) and modulations (from BPSK to 16-QAM).

A.3 VersaFEC (Short-block LDPC)

VersaFEC is a system of short-block LDPC codes that have been designed as a low-latency alternative to both Comtech’s existing LDPC codes, and to the system set forth in the DVB-S2 specification (EN 302307) ratified by ETSI.

Since the introduction of Comtech’s LDPC, considerable research has been carried out to find ways to reduce the block size of LDPC (and hence its latency) while preserving the coding gain performance very close to the Shannon bound.

The set of VersaFEC codes was developed with two distinct purposes:

- 1) To provide an expanded choice of combinations of modulation and coding that maintain the same coding gain performance as Comtech’s existing LDPC, while **significantly** reducing latency. The existing LDPC approach (and DVB-S2 short-block) uses blocks that are 16 kbits in length. VersaFEC, on the other hand, uses block sizes that vary between 2k and 8.2 kbits, and at the same time reduces latency still further through a novel design approach.
- 2) To provide combinations of modulation and coding (**ModCods**) that are suitable not only for Constant Coding and Modulation (**CCM**) applications, but are also the basis for Comtech Comtech EF Data and Comtech AHA Enterprise Products Group’s patent-pending Adaptive Coding and Modulation (**ACM**) system. The VersaFEC ACM feature requires activation of the appropriate FAST codes.

There are 12 ModCods in the VersaFEC set (see **Table A-1**).The modulation types (BPSK, QPSK, 8-QAM and 16-QAM) and the code rates have been chosen to give a continuous progression of performance in terms of both Eb/No and spectral efficiency – an essential aspect of a well-engineered ACM system.

Table A-1. The VersaFEC ModCod Set

ModCod	Modulation	Code Rate	Spectral efficiency, bps/Hz	Block size, bits	Typical Eb/No, for BER = 5×10^{-8}	Latency at 64 kbps, in milliseconds	Min. Data Rate (kbps)	Max. Data Rate (Mbps)
00	BPSK	0.488	0.49	2k	2.4 dB	26	16.0	1.462
01	QPSK	0.533	1.07	4.1k	2.2 dB	53	16.0	3.200
02	QPSK	0.631	1.26	4.1k	2.7 dB	59	16.0	3.785
03	QPSK	0.706	1.41	4.1k	3.4 dB	62	16.0	4.233
04	QPSK	0.803	1.61	4.1k	3.8 dB	66	16.0	4.818
05	8-QAM	0.642	1.93	6.1k	4.6 dB	89	16.0	5.782
06	8-QAM	0.711	2.13	6.1k	5.2 dB	93	16.0	6.401
07	8-QAM	0.780	2.34	6.1k	5.6 dB	97	16.0	7.021
08	16-QAM	0.731	2.93	8.2k	6.3 dB	125	16.0	8.776
09	16-QAM	0.780	3.12	8.2k	7.0 dB	129	16.0	9.361
10	16-QAM	0.829	3.32	8.2k	7.5 dB	131	16.0	9.946
11	16-QAM	0.853	3.41	8.2k	8.0 dB	132	16.4	10.239

As a comparison, looking at LDPC Rate 2/3 8-QAM and VersaFEC Rate 0.642 8-QAM essentially identical spectral efficiency and Eb/No performance. However, at 64 kbps, the latency has been reduced from 350 milliseconds to 89 milliseconds – **a factor of 4 reduction**.

The performance of the VersaFEC codes compared with the Shannon bound is shown in **Figure A-1**. This puts the performance of VersaFEC at or near the DVB-S2 performance with 16 kbit blocks.

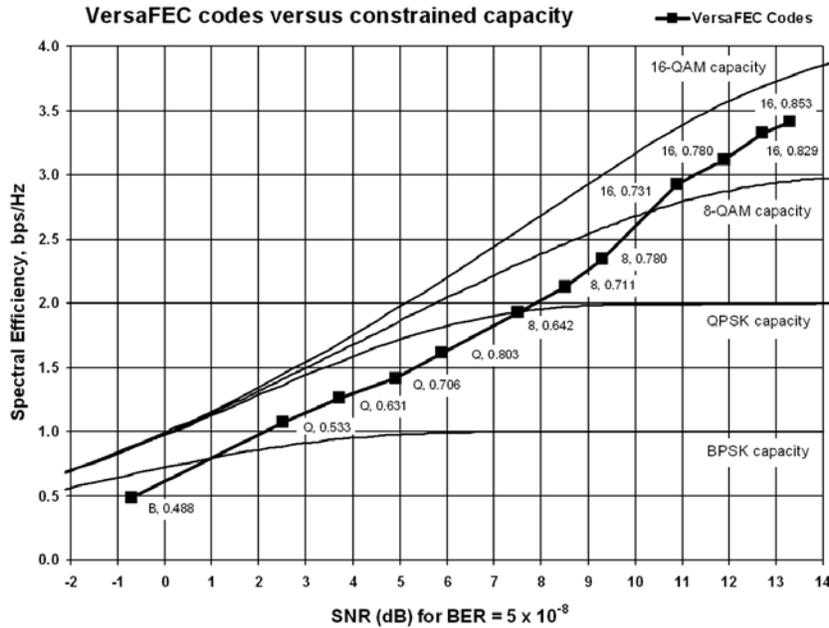


Figure A-1. VersaFEC Codes versus Shannon Capacity

Note that SNR is defined as $E_b/N_o + 10_{\log}(\text{Spectral Efficiency})$.

A.3.1 VersaFEC Extensions

A.3.1.1 Extended CCM Codes

Two additional rates are available with the VersaFEC family of codes. Note that these are CCM (Constant Coding and Modulation) only – they are NOT included in the ACM set of ModCods.

These two codes (see **Table A-2**) have been added to fill in perceived gaps in the progression of spectral efficiency versus SNR. They do not, in fact, provide any discernible improvement in Eb/No performance (compared with their nearest neighbors in the initial VersaFEC family), but exhibit a modest SNR improvement.

Table A-2. Extended CCM Codes

Modulation	Code Rate	Spectral efficiency, bps/Hz	Typical Eb/No, for BER = 5×10^{-8}	Latency at 64 kbps, in milliseconds	Min. Data Rate, CCM Mode (kbps)	Max. Data Rate, CCM Mode (Mbps)
8-QAM	0.576	1.73	4.5 dB	87	16.0	5.179
16-QAM	0.644	2.58	6.5 dB	121	16.0	7.726

A.3.1.2 Ultra-Low-Latency (ULL) Codes

Four additional ultra-short block LDPC codes address the needs of users with applications requiring even lower latency than the ‘standard’ VersaFEC code set. These codes, limited to BPSK and QPSK only (see **Table A-3**), use significantly shorter code blocks than ‘standard’ VersaFEC. As a result, the coding gain is slightly reduced. However, in terms of latency, the performance is exceptional – far lower than any other FEC method ever offered, with the exception of Viterbi.

Table A-3. ULL Codes

Modulation	Code Rate	Spectral efficiency, bps/Hz	Typical Eb/No, for BER = 5×10^{-8}	Latency at 64 kbps, in milliseconds	Min. Data Rate (kbps)	Max. Data Rate (Mbps)
BPSK	0.493	0.49	3.3 dB	18	16.0	1.479
QPSK	0.493	0.99	3.3 dB	19	16.0	2.959
QPSK	0.654	1.30	3.8 dB	21	16.0	3.923
QPSK	0.734	1.47	4.3 dB	23	16.0	4.405

A.4 Uncoded Operation (No FEC)



CAUTION

Comtech EF Data strongly cautions users when using uncoded operation. If the acquisition sweep width exceeds one quarter of the symbol rate, there is a very high probability that the demodulator will false lock.

Comtech EF Data cannot be held responsible for incorrect operation if the user does not adhere to these guidelines when using uncoded operation.

Example: If selecting 64 kbps QPSK, uncoded, the symbol rate will be half of this rate, or 32 ksymbols/second. One quarter of this equals 8 kHz. Therefore, the absolute maximum acquisition sweep range that should be considered is ± 8 kHz. If there is any frequency uncertainty on the incoming carrier, this should be subtracted from the sweep width. The problem becomes progressively better with increasing symbol rate.

There are occasions where a user may wish to operate a satellite link with no forward error correction of any kind. For this reason, the CDD-56xA/L offers this uncoded mode for the modulation types BPSK and QPSK. However, the user should be aware of some of the implications of using this approach.

PSK demodulators have two inherent undesirable features. The first, known as ‘phase ambiguity’, is due to the fact the demodulator does not have any absolute phase reference and, in the process of carrier recovery, the demodulator can lock up in any of K phase states where $K = 2$ for BPSK, $K = 4$ for QPSK. Without the ability to resolve these ambiguous states, there would be a 1-in-2 chance that the data at the output of the demodulator would be wrong in the case of BPSK. For QPSK, the probability would be 3-in-4.

The problem is solved in the case of BPSK by differentially encoding the data prior to transmission, then performing the inverse decoding process. This is a very simple process, but has the disadvantage that it doubles the receive BER. For every bit error the demodulator produces, the differential decoder produces two.

The problem for QPSK is more complex, as there are four possible lock states leading to four ambiguities. When FEC is employed, the lock state of the FEC decoder can be used to resolve two of the four ambiguities, and the remaining two can be resolved using serial differential encoding/decoding. However, when no FEC is being used, an entirely different scheme must be used. Therefore, in QPSK, a parallel differential encoding/decoding technique is used, but has the disadvantage that it again doubles the receive BER.

NOTE: Whenever uncoded operation is selected, the modem offers the choice between enabling and disabling the differential encoder/decoder appropriate for the modulation type.

The second problem inherent in PSK demodulators is that of ‘data false locking’. In order to accomplish the task of carrier recovery, the demodulator must use a non-linear process. A second-order non-linearity is used for BPSK, and a fourth-order non-linearity is used for QPSK. When data at a certain symbol rate is used to modulate the carrier, the demodulator can lock at incorrect frequencies, spaced at intervals of one-quarter of the symbol rate away from the carrier. Fortunately, when FEC decoding is used, the

decoder synchronization state can be used to verify the correct lock point has been achieved, and to reject the false locks.

However, if uncoded operation is used, there is no way to recognize a data false lock. The demodulator will indicate that it is correctly locked, but the data out will not be correct.

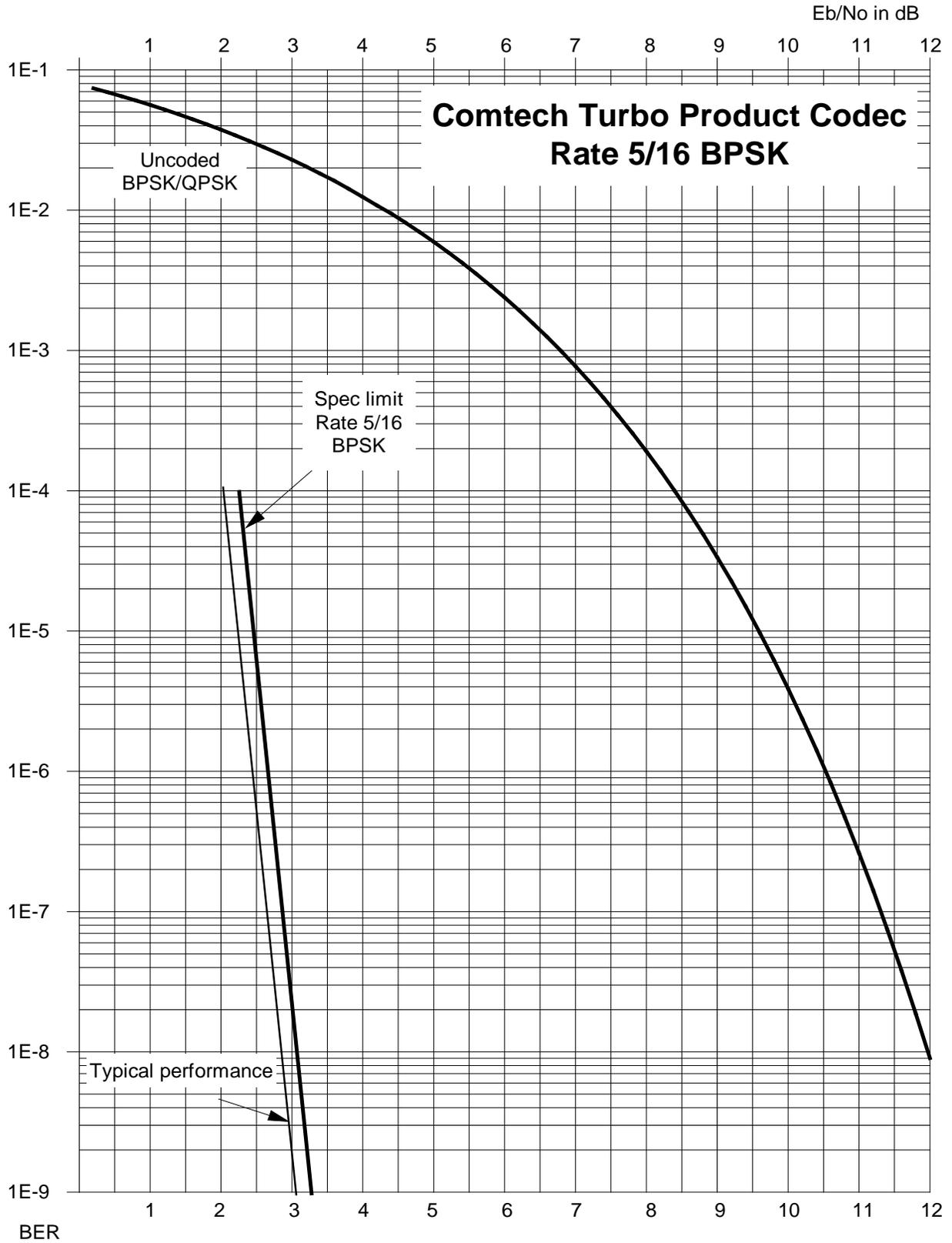


Figure A-2. Turbo Product Code Rate 5/16 BPSK

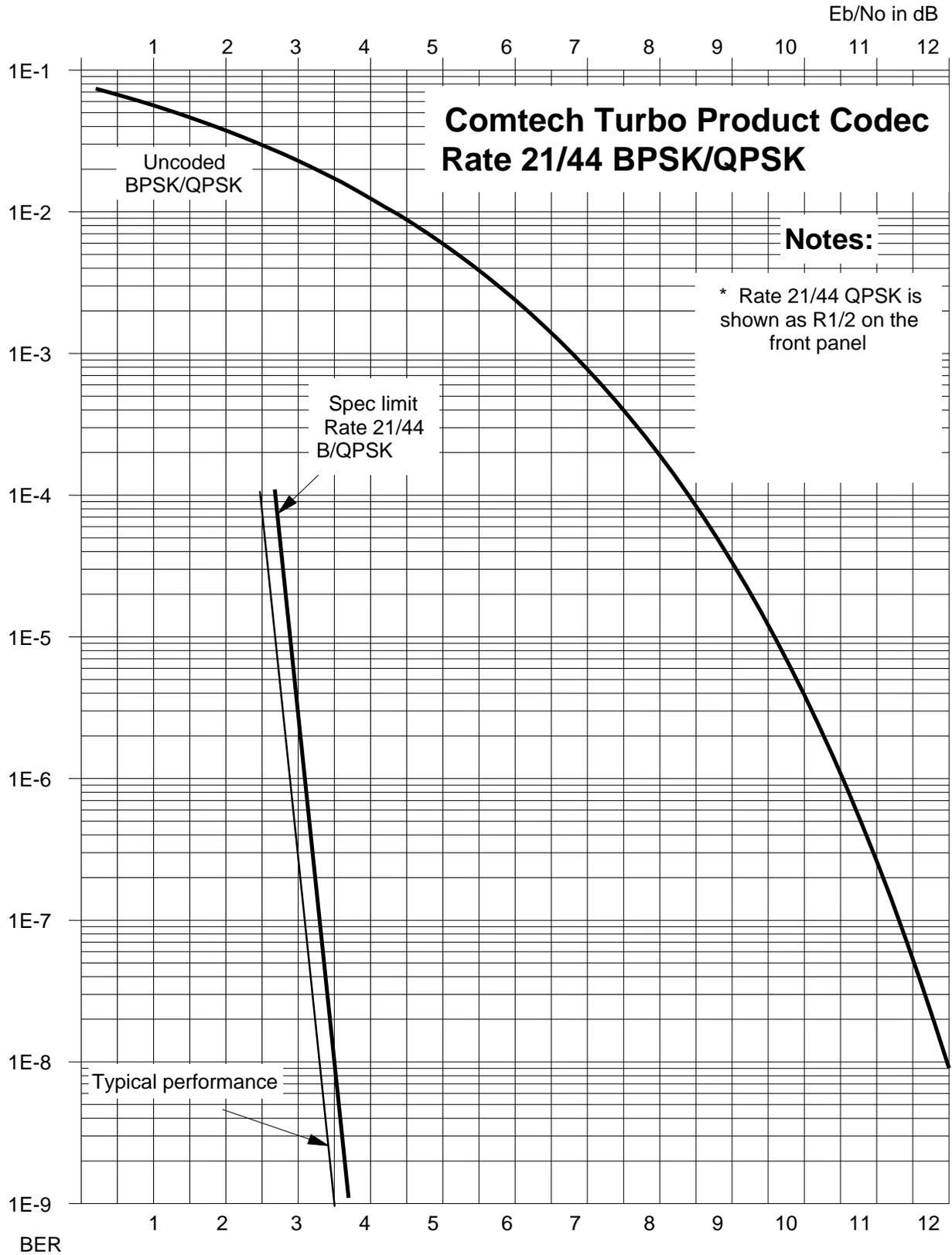


Figure A-3. Turbo Product Codec Rate 21/44 BPSK/QPSK

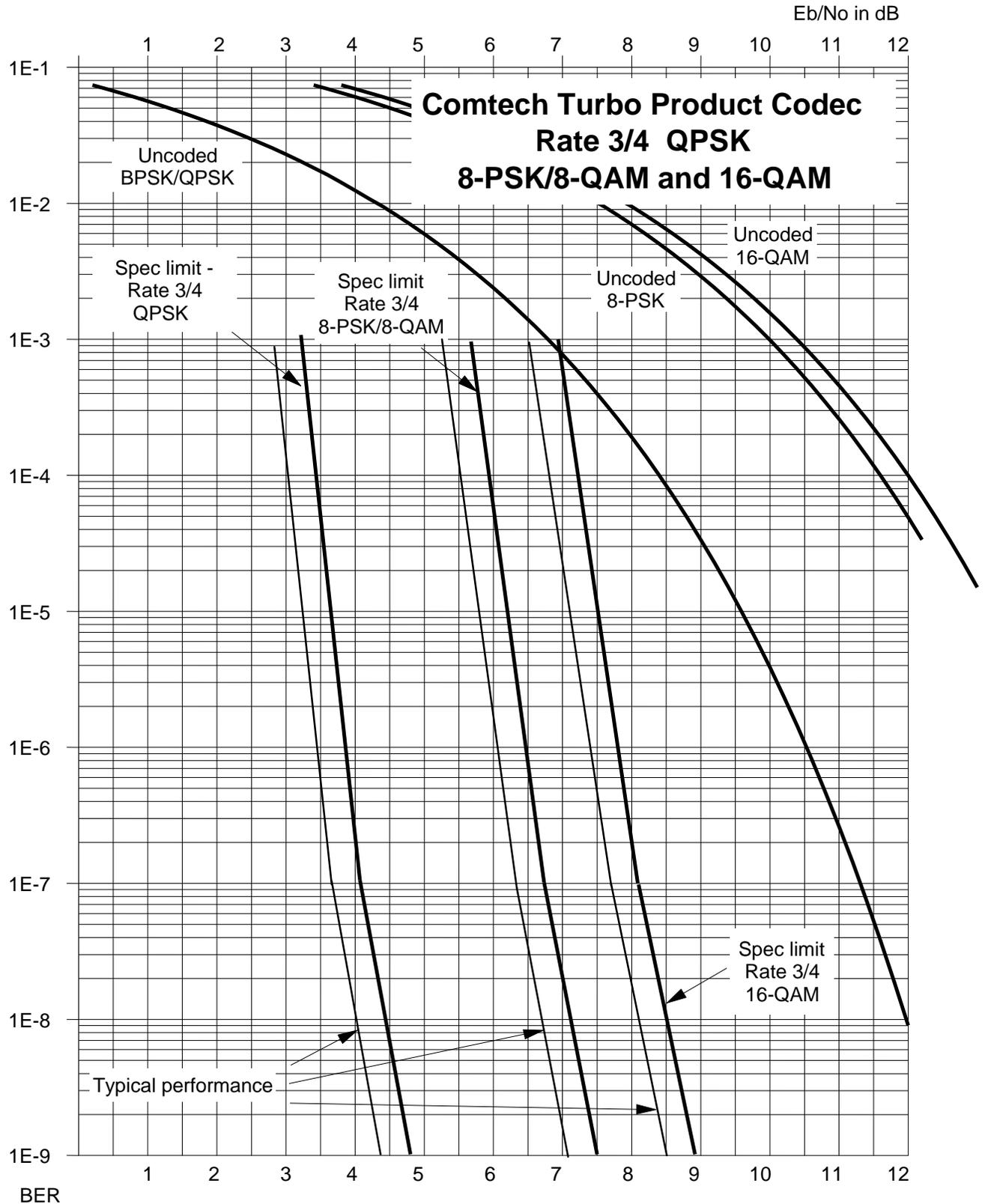


Figure A-4. Turbo Product Codec Rate 3/4 QPSK, 8-PSK/8-QAM, and 16-QAM

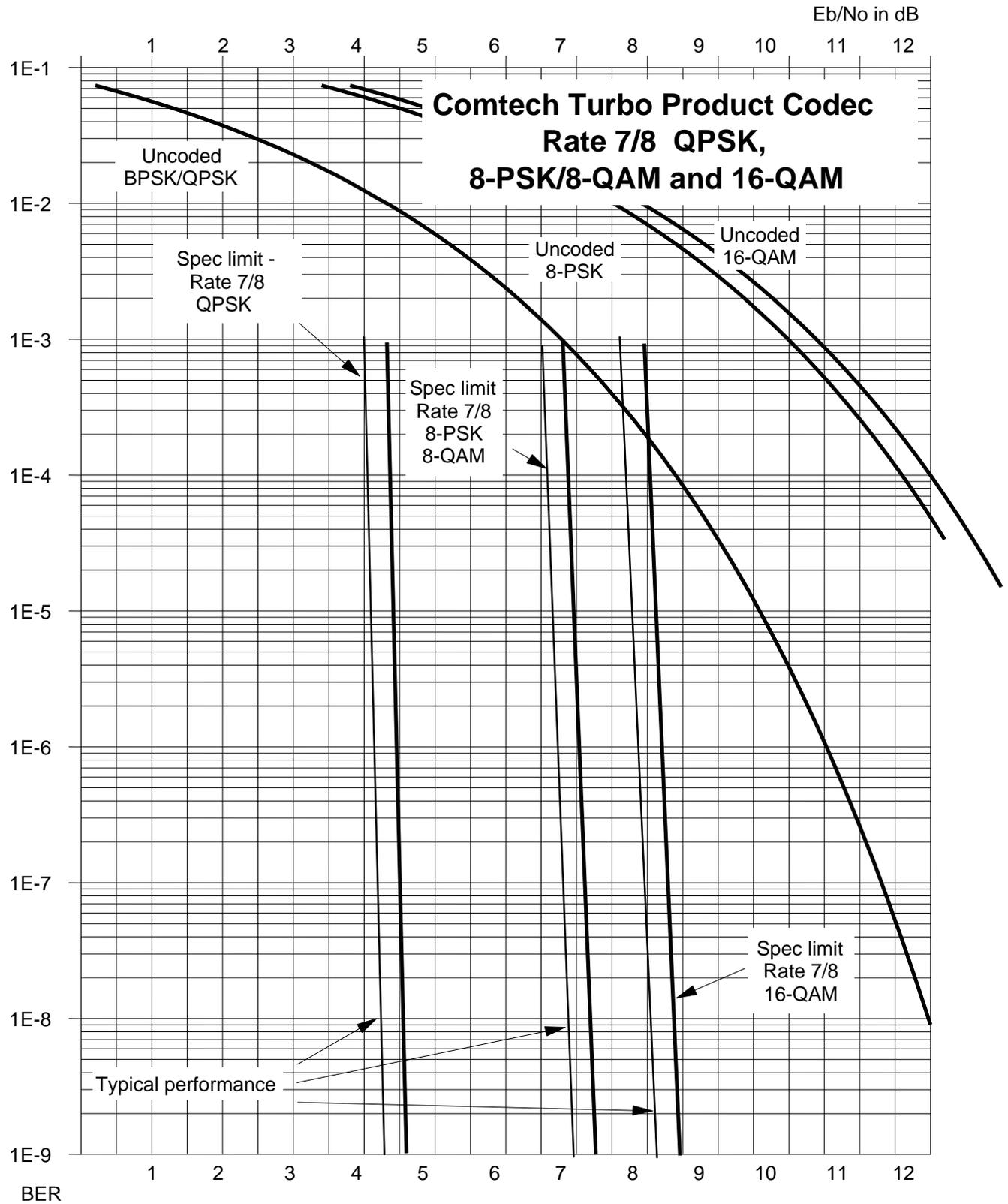


Figure A-5. Turbo Product Codec Rate 7/8 QPSK, 8-PSK/8-QAM, and 16-QAM

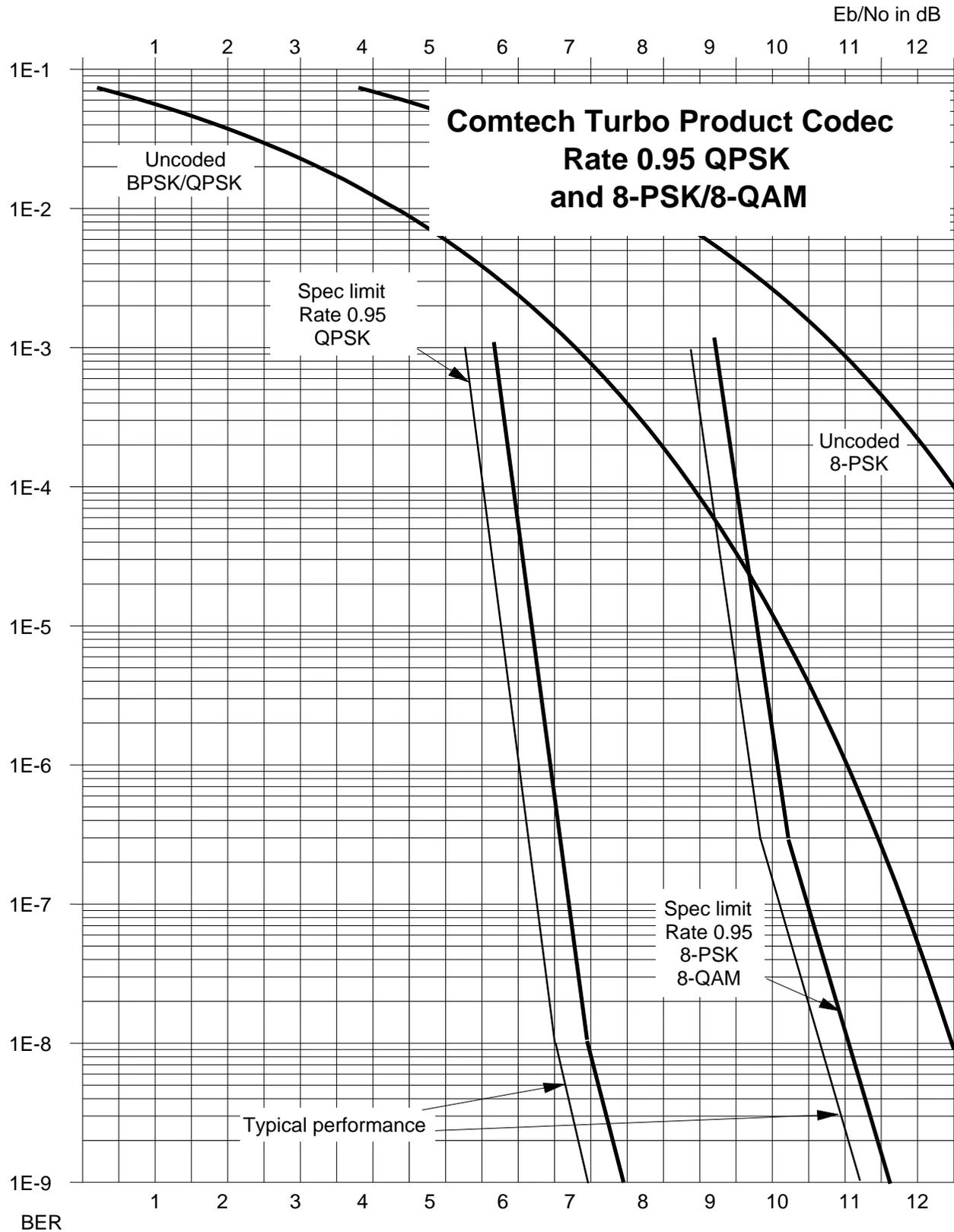


Figure A-6. Turbo Product Codec Rate 0.95 QPSK and 8-PSK/Q-QAM

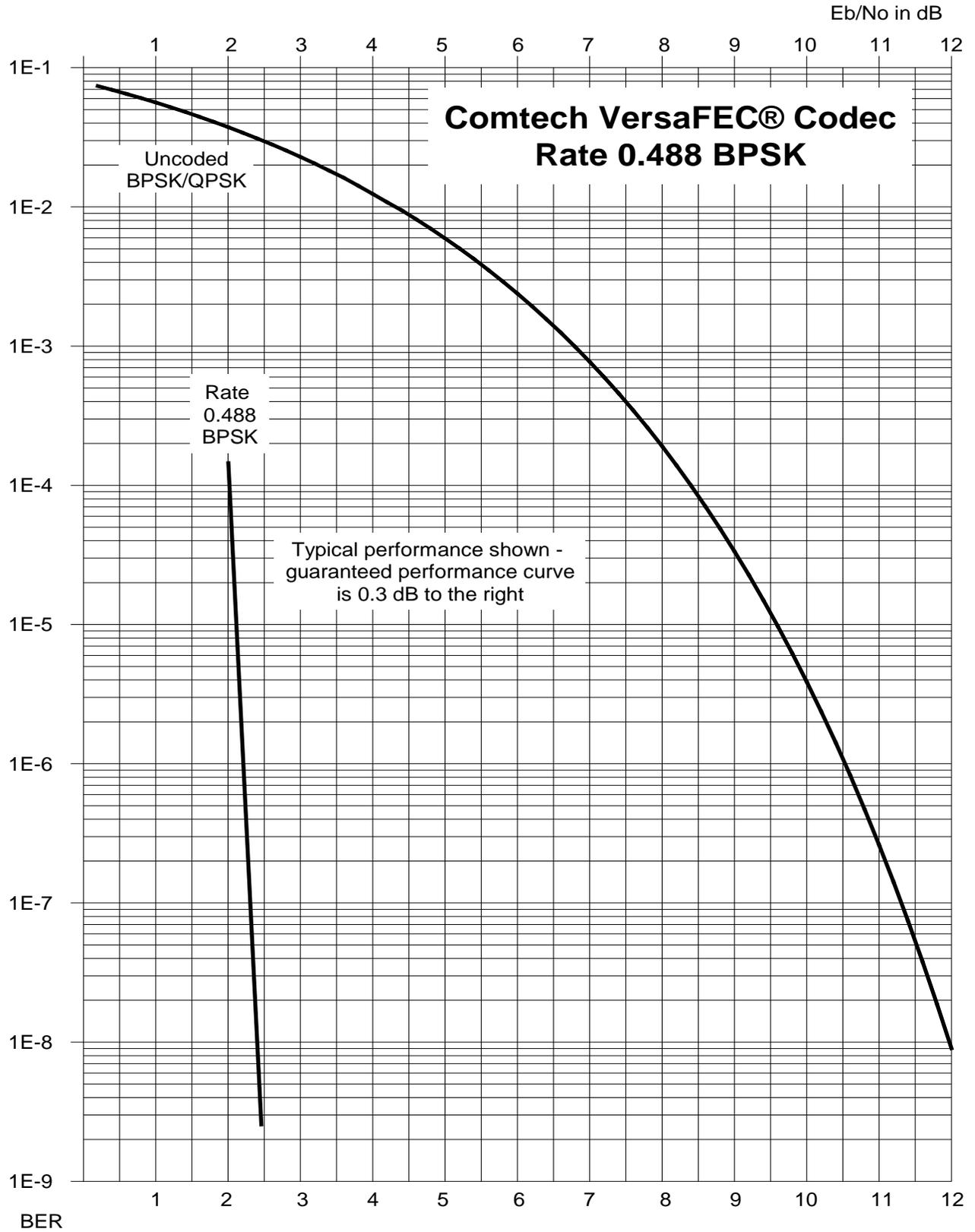


Figure A-7. VersaFEC Codec Rate 0.488 BPSK

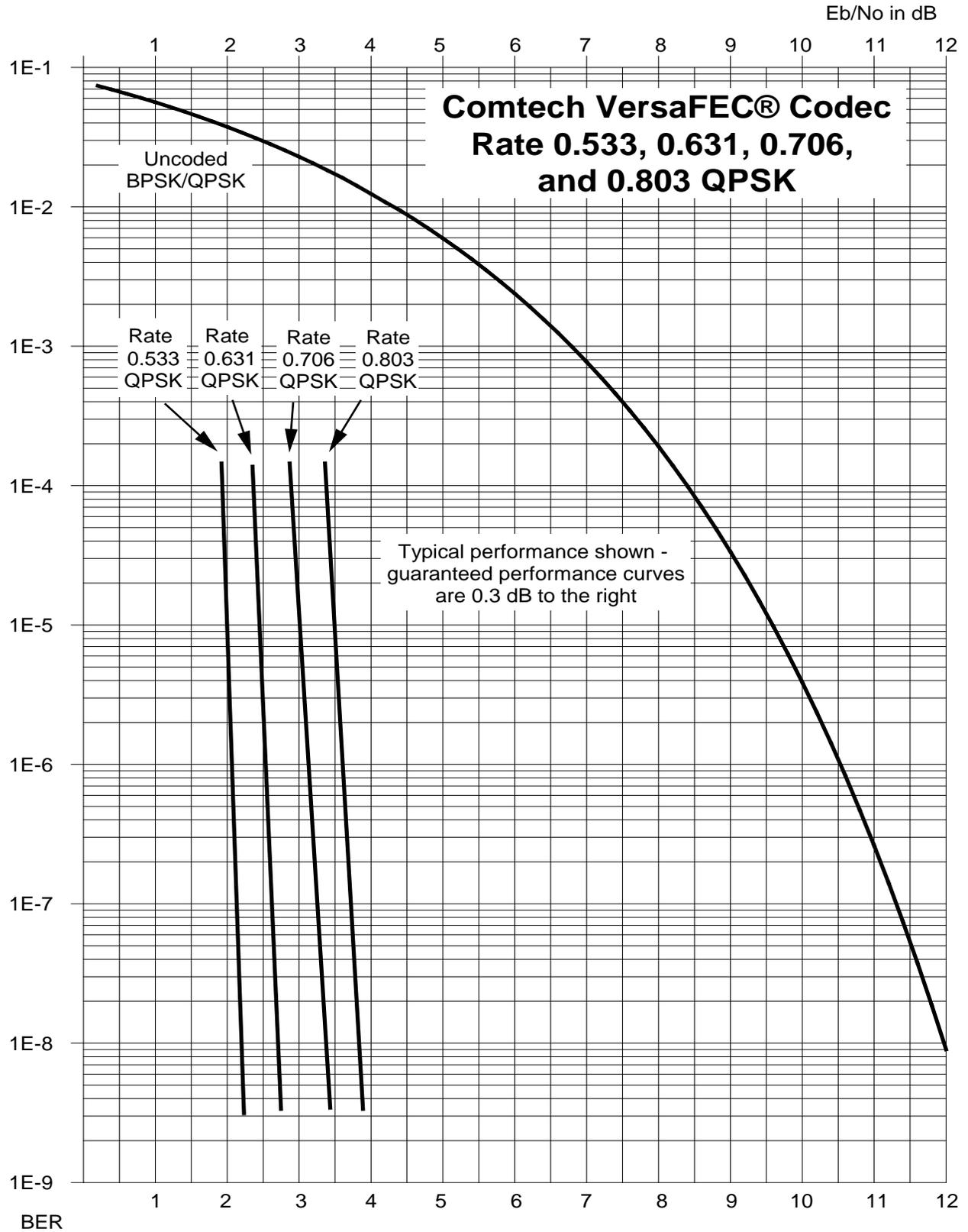


Figure A-8. VersaFEC Codec Rates 0.533, 0.631, 0.706, and 0.803 QPSK

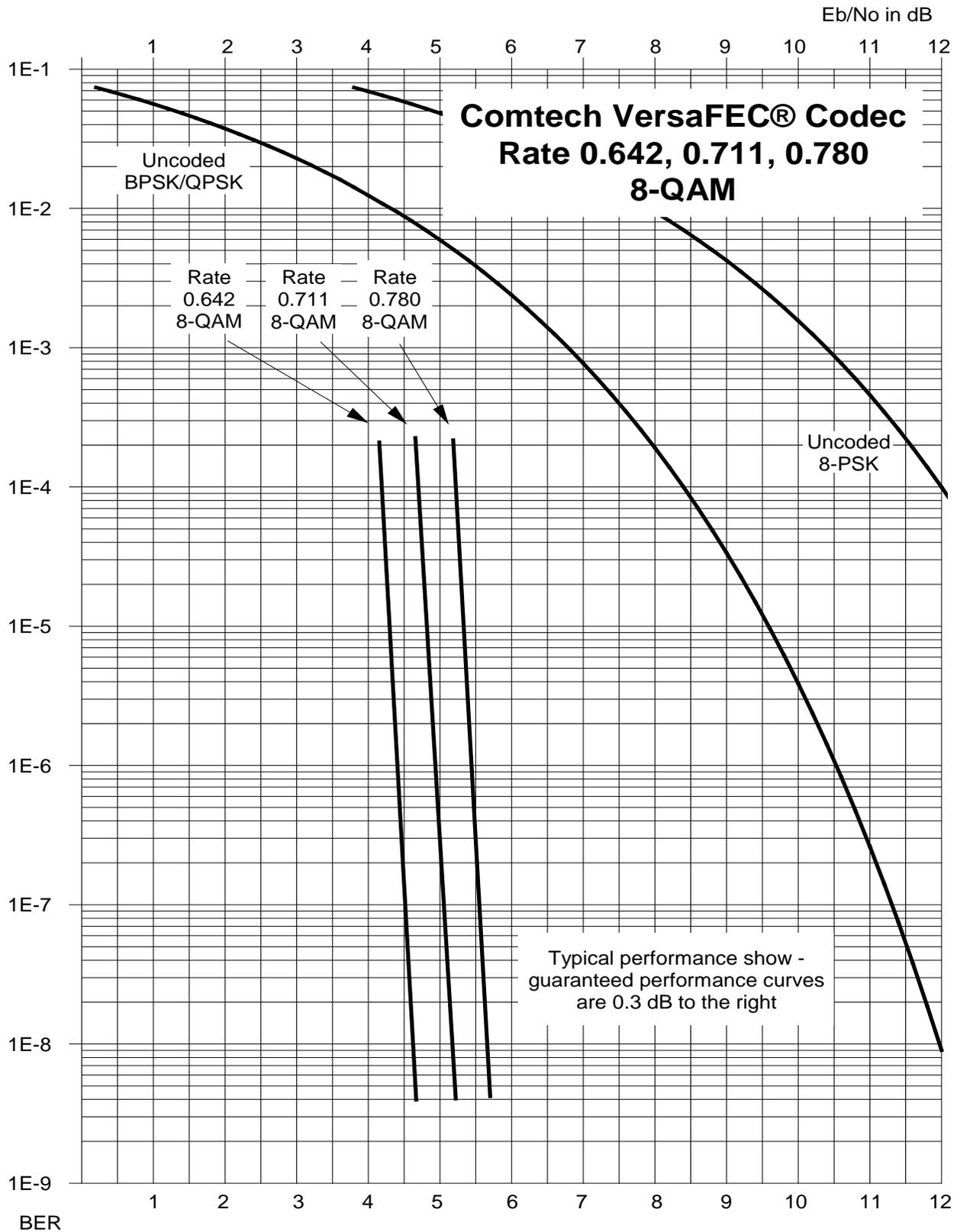


Figure A-9. VersaFEC Codec Rates 0.642, 0.711, and 0.780 8-QAM

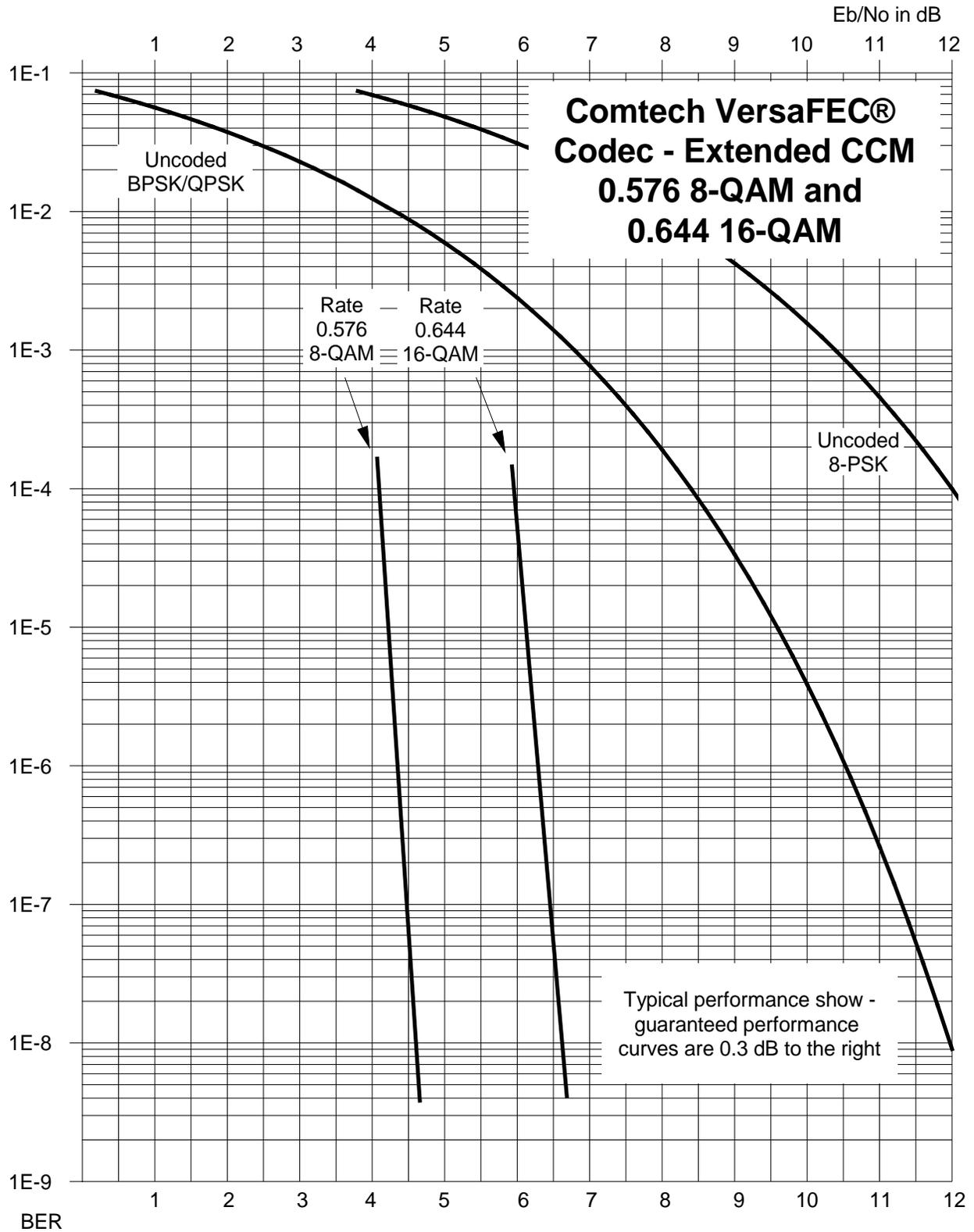


Figure A-22. VersaFEC Codec Extended CCM Rate 0.576 8-QAM and Rate 0.644 16-QAM

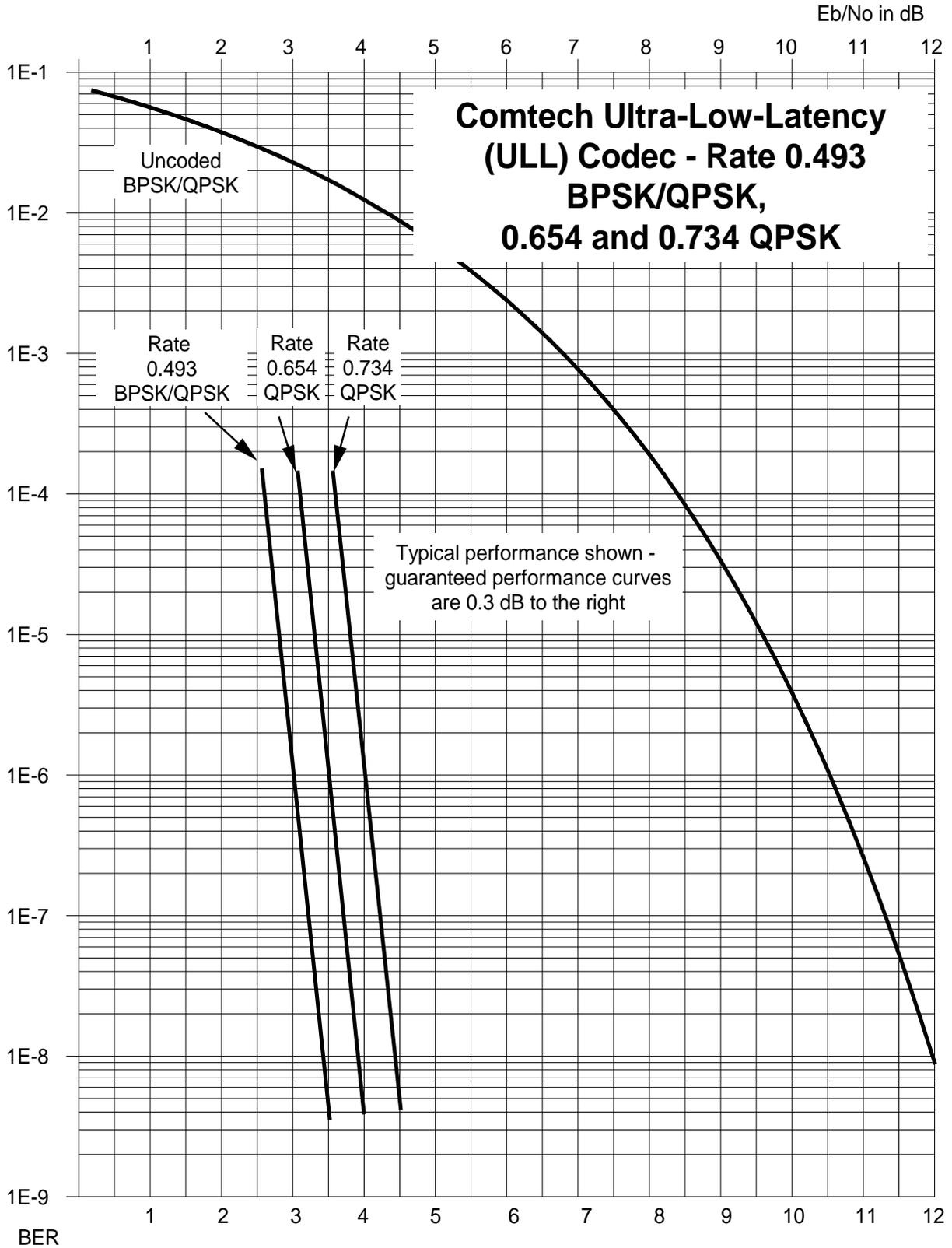


Figure A-23. ULL Codec Rate 0.493 BPSK/QPSK and Rates 0.654 and 0.734 QPSK

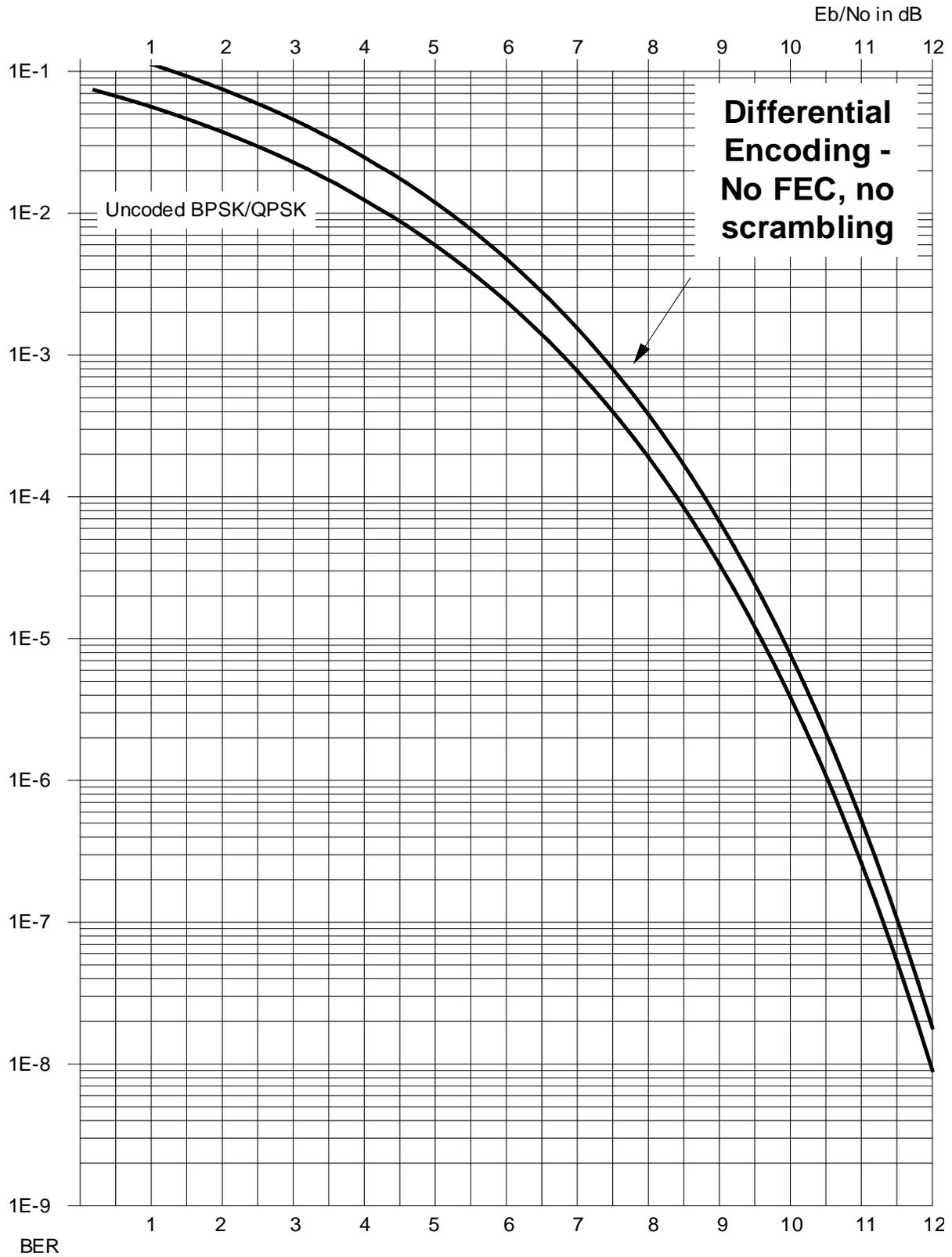


Figure A-24. Differential Encoding – No FEC, No Scrambling

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Appendix B. E_b/N_0 MEASUREMENT

Although the CDD-56xA/L demodulator calculates and makes the value of receive E_b/N_0 available through the remote port of the unit, it is sometimes useful to measure the value using a spectrum analyzer, if one is available.

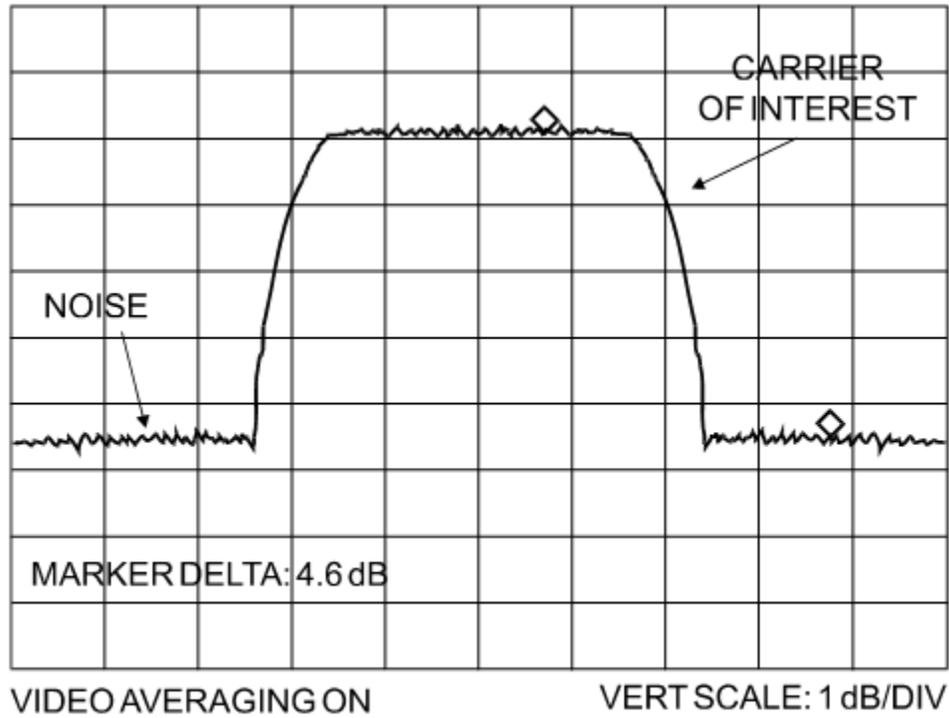
The idea is to accurately measure the value of $(C_0+N_0)/N_0$, (Carrier density + Noise density/Noise density). This is accomplished by tuning the center frequency of the Spectrum analyzer to the signal of interest, and measuring the difference between the peak spectral density of the signal (the flat part of the spectrum shown) and the noise density.

To make this measurement:

- Use a vertical scale of 1 or 2 dB/division.
- Set the Resolution Bandwidth of the Spectrum Analyzer to $< 20\%$ of the symbol rate.
- Use video filtering and/or video averaging to reduce the variance in the displayed trace to a low enough level that the difference can be measured to within 0.2 dB.
- Place a marker on the flat part of the signal of interest, then use the MARKER DELTA function to put a second marker on the noise to the side of the carrier. This value is $(C_0+N_0)/N_0$, in dB.
- Use this value of $(C_0+N_0)/N_0$ in the table on the following page to determine the E_b/N_0 . You will need to know the operating mode to read from the appropriate column.
- If the $(C_0+N_0)/N_0$ value measured does not correspond to an exact table entry, interpolate using the two nearest values.

The accuracy of this method degrades significantly at low values of $(C_0+N_0)/N_0$ (approximately less than 6 dB).

Example: In this diagram, the $(C_o+N_o)/N_o$ measured is 4.6 dB. If Rate 1/2 QPSK is being used, this would correspond to an E_b/N_0 of approximately 2.6 dB.



The exact relationship used to derive the table values is as follows:

$$E_b/N_0 = 10 \log_{10} (10^{(C_o+N_o/N_o)/10} - 1) - 10 \log_{10} (\text{FEC Code Rate}) - 10 \log_{10} (\text{bits/symbol})$$

Where:

E_b/N_0 and $(C_o+N_o)/N_o$ are expressed in dB

Bits/symbol = 1 for BPSK

Bits/symbol = 2 for QPSK

Bits/symbol = 3 for 8-PSK/8-QAM

Bits/symbol = 4 for 16-QAM

Code Rate for 'uncoded' = 1

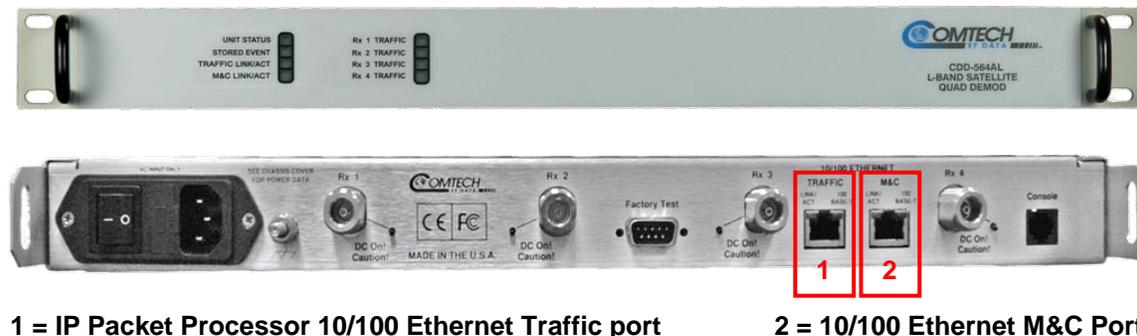
Pay close attention to the sign of the middle term

(Co+No) /No	Eb/No Rate 21/44 BPSK	Eb/No Rate 5/16 BPSK	Eb/No Uncoded QPSK	Eb/No Rate 3/4 QPSK	Eb/No Rate 7/8 QPSK	Eb/No Rate 0.95 QPSK	Eb/No Rate 3/4 8-PSK	Eb/No Rate 7/8 8-PSK	Eb/No Rate 0.95 8-PSK	Eb/No Rate 3/4 16-QAM	Eb/No Rate 7/8 16-QAM
1.4	-	0.8	-	-	-	-	-	-	-	-	-
1.6	-	1.5	-	-	-	-	-	-	-	-	-
1.8	-	2.1	-	-	-	-	-	-	-	-	-
2.0	0.9	2.7	-	-	-	-	-	-	-	-	-
2.2	1.4	3.2	-	-	-	-	-	-	-	-	-
2.4	1.9	3.7	-	-	-	-	-	-	-	-	-
2.6	2.3	4.2	-	-	-	-	-	-	-	-	-
2.8	2.8	4.6	-	-	-	-	-	-	-	-	-
3.0	3.2	5.0	-	-	-	-	-	-	-	-	-
3.5	4.1	5.9	-	-	-	-	-	-	-	-	-
4.0	5.0	6.8	-	-	-	-	-	-	-	-	-
4.5	5.8	7.6	-	0.8	-	-	-	-	-	-	-
5.0	6.5	8.4	-	1.5	0.9	-	-	-	-	-	-
5.5	7.3	9.1	1.1	2.3	1.7	1.3	-	-	-	-	-
6.0	7.9	9.8	1.7	2.9	2.3	1.9	-	-	-	-	-
6.5	8.6	10.4	2.4	3.6	3.0	2.6	-	-	-	-	-
7.0	9.2	11.1	3.0	4.2	3.6	3.2	-	-	-	-	-
7.5	9.8	11.7	3.6	4.8	4.2	3.8	-	-	-	-	-
8.0	10.5	12.3	4.3	5.5	4.9	4.5	-	-	-	-	-
8.5	11.0	12.9	4.8	6.0	5.4	5.0	-	-	-	-	-
9.0	11.6	13.4	5.4	6.6	6.0	5.6	4.9	-	-	-	-
9.5	12.2	14.0	6.0	7.2	6.6	6.2	5.5	4.8	4.5	-	-
10.0	12.7	14.6	6.5	7.7	7.1	6.7	6.0	5.3	5.0	-	-
10.5	13.3	15.1	7.1	8.3	7.7	7.3	6.6	5.9	5.6	5.3	-
11.0	13.8	15.7	7.6	8.8	8.2	7.8	7.1	6.4	6.1	5.8	5.2
11.5	14.4	16.2	8.2	9.4	8.8	8.4	7.7	7.0	6.7	6.4	5.8
12.0	14.9	16.7	8.7	9.9	9.3	8.9	8.2	7.5	7.2	6.9	6.3
12.5	15.4	17.3	9.2	10.4	9.8	9.4	8.7	8.0	7.7	7.4	6.8
13.0	16.0	17.8	9.8	11.0	10.4	10.0	9.3	8.6	8.3	8.0	7.4
13.5	16.5	18.3	10.3	11.5	10.9	10.5	9.8	9.1	8.8	8.5	7.9
14.0	17.0	18.8	10.8	12.0	11.4	11.0	10.3	9.6	9.3	9.0	8.4
14.5	17.5	19.4	11.3	12.5	11.9	11.5	10.8	10.1	9.8	9.5	8.9
15.0	18.1	19.9	11.9	13.1	12.5	12.1	11.4	10.7	10.4	10.1	9.5
15.5	18.6	20.4	12.4	13.6	13.0	12.6	11.9	11.2	10.9	10.6	10.0
16.0	19.1	20.9	12.9	14.1	13.5	13.1	12.4	11.7	11.4	11.1	10.5
16.5	19.6	21.4	13.4	14.6	14.0	13.6	12.9	12.2	11.9	11.6	11.0
17.0	20.1	21.9	13.9	15.1	14.5	14.1	13.4	12.7	12.4	12.1	11.5
17.5	20.6	22.4	14.4	15.6	15.0	14.6	13.9	13.2	12.9	12.6	12.0
18.0	21.1	23.0	14.9	16.1	15.5	15.1	14.4	13.7	13.4	13.1	12.5
18.5	21.6	23.5	15.4	16.6	16.0	15.6	14.9	14.2	13.9	13.6	13.0
19.0	22.1	24.0	15.9	17.1	16.5	16.1	15.4	14.7	14.4	14.1	13.5
19.5	22.7	24.5	16.5	17.7	17.1	16.7	16.0	15.3	15.0	14.7	14.1
20.0	23.2	25.0	17.0	18.2	17.6	17.2	16.5	15.8	15.5	15.2	14.6

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Appendix C. CDD-564A/L Dedicated Management Port

C.1 Introduction



1 = IP Packet Processor 10/100 Ethernet Traffic port

2 = 10/100 Ethernet M&C Port

Figure C-1. CDD-564AL Multi-Channel Demodulator Example

The CDD-564A/L has a Dedicated Management Port function.

Using a single Ethernet port for both demodulator M&C and user data traffic causes many security issues and difficulties. A Dedicated Management Port mitigates the issues caused by converging two networks into a single port.

When you use the Dedicated Management Port, the CDD-564A/L uses the demodulator's onboard 10/100 Ethernet M&C port for M&C access, and uses the IP Packet Processor 10/100 Ethernet Traffic port for Ethernet traffic data traffic. This separates the M&C and traffic networks, and restricts user access to the dedicated port for demodulator M&C. See Figure C-1.

The Dedicated Management Port is available in the Router Point-to-Point, Router Point-to-Multipoint and Vipersat working modes.

The screens shown here are only examples. The appearance of your CLI interface will likely vary from these examples, depending on your system configuration and the terminal emulator that you use.

C.2 Description



CAUTION

You must make sure that Dedicated Management Port operation is enabled at both ends of the network for correct operation.

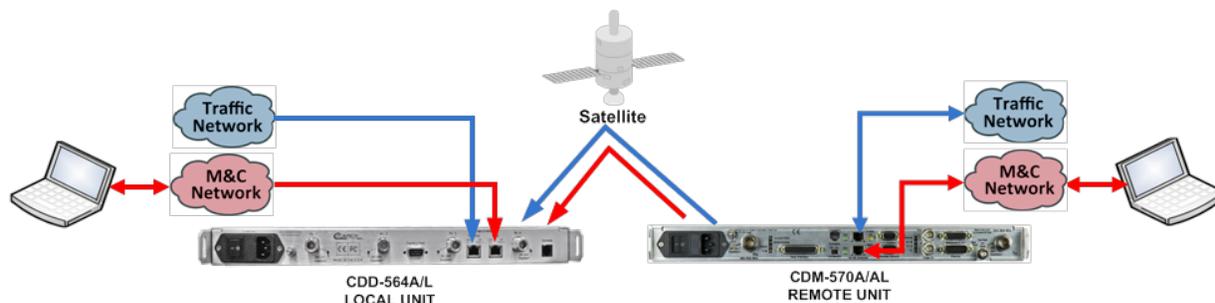


Figure C-2. CDD-564A/L Dedicated Management Port Operation

Figure C-2 shows the local and distant-end (remote) networks with Dedicated Management Port operation enabled. The demodulator on the local M&C network can access the local demodulator M&C without compromise. It does this by packet mixing from the Ethernet traffic network.

C.3 Configuration

By default, Dedicated Management Port operation is disabled. Enable or disable its operation through the CDD-564A/L CLI interface only.

Parameter changes made for the demodulator or IP settings are not saved until you type **S** to save them.



CAUTION

Make sure to save changes before you go to a new CLI screen. Type **S** to save the changes.

C.3.1 Steps to enable (or disable) Dedicated Management Port operation

See Figure C-3.

1. From the CLI Main Menu, type **I** to go to the Interface Configuration menu
2. On the Interface Configuration menu, type **E** to go to the Ethernet Configuration menu
3. On the Ethernet Configuration menu, type **D** to set Dedicated Management Port operation. Available choices depend on the active Working Mode:
 - a. In Router Mode, type **2** to enable Dedicated Management Port operation
4. Type **S** to save the change.

```

1
Main Menu
Administration.....A
Interface Configuration.....I
Route Table.....R
Protocol Configuration.....P
Satellite Demod Configuration.....M
Operations and Maintenance.....O

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
■

2
Interface Configuration
Ethernet Interface.....E
Satellite/HDLC Interface.....H

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
■

Ethernet Interface
Mgmt MAC Address.....[00-06-B0-05-64-1E]
Traffic Port Speed/Mode.....[Auto].....E
Mgmt IP Address.....[192.168.21.70].....I
Mgmt Subnet Prefix Length.....[ 24 ].....M
DM/Red Traffic MAC Address.....[00-06-B0-05-64-1E]
DM/Red Traffic IP Addr.....[192.168.21.70]
DM/Red Traffic Subnet Prefix..[ 24 ]
Traffic Port Actual Speed.....[100 Mb/sec Full Duplex]
Dedicated Management Port.....[Disabled].....D

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
d

3a
Please enter a value for the Dedicated Management Port
Press ESC to abort
 1 -- Disabled
 2 -- Enabled

Ethernet Interface
Mgmt MAC Address.....[00-06-B0-05-64-1F]
Traffic Port Speed/Mode.....[Auto].....E
Mgmt IP Address.....[192.168.21.70].....I
Mgmt Subnet Prefix Length.....[ 24 ].....M
DM/Red Traffic MAC Address.....[00-06-B0-05-64-1E]
DM/Red Traffic IP Addr.....[192.168.222.70].....L
DM/Red Traffic Subnet Prefix..[ 24 ].....B
Traffic Port Actual Speed.....[100 Mb/sec Full Duplex]
Dedicated Management Port.....[Enabled].....D

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
    
```

Figure C-3. CDD-564A/L Dedicated Management Port Configuration

C.4 Working Mode = Router Mode (Point-to-Multipoint / Point-to-Point / Vipersat)

C.4.1 Steps to set the active Router Working Mode

1. Use the CLI to set the active Router Working Mode
2. On the Administration menu, type **C** to see the available choices:
 - Type **1** for Small Network, Router uses 1-byte HDLC addresses
 - Type **2** for Large Network, Router mode using 2-byte HDLC addresses
 - Type **3** for Point to Point, Router mode uses 0 HDLC addresses to save satellite bandwidth
 - Type **4** for Vipersat, Router mode when running in a Vipersat Network
3. Type **S** to save the change.
4. Repeat the steps in Section D.3.1 to enable Dedicated Management Port operation.

C.4.2 IP Address requirements

When Dedicated Management is disabled, the existing Management IP Address is used for both M&C and traffic.

When used in Router Mode, Dedicated Management Port requires two IP Addresses. See Figure C-4:

- One IP Address for M&C (management) – the 10/100 Ethernet M&C port
- One IP Address for WAN (Ethernet data) traffic – the 10/100 Ethernet Traffic port

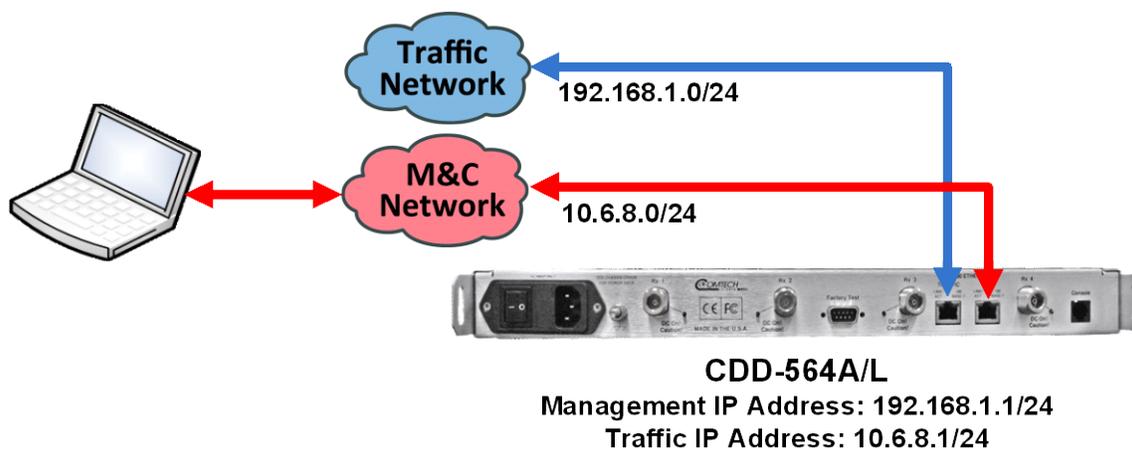


Figure C-4. CDD-564A/L Router Mode IP Addresses

When Dedicated Management Port is first enabled, the existing single IP Address is assigned automatically as the Management IP Address.

You must set the Traffic IP Address(es).

C.4.2.1 Steps to set the Traffic IP Address(es)

See Figure C-5:

1. From the CLI Main Menu, type **I** to go to the Interface Configuration menu
2. Type **E** to go to the Ethernet Configuration menu
3. On the Ethernet Configuration menu, type **I** or **L** to set the Management or Traffic IP Addresses, respectively.
4. On the Ethernet Configuration menu, type **M** or **B** to set the Subnet Prefixes. Make sure the Management and Traffic IP Addresses are not in the same subnet.
5. Type **S** to save the changes.

```

Main Menu
1 Administration.....A
  Interface Configuration.....I
  Route Table.....R
  Protocol Configuration.....P
  Satellite Demod Configuration.....M
  Operations and Maintenance.....O

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
■

Interface Configuration
2 Ethernet Interface.....E
  Satellite/HDLC Interface.....H

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
■

Ethernet Interface
3 & 4 Mgmt MAC Address.....[00-06-B0-05-64-1F]
  Traffic Port Speed/Mode.....[Autol].....E
  Mgmt IP Address.....[192.168.21.70].....I
  Mgmt Subnet Prefix Length.....[ 24 ].....M
  DM/Red Traffic MAC Address.....[00-06-B0-05-64-1E]
  DM/Red Traffic IP Addr.....[192.168.222.70].....L
  DM/Red Traffic Subnet Prefix.....[ 24 ].....B
  Traffic Port Actual Speed.....[100 Mb/sec Full Duplex]
  Dedicated Management Port.....[Enabled].....D

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X
    
```

Figure C-5. CDD-564A/L Router Mode – Assign IP Addresses

C.4.3 Route Table requirements

You must use Route Tables to allow local and remote M&C access when in Router Mode. See Figure C-6.

Note, because the CDD-564A/L is a demodulator, there is no issue of sending it over the WAN interface.

C.4.3.1 Steps to set Route Tables to allow local M&C access

1. From the CLI Main Menu, type **R** to go to the Route Table menu.
2. On the Route Table menu:
 - a. Type a Route number to change an assigned Route
 - b. Or type **D** to delete an assigned route
3. Type **S** to save the change.

```

Main Menu
1 Administration.....A
  Interface Configuration.....I
  Route Table.....R
  Protocol Configuration.....P
  Satellite Demod Configuration.....M
  Operations and Maintenance.....O

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

```

Configuring the Route Table
Route Name      Dest IP/SNet Bits  Next Hop      MultiCast State
Route001... [DFG]      0.0.0.0/0      192.168.21.101  N/A          toEth1..1
Route002... [UNKNOWN].....2
Route003... [UNKNOWN].....3
Route004... [UNKNOWN].....4
Route005... [UNKNOWN].....5
Route006... [UNKNOWN].....6
Route007... [UNKNOWN].....7
Route008... [UNKNOWN].....8
Base.....[1].....B
Delete.....D
Display.....P
DL Mcast...[Disabled]
AddFilter.....A
DelFilter.....R

Demod Select.....[3].....Z
Save Parameters to permanent storage.....S
Exit.....X

```

Figure C-6. CDD-564A/L Route Tables



2114 WEST 7TH STREET TEMPE ARIZONA 85281 USA
480 • 333 • 2200 PHONE
480 • 333 • 2161 FAX