CME-5200

Digicast Media Router ASI Receiver

Installation and Operation Manual

Part Number MN/MRASIRCDC.IOM

Revision A

May 10, 2007

Comtech EF Data is an ISO 9001
Registered Company

Comtech EF Data, 2114 West 7th Street, Tempe, Arizona 85281 USA, (480) 333-2200, FAX: (480) 333-2161

Table of Contents

Tables

Figures

Preface

Customer Support

Contact the Comtech EF Data Customer Support Department for:

- Product support or training
- Reporting comments or suggestions concerning manuals
- Information on upgrading or returning a product

A Customer Support representative may be reached at:

Comtech EF Data
Attention: Customer Support Department
2114 West 7th Street
Tempe, Arizona 85281 USA

480.333.2200 (Main Comtech EF Data number)
480.333.4357 (Customer Support Desk)
480.333.2161 FAX

To return a Comtech EF Data product (in-warranty and out-of-warranty) for repair or replacement:

- **Contact** the Comtech EF Data Customer Support Department. Be prepared to supply the Customer Support representative with the model number, serial number, and a description of the problem.
- **Request** a Return Material Authorization (RMA) number from the Comtech EF Data Customer Support representative.
- **Pack** the product in its original shipping carton/packaging to ensure that the product is not damaged during shipping.
- **Ship** the product back to Comtech EF Data. (Shipping charges should be prepaid.)

For Online Customer Support:

An RMA number request can be requested electronically by contacting the Customer Support Department through the online support page at **www.comtechefdata.com/support.asp**:

- **Click** on "Return Material Authorization" for detailed instructions on our return procedures.
- **Click** on the "RMA Request Form" hyperlink, then fill out the form completely before sending.
- **Send e-mail** to the Customer Support Department at **service@comtechefdata.com**.

For information regarding this product's warranty policy, refer to the Warranty Policy, p. ix.

About this Manual

This manual provides installation and operation information, functional capabilities, and performance specifications for the Comtech EF Data (CEFD) CME-5200 Digicast Media Router ASI Receiver – referred to throughout this manual as "the ASI-R." This publication additionally provides information on how to connect the ASI-R to other data transport equipment.

This is a technical document intended for earth station engineers, technicians, and operators responsible for the operation and maintenance of the CME-5200 Digicast Media Router ASI Receiver.

Reporting Comments or Suggestions Concerning this Manual

Comments and suggestions regarding the content and design of this manual are appreciated. To submit comments, please e-mail the Comtech EF Data Technical Publications Department at **techpub@comtechefdata.com**.

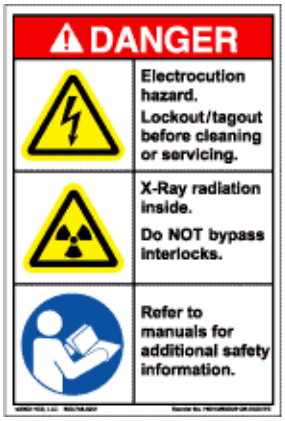
Conventions and References

Cautions and Warnings

IMPORTANT or NOTE indicates a statement that is associated with the task being performed or information critical for proper equipment function.

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.

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



Examples of Multi-Hazard Formats

Metric Conversion

Metric conversion information is located on the inside back cover of this manual. This information is provided to assist the operator in cross-referencing non-Metric to Metric conversions.

Recommended Standard Designations

Recommended Standard (RS) Designations are interchangeable with the designation of the Electronic Industries Association (EIA).

Trademarks

Windows is a trademark of the Microsoft Corporation.

Other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged. Comtech EF Data neither endorses nor otherwise sponsors any such production or services referred herein.

Electromagnetic Compatibility (EMC) Compliance

This is a Class B product. In a domestic environment, it may cause radio interference that requires the user to take adequate protection measures.

Emissions Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the Federal Communications Commision (FCC) rules, and EN55022 Class B requirements.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

EN61000 Compliance

This equipment meets the EMC/immunity characteristics for the limits and methods of measurement for information technology equipment as per EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5 and EN61000-4-11.

This equipment meets the EMC/immunity characteristics for the limits and methods of measurement of mains harmonics & flicker for information technology equipment as per CE EN61000-3-2 and EN61000-3-3.

Safety Compliance

EN60950 Compliance

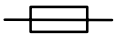
Applicable testing is routinely performed as a condition of manufacturing on all units to ensure compliance with safety requirements of EN60950.This equipment meets the Safety of Information Technology Equipment specification as defined in EN60950.

Low Voltage Directive (LVD)

The following information is applicable for the European Low Voltage Directive (EN60950):

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

International Symbols:

Symbol	Definition
~	Alternating Current
	Fuse

Symbol	Definition
	Protective Earth / Safety Ground
	Chassis Ground

NOTE

For additional symbols, refer to* Cautions and Warnings *listed earlier in this Preface.

Warranty Policy

Comtech EF Data products are warranted against defects in material and workmanship for a period of two years from the date of shipment. During the warranty period, Comtech EF Data will, at its option, repair or replace products that prove to be defective.

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

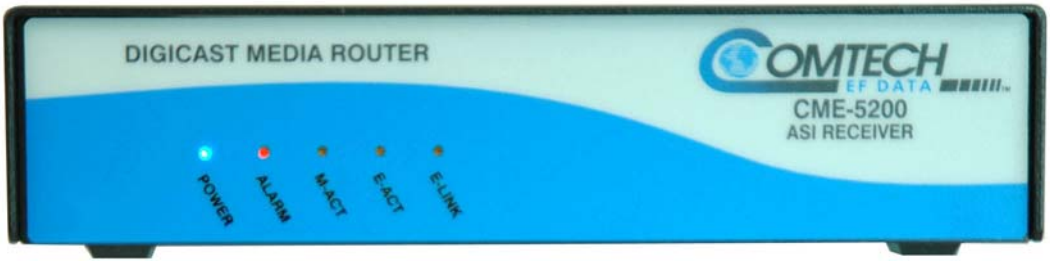


Figure 1-1. CME-5200 Digicast Media Router ASI-R – Front Panel

1.1 Introduction

The Comtech EF Data (CEFD) CME-5200 Digicast Media Router ASI Receiver – referred to throughout this manual as "the ASI-R" – is an economical ASI-to-IP Receiver providing price-versus-performance unparalleled in today's market.

The ASI-R receives Multiprotocol Encapsulated (MPE) packets (as specified in ETSI EN 301 192) over an MPEG-2 Asynchronous Serial Interface (ASI) input and decapsulates Ethernet/IP Unicast or Multicast packets. Additionally, the ASI-R can be configured to provide transport stream (TS) over IP.

1.2 Standard Features

Based on an embedded architecture utilizing a MIPS CPU and eCOS Operating System, the ASI-R provides the following features:

- High Reliability
- ASI Input at rates as high as 213 Mbps
- Ethernet Egress Rate as high as 85 Mbps (1,500 byte packets)
- Support for Multicast and Unicast IP datagrams
- MPE Section Packing and Non-Section Packing on a PID-by-PID basis
- Support for Transport Stream over IP
- Support for all valid PIDs in 8192 range
- 64 PIDs

- MPEG-2 188/204-byte operation
- Support for 802.1Q VLAN Tags
- IGMP for Multicast Route Announcements
- Configurable Telnet and HTTP ports for security
- Color LEDs for status monitoring and rapid fault isolation
- Device management (monitor, control and configuration):
    - Web Interface
    - Terminal Interface
    - TFTP for remote field software/firmware upgrade
    - Telnet
    - SNMP V2 (Private and MIB II) Support *(Future)*

1.3 Performance

The ASI-R provides the following performance characteristics:

Item	Value
Maximum Ingress (ASI Input)	213 Mbps 188-byte Mode
Maximum Packets per Second (PPS) (Minimum Packet Size 64 bytes)	15,000 PPS
Maximum Bits Per Second (Maximum Packet Size 1,518 bytes)	85 Mbps 188-byte Mode
Latency	Less than 10 mS

1.4 Configuration

A typical ASI-R configuration, shown in in Figure 1-2, enbales IP-based multimedia content (video, audio and data) to be delivered over a high-speed ASI link and distributed to remote devices connected to the ASI-R via an Ethernet LAN.

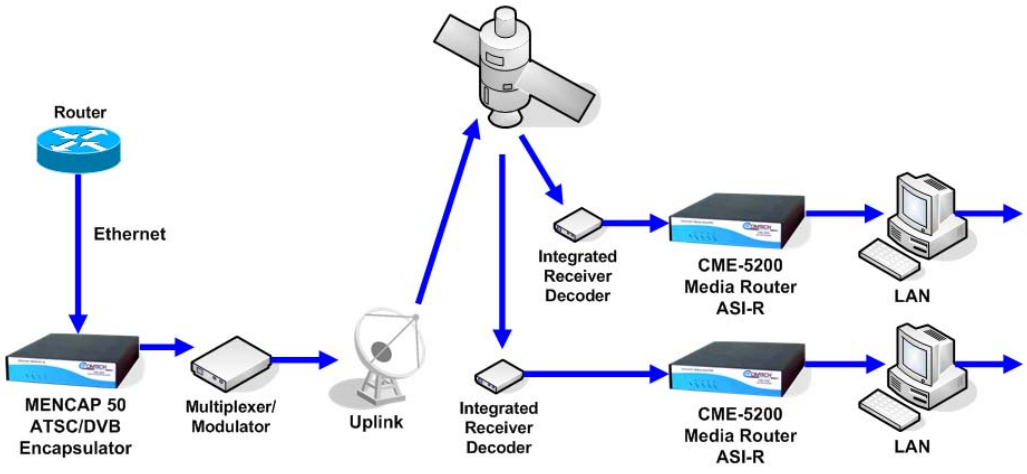


Figure 1-2. CME-5200 Digicast Media Router ASI-R

1.5 Specifications

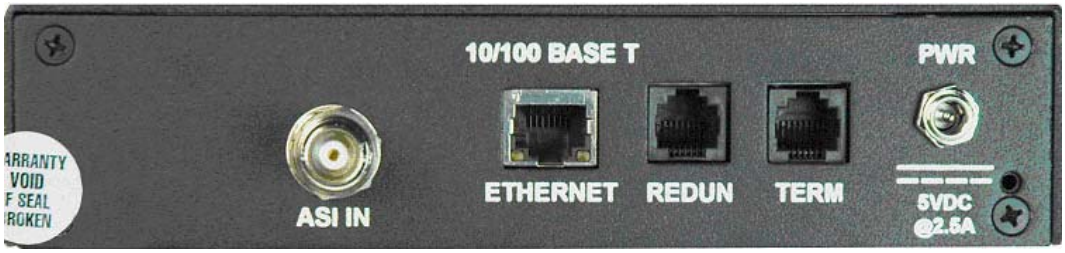


Figure 1-3. CME-5200 Digicast Media Router ASI-R – Rear Panel

Table 1-1. CME-5200 Digicast Media Router ASI-R – Specifications

Parameter			Specification	
Physical	Dimensions		7.125” L x 8.125” W x 1.72” H (18.1L x 20.6W x 4.4H cm)	
	Weight		< 6 lbs (2.7 kg)	
	Power		2.5 mm with screw type connector	
	ASI Copper Input		BNC (75Ω)	
	Ethernet (10/100BaseT)		RJ-45	
	Terminal		RJ-12	
	Redundancy		RJ-12	
	LEDs	Blue	POWER	Power
		Red	ALARM	Alarm
		Green	M-ACT	MPE data activity
		Green	E-ACT	Ethernet traffic/activity
		Green	E-LINK	Ethernet connection to hub/switch operational
Electrical	Power Input / Consumption		48 to 248 VAC 50/60 Hz converted to +5VDC @ 2.5A / < 7 W	
	ASI (Copper)		EN50083-9	
	Ethernet (10/100BaseT)		IEEE 802.3u	
	Console		RS-232	
	Redundancy		RS-232	
Environmental	**Temperature**			
	Operating		32° to 104° Farenheit (0° to 40° Celsius)	
	Storage (Non-operating)		-22° to 150° Farenheit (-30° to 65° Celsius)	
	Humidity			
	Operating		10% to 75% Non-condensing	
	Storage (Non-operating)		Relative Humidity to 95% with temperature ≤ 95° Farenheit (35° Celsius)	
	Altitude			
	Operating		Up to 10,000 feet (3048 m) above sea level	
	Storage (Non-operating)		Survival up to 50,000 feet (15240 m) above sea level for up to 15 hours	

1.6 Terminology

The following table defines the acronyms referred to throughout this manual:

Acronym	Definition
ASI	Asynchronous Serial Interface
ARP	Address Resolution Protocol
CEFD	Comtech EF Data
DVB	Digital Video Broadcast
EBU	European Broadcasting Union
ETS	European Telecommunications Standard
FTP	File Transfer Protocol
IANA	Internet Assigned Number Authority
IGMP	Internet Gateway Messaging Protocol
IP	Internet Protocol
IRD	Integrated Receiver Decoder
LAN	Local Area Network
MAC	Media Access Control
MIB	Management Information Base
MPE	Multi-Protocol Encapsulation
MPEG	Moving Pictures Expert Group
MPEGTS	Moving Pictures Expert Group Transport System
MUX	Multiplexer
PID	Packet Identifier
RS	Reed Solomon
SNMP	Simple Network Management Protocol
SYSLOG	System Log
TCP	Transmission Control Protocol
TERM	Terminal
TSD	Transport Stream Demultiplexer
UDP	User Datagram Protocol
VLAN	Virtual Local Area Network

Chapter 2. INSTALLATION & INITIAL CONFIGURATION

2.1 Major Assembly

The CME-5200 Digicast Media Router ASI-R is available in a standalone configuration. Table 2-1 lists the components provided with a standard configuration. In the event any listed item is missing, please contact Comtech EF Data Customer Support:

Table 2-1. CME-5200 Digicast Media Router ASI-R – Standalone Configuration

Quantity	Description
1	CME-5200 Digicast Media Router ASI-R
1	SPU24-102 Power Supply
1	IEC AC Power Cord
1	CA-TERMINAL Terminal Cable
1	CD (includes this manual and a Quick Start reference)
1	Quick Start sheet

2.2 Unpacking

The shipping container and packing materials should be retained for possible reshipment.

Perform a receiving inspection as follows:

- **Inspect** the shipping container for damage. If there is damage to the shipping container, **notify the carrier**.
- **Check** to determine that all parts, materials and documentation have been shipped with the router.
- **Inspect** the ASI-R for possible physical damage.
- **Test** the ASI-R for proper operation.

- **Contact** Comtech EF Data Customer Support if the shipment is:
    - Incomplete
    - Physically damaged
    - Inoperable

2.3 Installation

The ASI-R is designed for ease of installation and configuration. Once the unit has been removed from the packing container, please follow these instructions:

Step	Procedure
1	Place the ASI-R on a flat surface with free-air flow where the LEDs can be clearly observed with unrestricted access to the rear panel of the unit.
2	Connect the DC power connection to the connection labeled **PWR** on the back of the unit and tighten the restraining nut to ensure secure operation.
3	Connect an RJ-45 Ethernet cable (patch cord) to the port labeled **ETHERNET**. This cable should be connected to an Ethernet concentrator (hub) or switch.
4	Connect a terminal cable (supplied) to the port labeled **TERM**. This cable should be connected to a PC's serial port (DB-9) to initially configure the ASI-R.
5	Connect the AC power cord between a standard wall outlet and the power supply. The blue LED will illuminate.
6	IMPORTANT *It is recommend that the ASI cable **NOT** be connected until the unit has been completely configured.*
7	Upon startup, the following LEDs will illuminate on the ASI-R front panel:

LED	Function Label	Description
Blue	**POWER**	LED illuminates if power is properly applied
Red	**ALARM**	LED may illuminate since the unit is not yet configured
Green	**M-ACT**	LED illuminates if MPE data is present
Green	**E-ACT**	LED flashes if there is Ethernet traffic/activity
Green	**E-LINK**	LED illuminates if the Ethernet connection to the Hub/Switch is operational

2.4 Initial Configuration

The initial configuration involves setting up the IP parameters via the terminal cable. Once the IP parameters have been configured, the terminal cable can be removed. The terminal cable should be stored in a known location, since it may be needed in the future.

To configure the IP parameters:

Step	Procedure
1	Using a terminal emulator on a PC such as HyperTerminal™ or TeraTerm™, set up the communication port as follows: • 38,400 BAUD • 8 Data Bits • 1 Stop Bit • No Parity • No Flow Control
2	Press the **<ENTER>** key on the PC – the ASI-R's menu should be displayed.
3	Press "**N**" for Network Menu.
4	Press "**I**" for the IP Address, Enter the IP Address and press **<ENTER>.**
5	Press "**M**" for the Subnet Mask. Enter the Subnet Mask and press **<ENTER>.**
6	Press "**G**" for the Default Gateway IP Address. Enter the Default Gateway Address and press **<ENTER>**.
7	Press "**S**" to save the parameters.
8	Press "**Y**" to confirm the saving of parameters.
9	Press "**X**" to exit to the main menu.
10	Press "**P**" to configure the PIDs. Enter a valid number of PIDs and press **<ENTER>**.
11	Press "**Y**" to confirm the saving of parameters.
12	Press "**X**" to exit to the main menu.

At this point, the unit has been configured for full operation and the terminal cable may be removed. The ASI cable may now be safely attached to the **ASI IN** (input) port. For continued operation the unit may be managed via the Terminal Interface; however, it is recommended to use the Web Interface for ease of management.

Notes:

Chapter 3. INTERFACE PINOUTS

3.1 Pinout Overview

The rear panel interface (Figure 3-1) provides all necessary external connections between the CME-5200 Digicast Media Router ASI-R and other equipment.

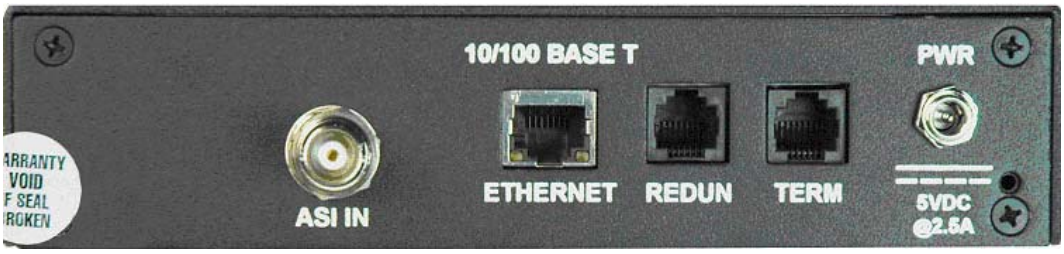


Figure 3-1. CME-5200 Digicast Media Router ASI-R – Rear Panel

3.2 DC Power

Pin	Definition
Center	+5VDC
Outer Ring	GND

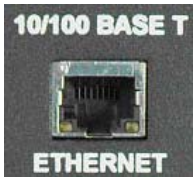
3.3 RJ-12 Terminal

Pin	Definition
1	GND
2	TXD
3	RXD
4	GND
5	N/C
6	N/C

3.4 RJ-12 Redundancy

Pin	Definition
1	GND
2	TXD
3	RXD
4	GND
5	N/C
6	N/C

3.5 RJ-45 Ethernet



Pin	Definition
1	TXD+
2	TXD-
3	RXD+
4	N/C
5	N/C
6	RXD-
7	N/C
8	N/C

3.6 BNC ASI IN

Pin	Definition
Center	8B/10B 270 Mbps
Outer Ring	GND

Chapter 4. DEVICE MANAGEMENT VIA USER INTERFACES

4.1 Introduction

Management of the ASI-R is simple and intuitive. There are a variety of ways to configure and manage the ASI-R:

- Web Interface via a LAN-based Desktop Browser
- Terminal Interface via direct connection to a PC's asynchronous serial port
- Telnet Interface via a LAN
- TFTP for remote terminal upgrades
- SNMP Private MIB and MIB II (Future)

4.2 Web Interface

The Web Interface, operating under standard HyperText Transport Protocol (HTTP), is used to communicate with and command the ASI-R via a HyperText Markup Language-based Graphical User Interface (GUI). To utilize the Web Interface, a LAN connection must exist between the ASI-R and a PC with a browser such as Microsoft Internet Explorer.

Once a valid IP Address, Subnet Mask and Default Gateway have been entered into the ASI-R, activate a browser on the desktop. Enter the IP address for the ASI-R into the URL field as shown in Figure 4-1. If the port number has been modified from the **Standard 80** via the Terminal Interface, then the port number must be appended with a colon to the IP address.

Figure 4-1. Connecting to the ASI-R

A successful connection between the PC and the ASI-R will result in the display of the "splash page" shown in Figure 4-2.

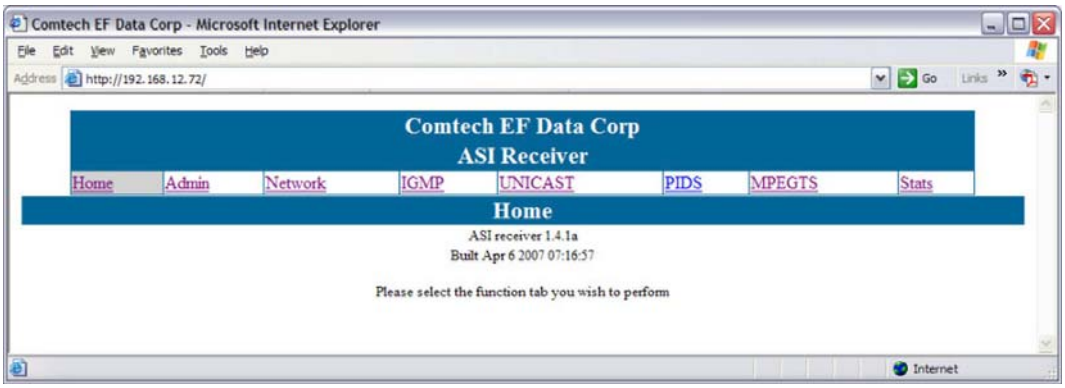


Figure 4-2. Home ("Splash") page

4.2.1 Administrative Configuration

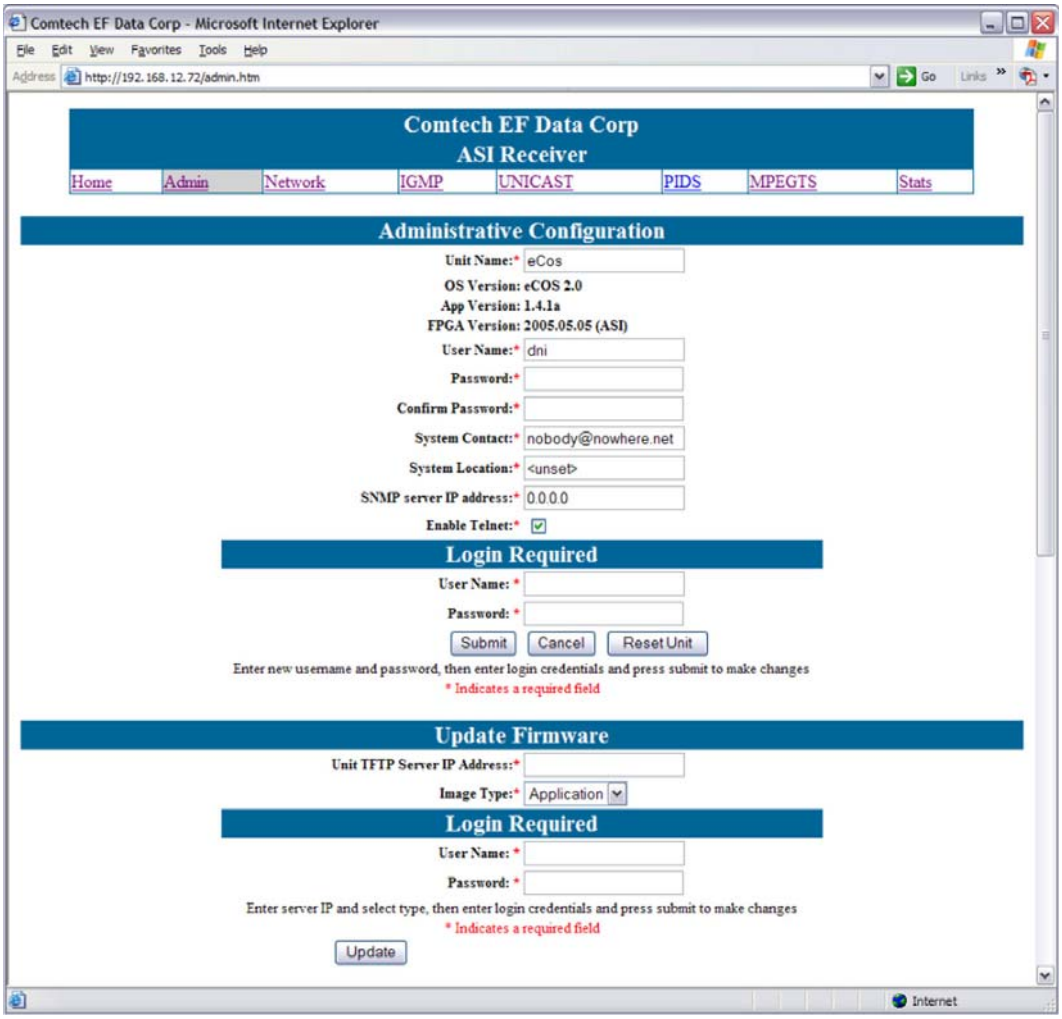


Figure 4-3. Administrative Configuration page

IMPORTANT

Beginning with the Administrative Configuration page (Figure 4-3), all pages containing configurable parameters feature a login dialog box at the bottom of the page. Changes to the ASI-R configuration will not be accepted without a valid user name and password.

The ASI-R Administrative Configuration page contains the following configurable parameters:

User Name

The ASI-R's User Name is user configurable and is used for connecting to the unit via IP management services.

The default user name is comtech.

Password

The ASI-R's Password is user configurable and is used for authenticating a user when connecting via IP management services. *The password is case sensitive and must be entered carefully.*

When the password is changed, the user will be prompted to enter the password **twice** to verify it is correct.

The default password is comtech.

System Contact

Contact information of the system administrator for support.

System Location

The physical location where the unit has been installed.

Enable Telnet

Enables Telnet application on the ASI-R.

SNMP IP Address

Defines the SNMP server that can connect to the unit.

Login Required

A user name and password are required to make any changes to the ASI-R configuration.

Update Firmware

Allows software/firmware changes to be made. User name and password is required for security.

4.2.2 Network Configuration

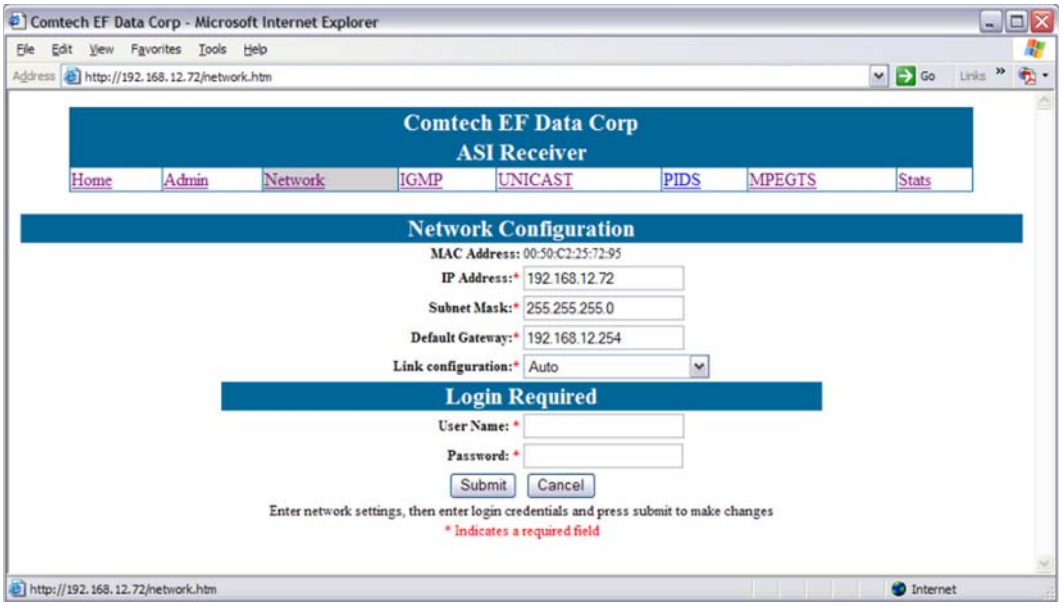


Figure 4-4. Network Configuration page

The ASI-R's Network Configuration page has the following configurable parameters:

IP Address

The IP Address assigned to the ASI-R's LAN interface. The IP Address is entered in dotted decimal format.

Subnet Mask

The Subnet Mask assigned to the ASI-R's LAN interface. The Subnet Mask is entered in dotted decimal format and is typically 255.255.255.0 for a C-Class mask, 255.255.0.0 for a B-Class mask or 255.0.0.0 for an A-Class mask.

Default Gateway

The Default Gateway assigned to the ASI-R's LAN interface. The Default Gateway is entered in dotted decimal format and must be within the subnet of the IP Address assigned to the LAN interface. The Default Gateway is the address of a local router to which all non-local subnet traffic will be directed.

Login Required

A user name and password are required to make any changes to the ASI-R configuration.

4.2.3 IGMP Configuration

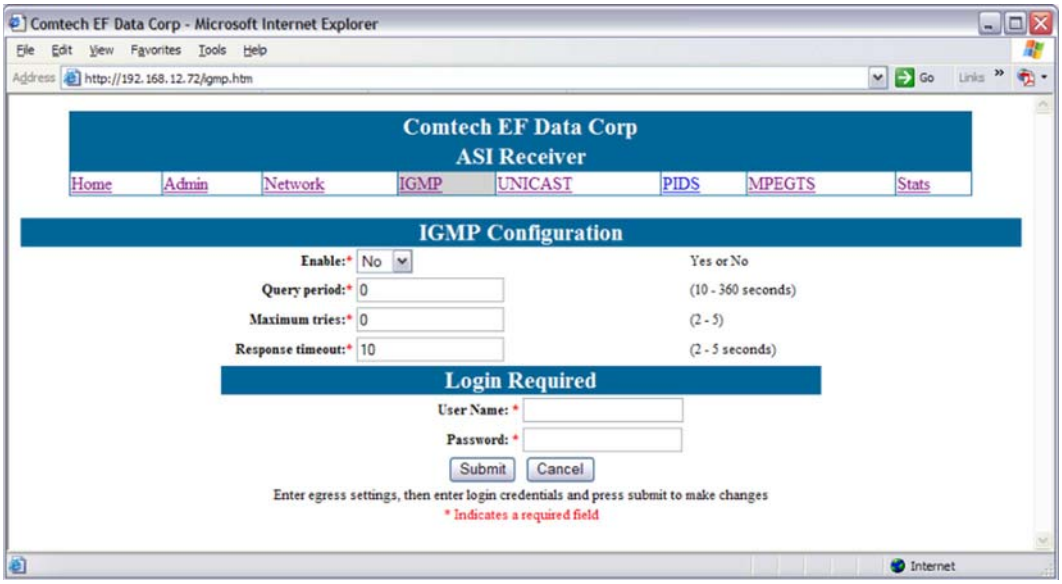


Figure 4-5. IGMP Configuration page

Enable

Select the Boolean if IGMP version 3 (IGMPv3) is to be supported. If the Boolean is not selected, all received Multicast IP is forwarded to the Ethernet. If support is enabled, no Multicast IP will be forwarded to the Ethernet until a subscriber has joined the Multicast group.

Query Period

How often a solicitation is made for Multicast subscribers.

Maximum Tries

The maximum number of attempts the ASI-R will make for soliciting for Multicast subscribers before the Multicast stream is pruned off.

Response Timeout

The maximum amount of time the ASI-R will wait for Multicast Subscribers before the Multicast stream is pruned off.

4.2.4 Unicast Routing Configuration

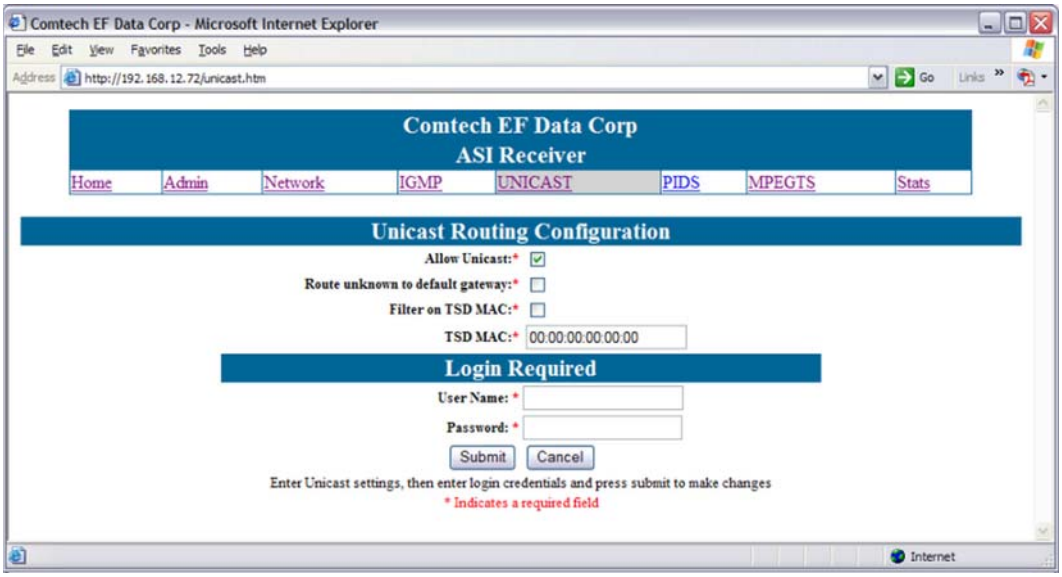


Figure 4-6. Unicast Routing Configuration page

Allow Unicast

Select the Boolean if Unicast routing is to be supported. If the Boolean is not selected, only Multicast IP support will be provided.

Route unknown to default gateway

If Unicast routing support is enabled, for IP packets that are received and are not destined to the local subnet, all non-local Unicast packets are directed to the default gateway for routing.

Filter on TSD MAC

This Boolean must be enabled if Unicast routing support is enabled, and the IP Encapsulator on the head-end is configured for Unicast routes with configured MAC addresses for each Transport Stream Demultiplexer (TSD).

TSD MAC

If the Filter on TSD MAC Boolean is enabled, this field is the MAC address used for routing incoming MPE packets carrying Unicast. The configured MAC address must match the incoming MAC address in the MPE packet. If the MAC addresses do not match, the packet will be silently discarded.

VLAN

VLAN is supported on the ASI-R. Packets that are received on the ASI interface as 802.1Q are routed to the Ethernet with the VLAN tags intact. The valid ranges of the VLAN ID are 0 to 4095.

4.2.5 PID Configuration

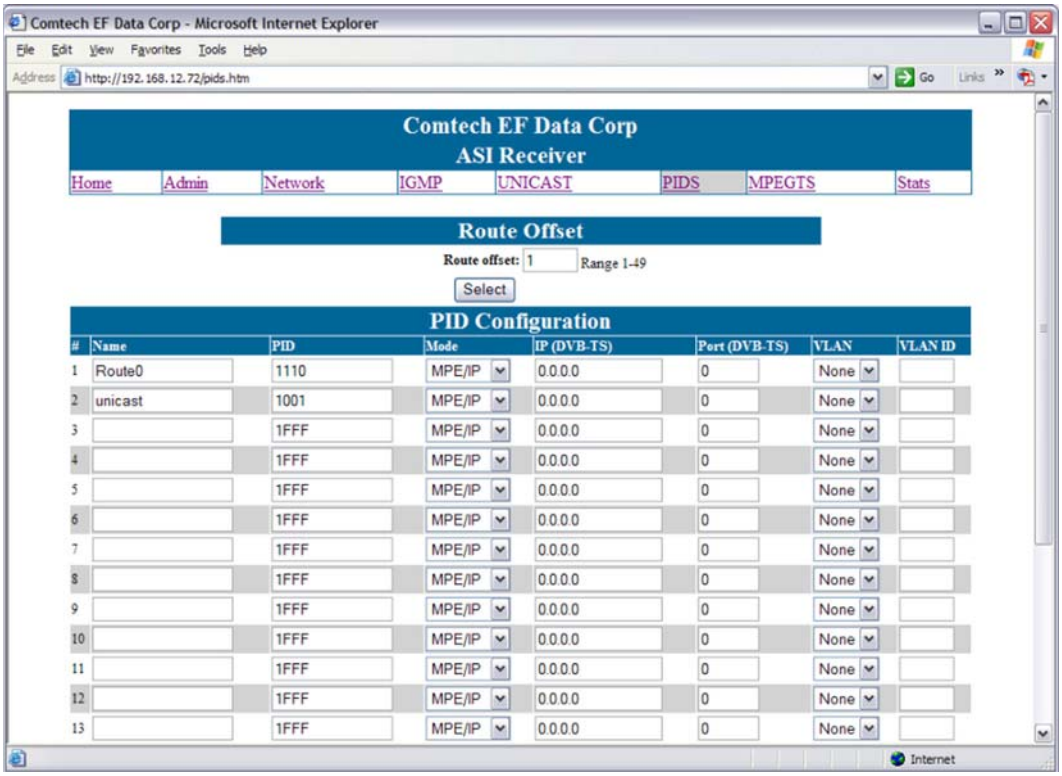


Figure 4-7. PID Configuration page

Packet Size

Determines the packet size of the incoming transport streams. Two packet sizes are support 188 or 204. For 204-byte packets, the trailing 16 bytes are discarded.

PID

The ASI-R supports up to 64 PIDs. All PIDs are entered in four (4) character hexadecimal format. For example, PID 25 would be entered as PID 0025, PID 200 would be entered as 0200 and PID 1353 would be entered as 1353. All inactive PIDs should be set to a value of 0x1FFF (Not Defined).

Mode

The ASI-R supports both MPE decoding to IP and MPEG Transport Stream (MPEGTS) over IP. The user must select the mode of operation for the desired PID.

IP (DVB-TS)

The IP address configured to send the MPEG TS over IP. The address may be either Unicast or Multicast.

Port (DVB-TS)

The port number configured to send the MPEG TS over IP. The port setting should be a value greater than 1024.

4.2.6 MPEG Transport Stream Route Configuration

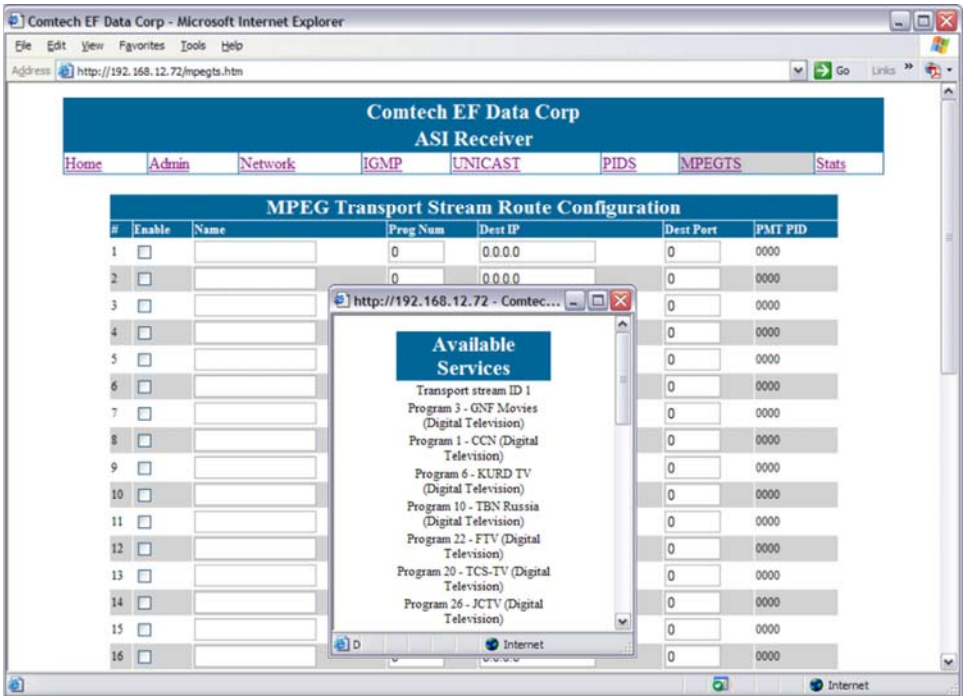


Figure 4-8. MPEG Transport Stream Route Configuration page

Upon selection of the desired input, a small popup window appears that shows all services on the particular input. This is achieved by looking at the Program Stream Information (PSI) that is contained in the Program Association Table (PAT) and Program Mapping Table (PMT) – all detected programs will be displayed for either input port selected.

Enable

Enables or disables the route.

Name

The name of the incoming program that is extracted from the Program Service Information.

Program Number

The program number to be routed to the Ethernet as Transport Stream over IP.

PMT PID Number

The PMT PID to be routed to the Ethernet as Transport Stream over IP.

Destination IP

The IP address to be used when routing the Transport Stream over Ethernet IP.

Port Number

The Port Number to be used when routing the Transport Stream over Ethernet IP.

4.2.7 Statistics

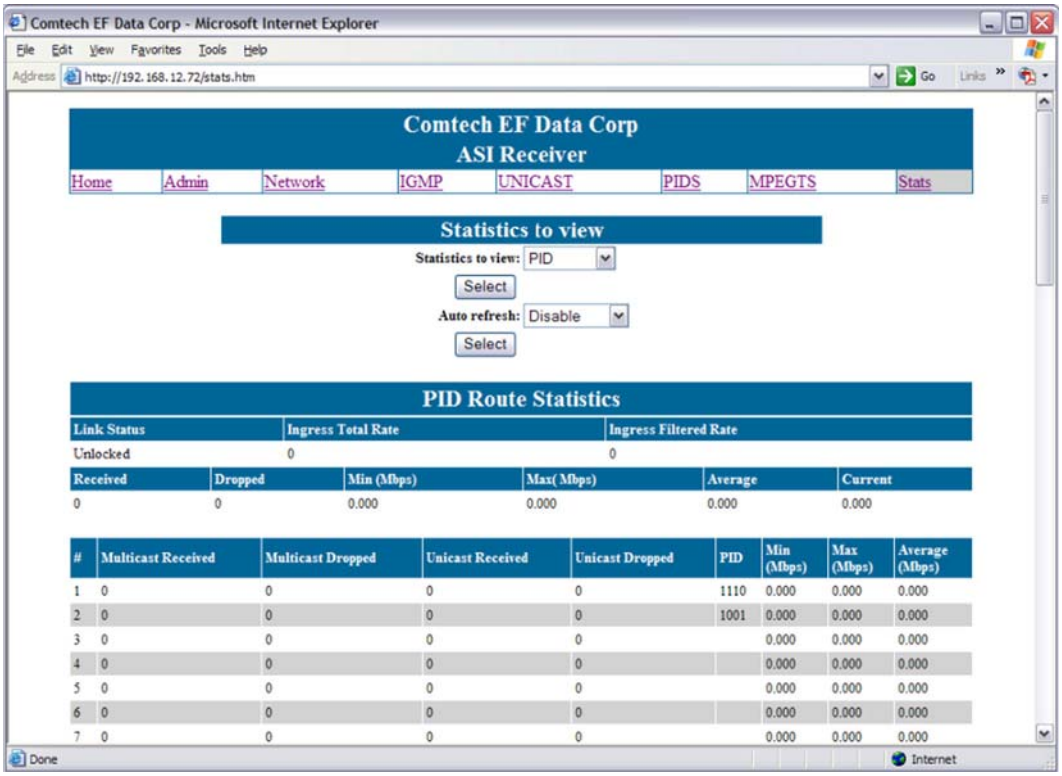


Figure 4-9. Statistics page

4.3 Terminal Interface

The Terminal Interface provides the user with a textual configuration dialog for configuring the ASI-R. This method of configuration should be used for initial configuration of the unit; i.e., configuring the network parameters for the unit but *not* for normal operation. The Web (HTTP) Interface is recommended for operational management.

The Terminal Interface allows the entire unit to be configured and managed, but this interface can only be used while a serial connection is present between the ASI-R and a

PC. The screens shown in this section are displayed via a Telnet connection.

The same menu information is displayed via the serial interface with some specific features only available via this access method – these 'serial interface only' features are noted in this section. Detailed information is provided about the menu features in **Chapter 4.2 Web Interface**.

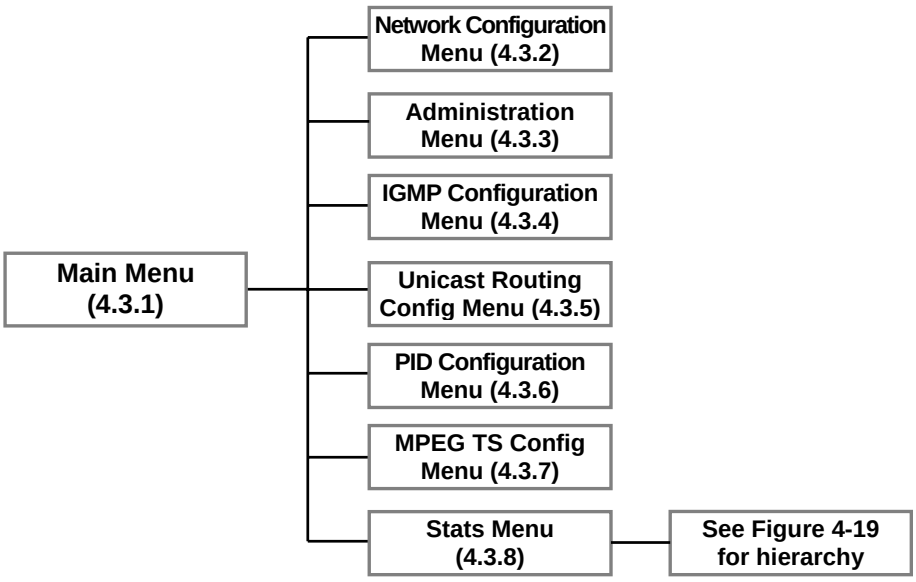


Figure 4-10. Menu Hierarchy (via Terminal Interface)

Figure 4-10 shows the hierarchal structure of the Terminal Interface-based menus, and the sections in this chapter which provide figures of these submenu pages.

Once the terminal interface is connected, as described in **Chapter 2.4 Initial Configuration**, press the **<ENTER>** key . The user should observe the the Main Menu as shown in Figure 4-11.

4.3.1 Main Menu

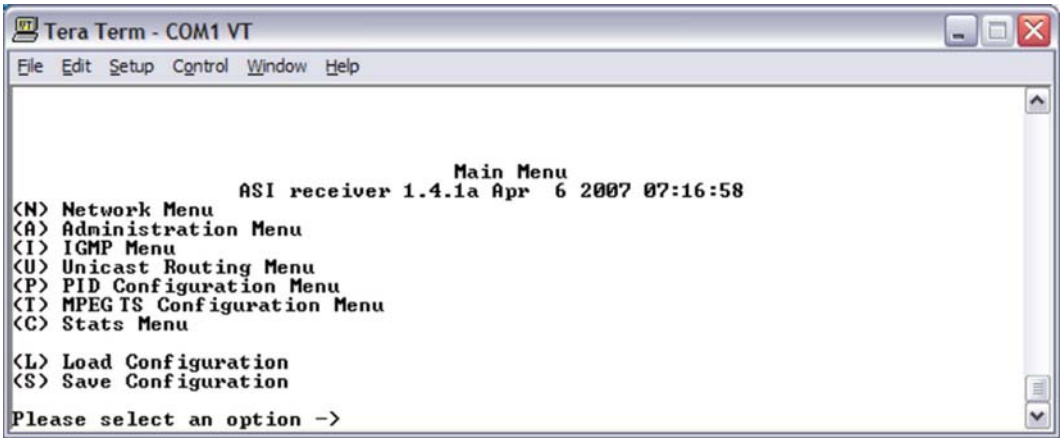


Figure 4-11. Main Menu

4.3.2 Network Configuration Menu

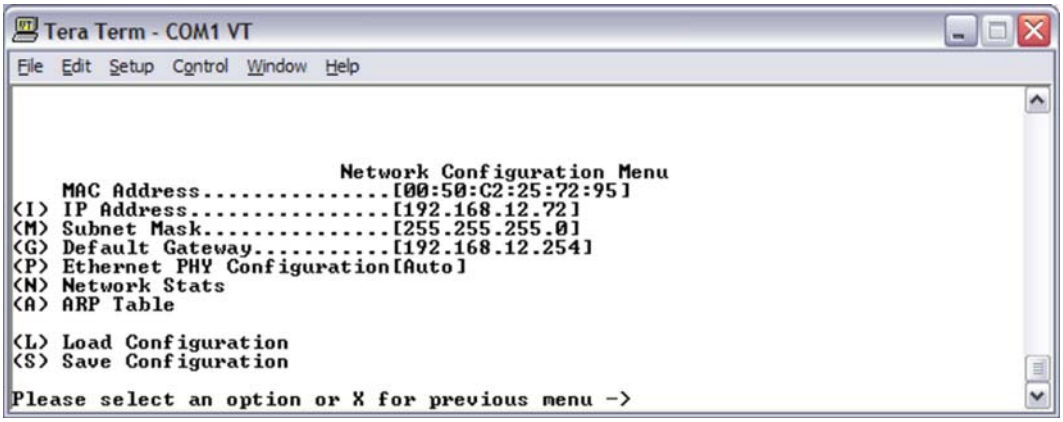


Figure 4-12. Network Configuration Menu

4.3.3 Administration Menu

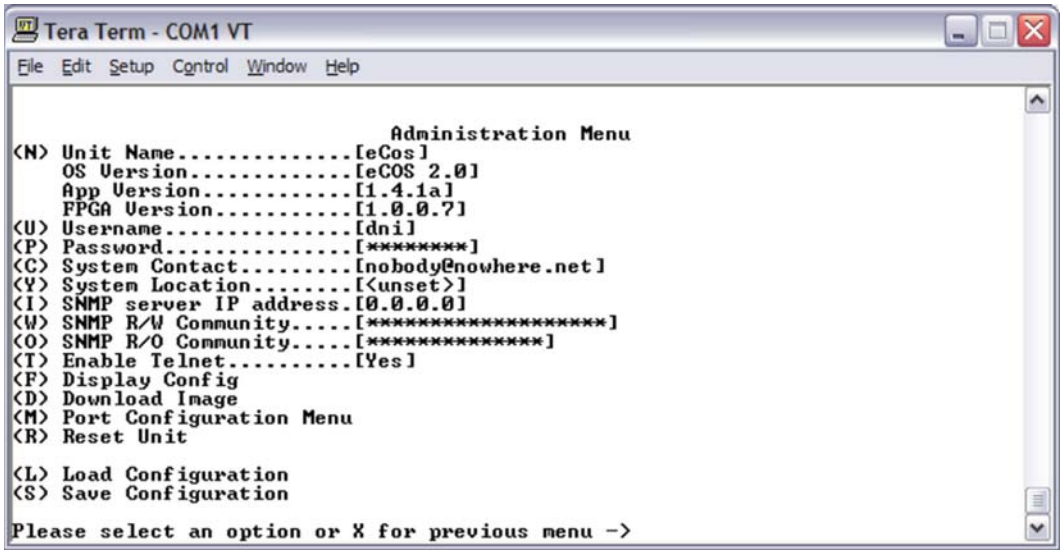


Figure 4-13. Administration Menu

4.3.3.1 Port Number Configuration

In addition to the features illustrated, one additional feature is available, for security reasons, via the serial interface only. Modifying the port numbers prevents attacks on "well known" ports by devices known as port scanners. This feature is configuration of the TCP Port number for Telnet and HTTP protocols. Option **<M>** allows the operator to modify the standard port numbers for Telnet (23) and HTTP (80) to prevent unauthorized access to the device. Care should be taken not to use a reserved standard port number.

4.3.4 IGMP Configuration Menu

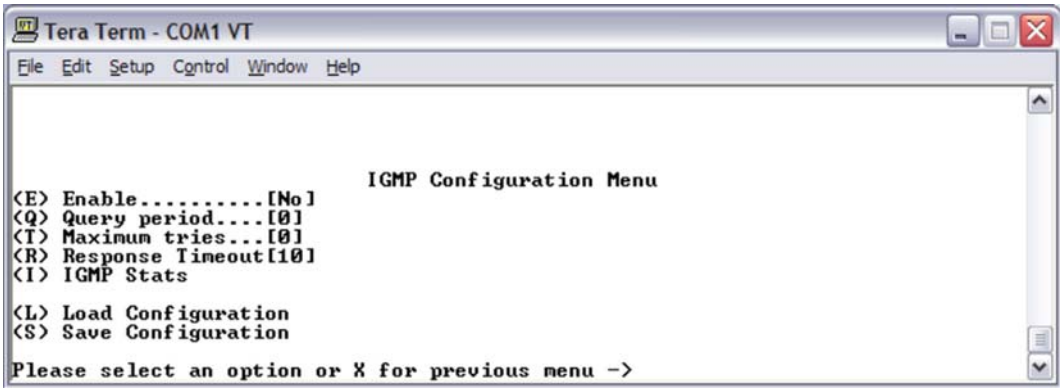


Figure 4-14. IGMP Configuration Menu

4.3.5 Unicast Routing Configuration Menu

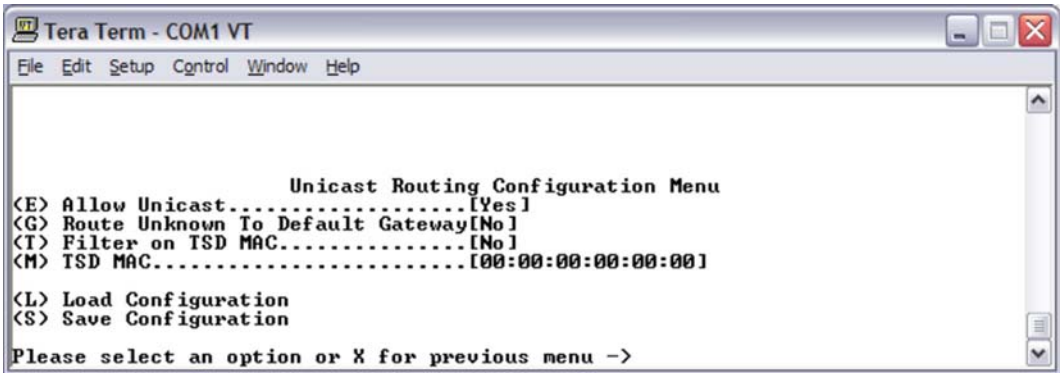


Figure 4-15. Unicast Routing Configuration Menu

4.3.6 PID Configuration Menu

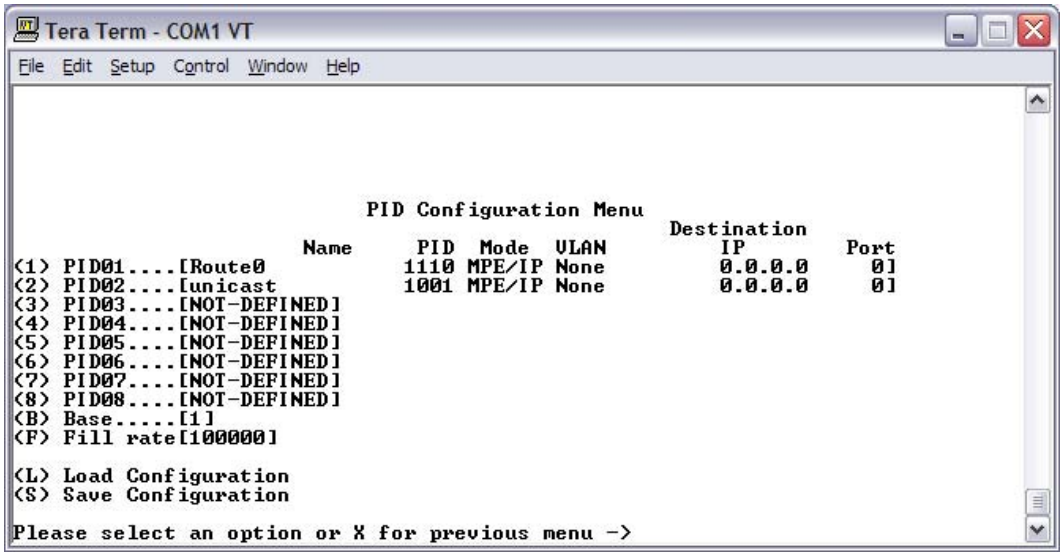


Figure 4-16. PID Configuration Menu

4.3.7 ASI MPEG TS Configuration Menu

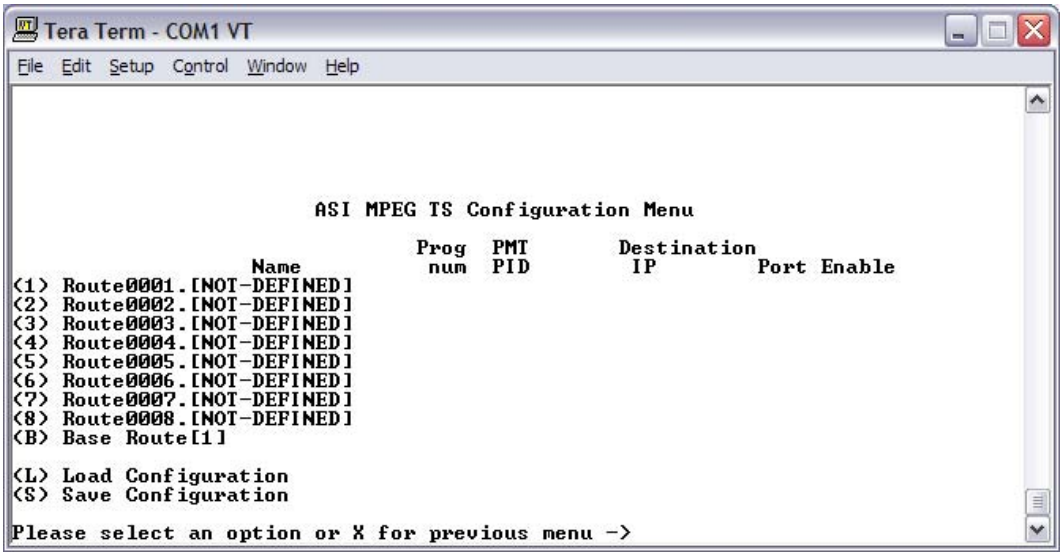


Figure 4-17. ASI MPEG TS Configuration Menu

4.3.8 Stats Menu

Figure 4-17 shows the hierarchal structure of the Terminal Interface-based Stats menus, and the sections in this chapter which illustrate the menu pages within this hierarchy.

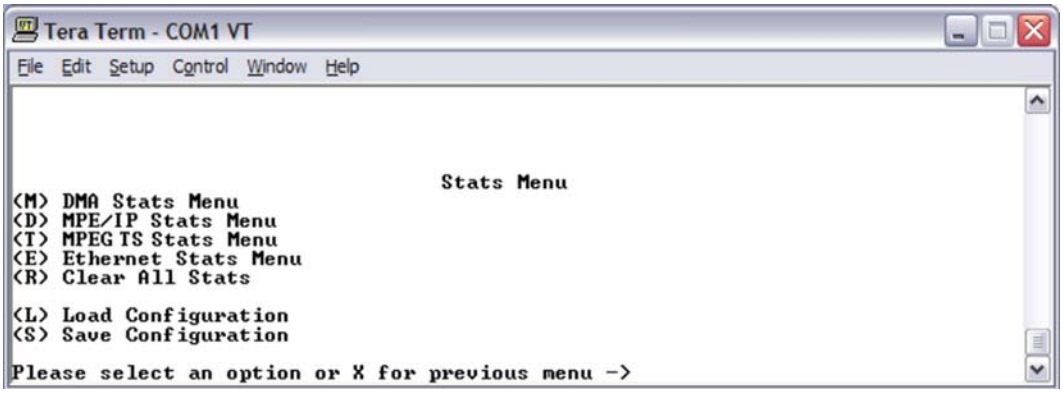


Figure 4-18. Stats Menu

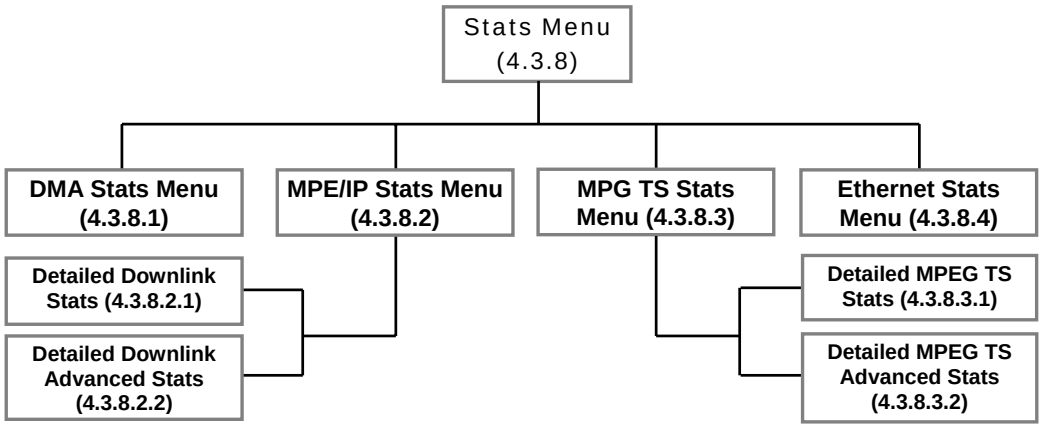


Figure 4-19. Stats Menu Hierarchy (via Terminal Interface)

4.3.8.1 DMA Stats Menu

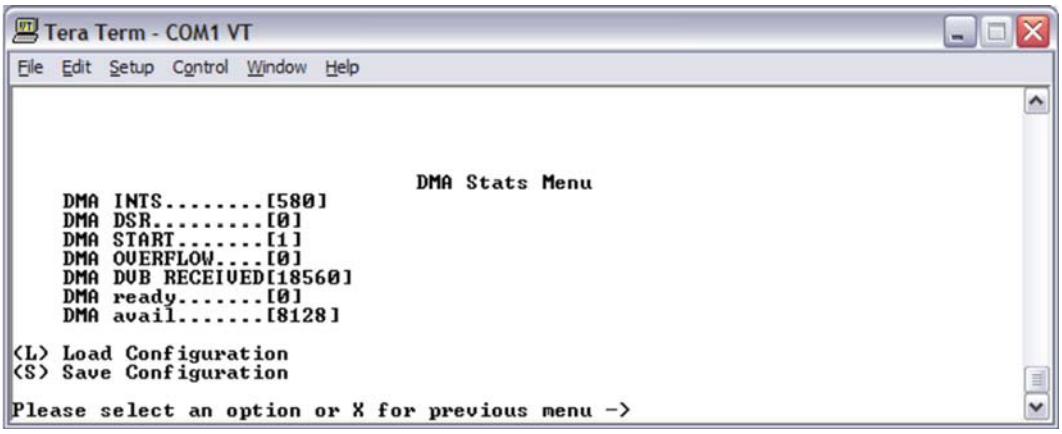


Figure 4-20. DMA Stats Menu

4.3.8.2 (MPE/IP) Downlink Stats Menu

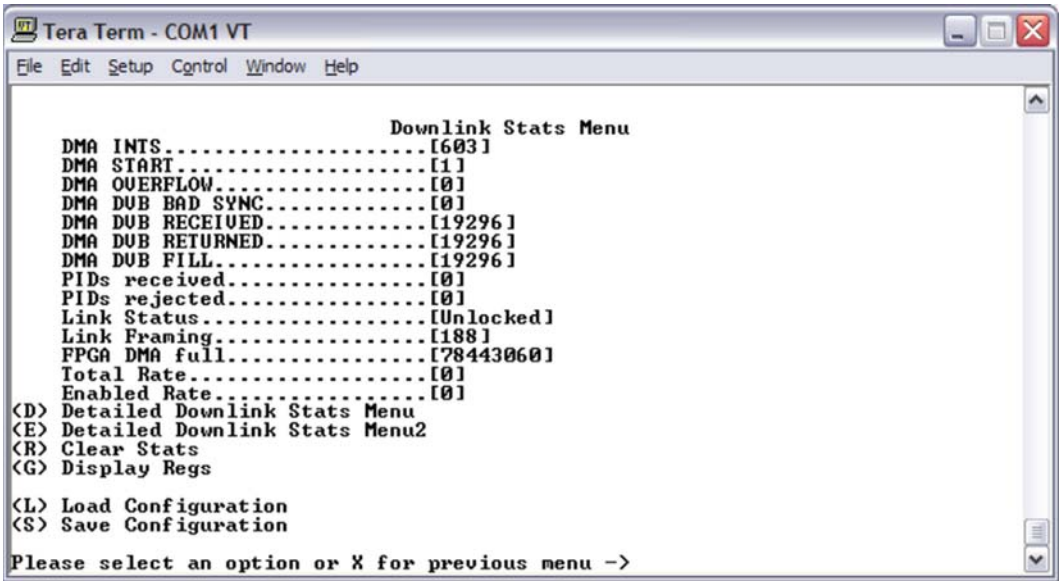


Figure 4-21. Downlink Stats Menu

4.3.8.2.1 Detailed Downlink Stats Menu

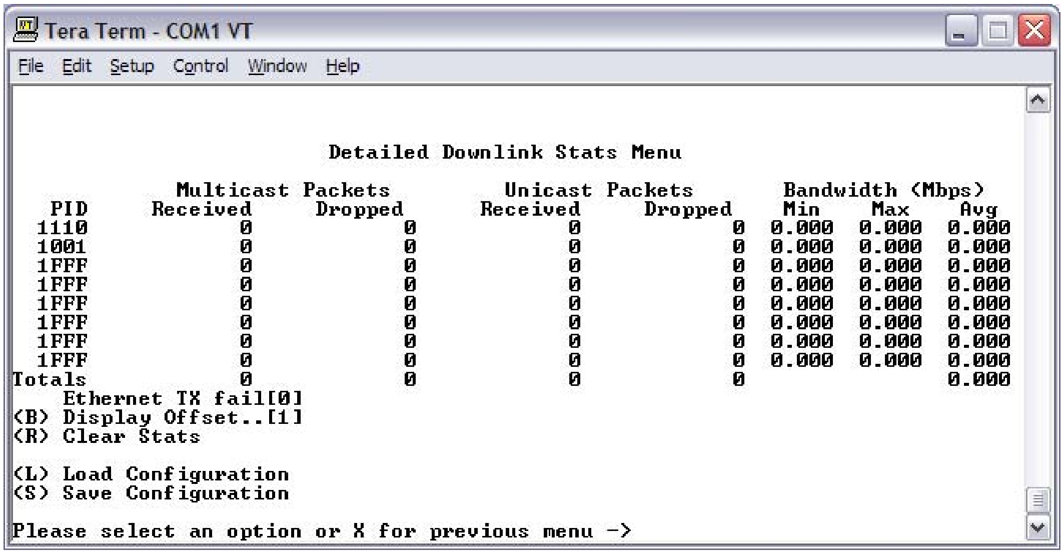


Figure 4-22. Detailed Downlink Stats Menu

4.3.8.2.2 Detailed Advanced Downlink Stats Menu

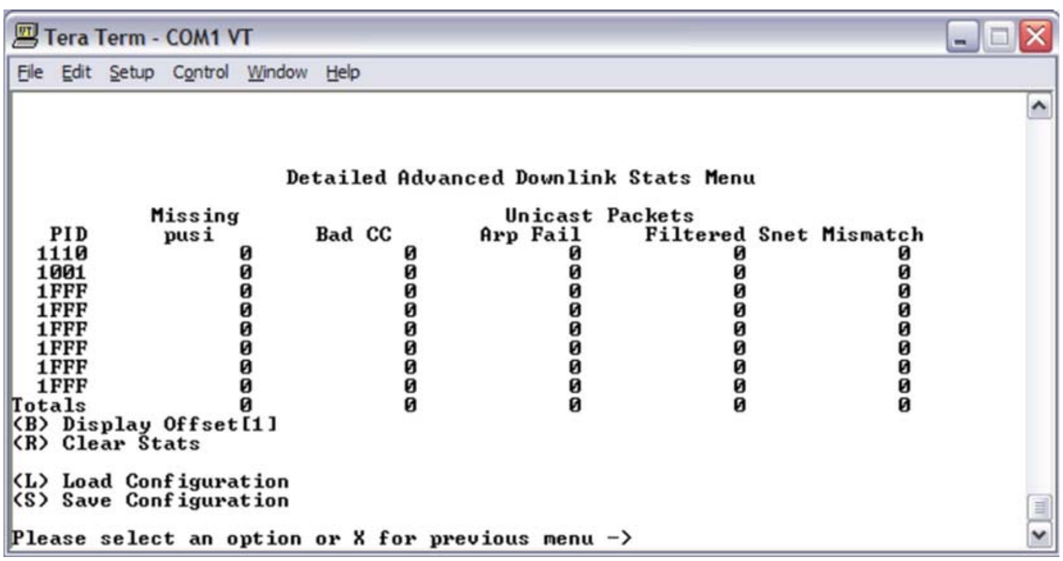


Figure 4-23. Detailed Advanced Downlink Stats Menu

4.3.8.3 MPEG TS Stats Menu

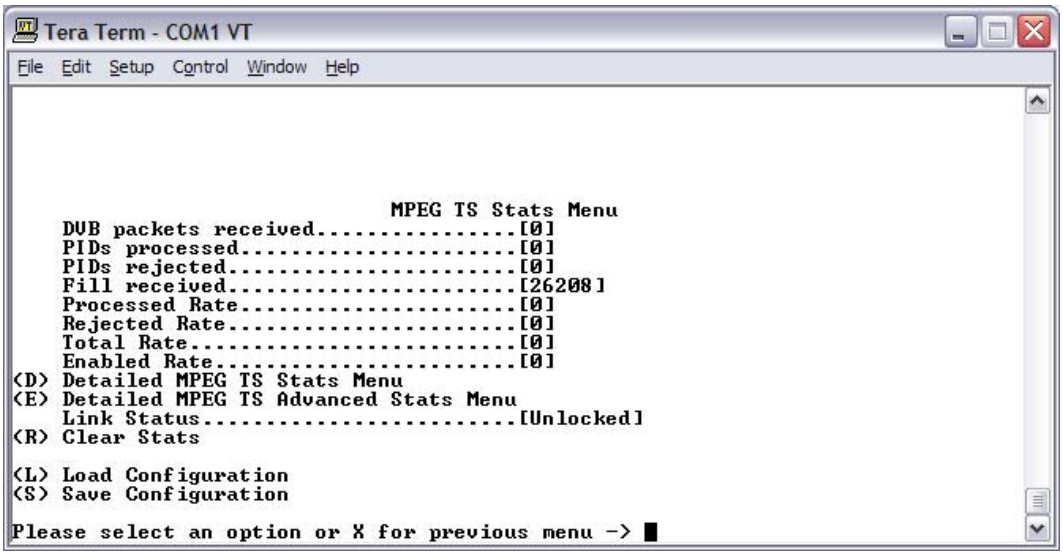


Figure 4-24. MPEG TS Stats Menu

4.3.8.3.1 Detailed MPEG TS Stats Menu

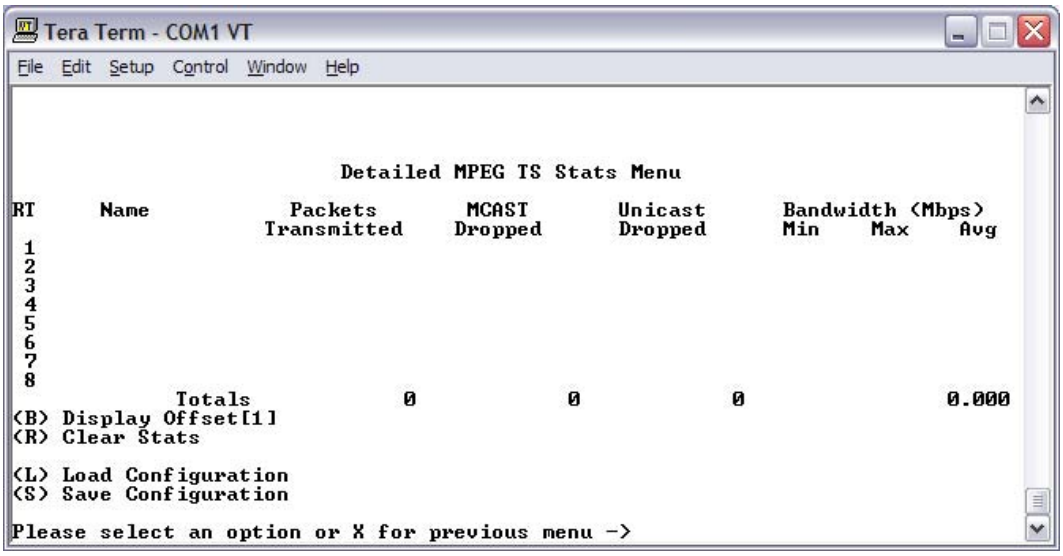


Figure 4-25. Detailed MPEG TS Stats Menu

4.3.8.3.2 Detailed MPEG TS Advanced Stats Menu

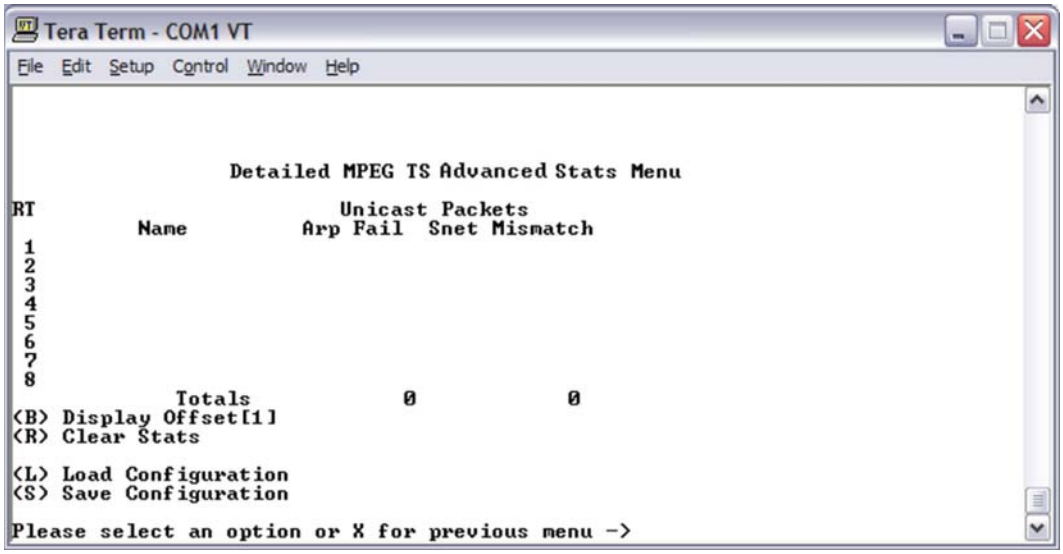


Figure 4-26. Detailed MPEG TS Advanced Stats Menu

4.3.8.4 Ethernet Stats Menu

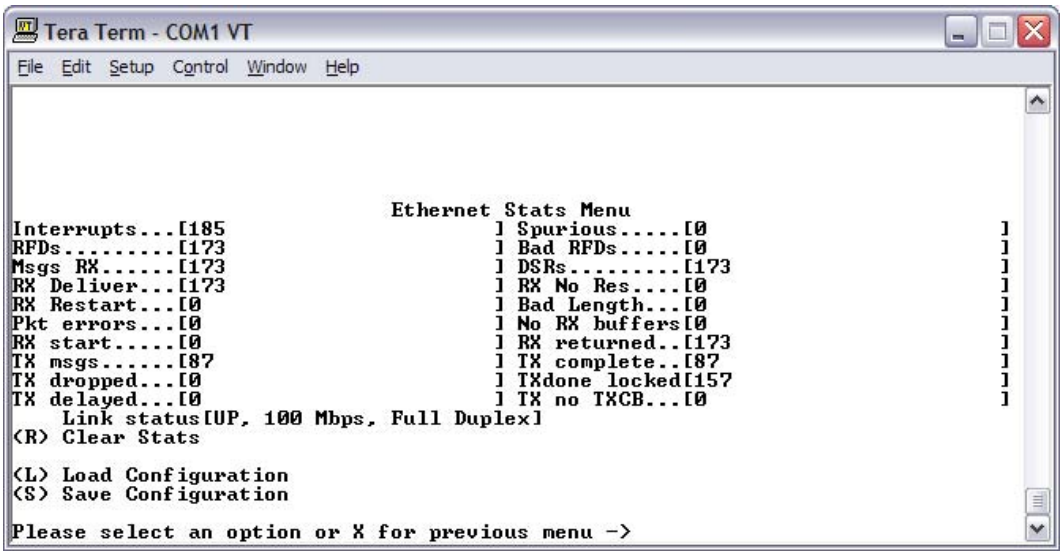


Figure 4-27. Ethernet Stats Menu

4.4 Telnet Interface

Telnet provides a textual interface over a LAN. Most PCs have the capability to use Telnet. To use Telnet on a Microsoft Windows® product, click Start then Run... .

The Run dialog box is shown in Figure 4-28. In the **Open:** text window, enter "**telnet xxx.xxx.xxx.xxx**," where **xxx.xxx.xxx.xxx** is the IP address of the ASI-R. If the port number has been modified from the **Standard 23** via the Terminal Interface, then the port number must be appended with a colon to the IP address.

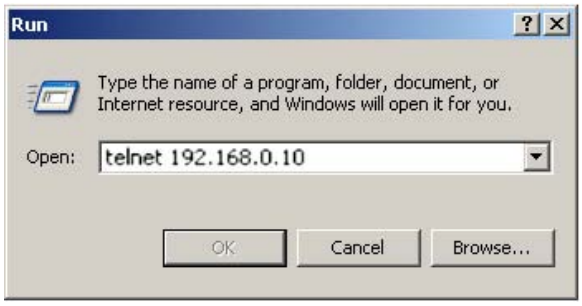


Figure 4-28. Starting Telnet Session

The user will be prompted to enter the user name and password to gain access to the telnet interface.

NOTE

The default username is comtech ***and the default password is*** comtech***, both of which are case sensitive.***

Once the menu is started, press **<ENTER>** and the ASI-R Main Menu will display as shown in Figure 4-29:

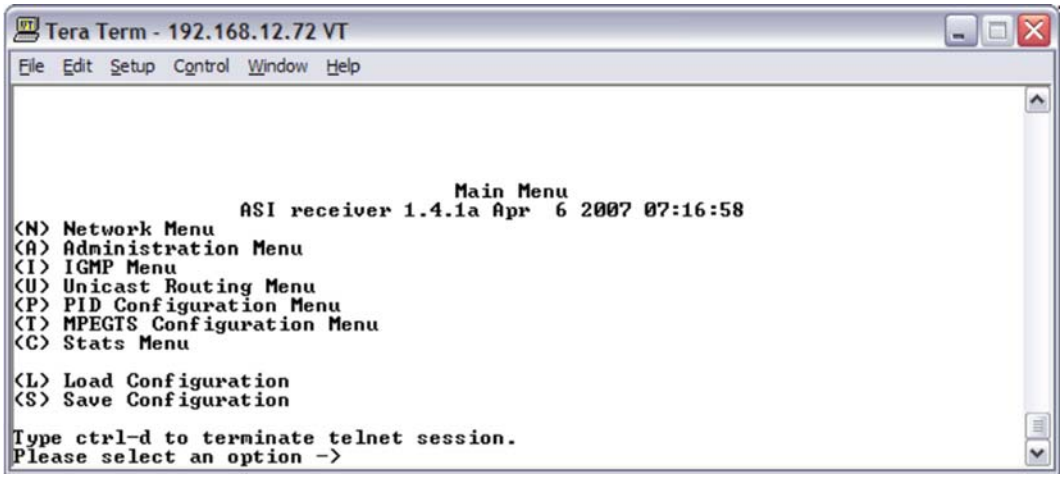


Figure 4-29. Main Menu via Telnet

The user may navigate the menus in the same manner as the Terminal Interface. With specific exceptions as noted in the Terminal Interface section, the menus available via Telnet and Serial interfaces are identical.

4.5 Trivial File Transfer Protocol (TFTP)

The ASI-R supports changes to the resident software and firmware by means of the Trivial File Transfer Protocol (TFTP). This enables changes to be made remotely via the LAN interface. It is recommended to use Solarwinds TFTP server application (available at http://support.solarwinds.net/updates/SelectProgramFree.cfm).

To modify the software and/or firmware, use the following procedures:

Configure the server as follows:

a) **File → Configuration →** Select the '**TFTP Root Directory**'. Set up the location of the ASI-R files.
b) **File → Configuration →** Select the '**Security**' tab and make sure '**Transmit and Receive**' are selected.
c) Save configuration.

The server is now configured for the file transfer process.

IMPORTANT

Because the ASI-R stops processing data traffic during the download process, it is recommended that this upgrade procedure be performed during scheduled network down time.

Do NOT remove power from the unit during the download process.

To modify code via Telnet:

Step	Procedure
1	Start up Solarwinds TFTP server – ensure configuration as described previously.
2	Ensure that the code provided by CEFD is located in the TFTP Root directory.
3	Start up Telnet client and initiate a session with the ASI-R as described in the Telnet Interface section.
4	Select '**A**' for Administration.
5	Select '**D**' for Download.
6	Enter '**1**' for Application code or '**2**' for FPGA code (the user will be directed to select **Application** or **FPGA** code in the download instructions provided by CEFD when new code is provided).
7	Enter the IP address of the TFTP server and wait for the message "**Upgrade complete. Press any key to continue.**"

This code modification process can also be conducted via the Web Interface, under the Administration page, or the Terminal Interface under the Main Menu.

IMPORTANT

Under heavy traffic conditions, the TFTP transfer may take several minutes. The transfer process reported by Solarwinds may show greater than 100% transferred, but this is a normal condition. Be patient and allow the transfer to take place.

4.6 Simple Network Management Protocol (SNMP) (Future)

Simple Network Management Protocol (SNMP) has not been enabled on this product and is planned as a future release. However, when enabled, SNMP allows an SNMP Manager such as OpenView or Castle Rock to be used to remotely manage the ASI-R in an automated fashion.

The ASI-R supports SNMP versions 1 and 2 (SNMPv1 and SNMPv2). Two types of Management Information Bases (MIBs) are supported: **MIB II** and **private MIB**.

MIB II is the default MIB that is used to gather generic information about the unit, such as system 'up' time, packets sent or received on an interface, etc. **MIB II** is designed for only read access, not write access. To read and write configuration parameters over SNMP requires a **private MIB**. The **private MIB** allows parameters to be set on the Web, Terminal, or Telnet interfaces.

The elements Object Identifiers (OIDs) of the MIB will be listed in the appendix of a future revision of this manual. CEFD has been assigned an SNMP designator by the IEEE, and will be found in all elements of the ASI-R's MIB.

The assigned designator for CEFD (enterprise OID) is 1.3.6.4.1.18723.

The ASI-R supports configurable community strings for added security. **As a security precaution, passwords cannot be remotely queried over SNMP.**

For SNMP access from a remote network via the public Internet, a VPN connection to the ASI-R will need to be established using third-party VPN client/server access.

The default community string for the public elements is `public` and the private community string is `private`.

Appendix A. SOFTWARE UPGRADE

A.1 Introduction

The ASI-R is enabled to receive an upgrade via Trivial File Transfer Protocol (TFTP) transmission. Comtech EF Data recommends using the Solarwinds TFTP server application (available at http://support.solarwinds.net/updates/SelectProgramFree.cfm) for upgrading the product.

NOTE

The user will be instructed whether to select Application or FPGA code in the download instructions provided by CEFD when new code is provided.

Once the TFTP server is enabled and the new file (**Application** or **FPGA**) has been copied to the TFTP server, the procedures outlined in sections A.2 and A.3 may be used to upgrade the unit.

A.2 Web Interface

Access the **Administrative Configuration** menu (Figure A-1):

a) In the **Update Firmware** section, enter the **Unit TFTP Server IP Address**.
b) Select **Application** or **FPGA** for the **Image Type** to be upgraded.
c) Enter a valid username and password in the **Login Required** section (below the **Update Firmware** section) then select **Update**. The software update will begin to download.

IMPORTANT

Do NOT power the unit down during the upgrade process.

d) When the update is complete, the message "**Press any key to continue**" will be displayed.
e) Once the unit is upgraded, reset the unit by entering a valid username and password in the first **Login Required** section, then selecting **Reset Unit**.

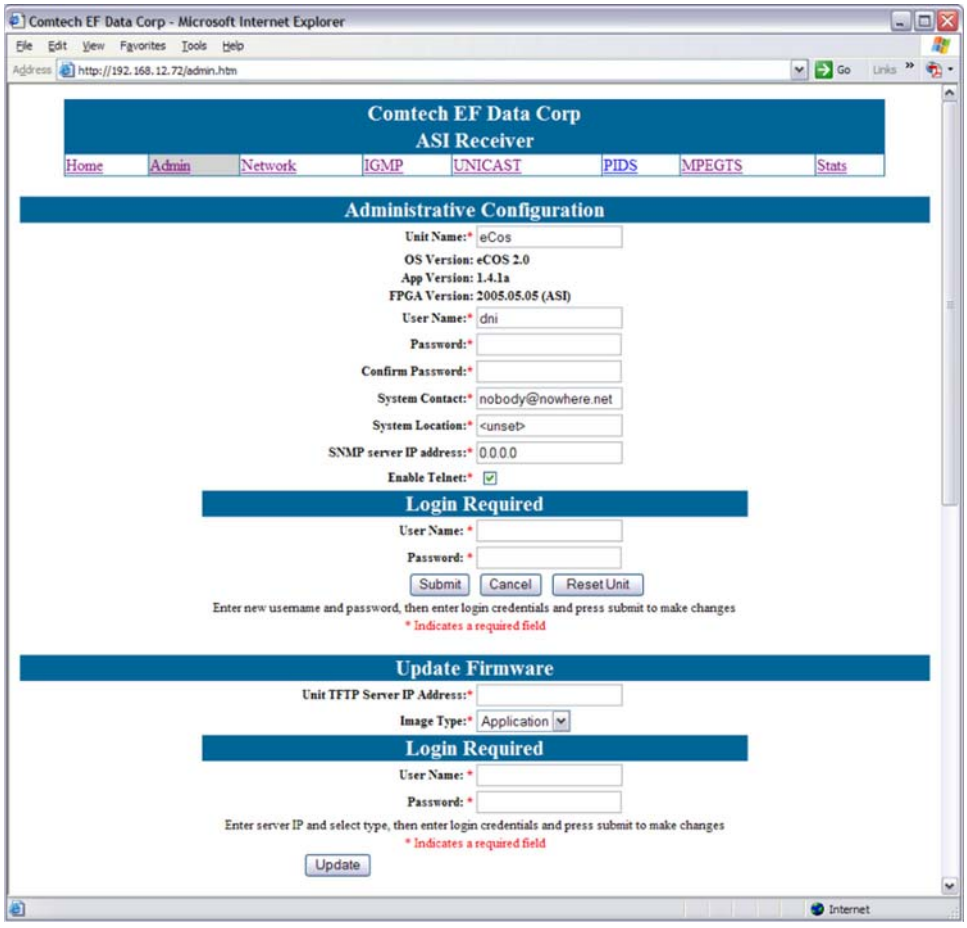


Figure A-1. TFTP Download (via Web)

A.3 Telnet or Terminal Interface

Access the Admin Menu (Figure A-2):

a) Select **(D)** for **Download Image**.
b) At the "**Image type**" prompt, enter **1** for **Application** or **2** for **FPGA**.
c) Enter the TFTP IP server address. Once the TFTP IP server address is entered, the software update will begin to download.

IMPORTANT

Do NOT power the unit down during the upgrade process.

d) When the update is complete, the message "**Press any key to continue**" will be displayed (Figure A-3).
e) After the unit has been upgraded, reset the unit by selecting **(R)** for Reset and '**Y**' to confirm the reset.

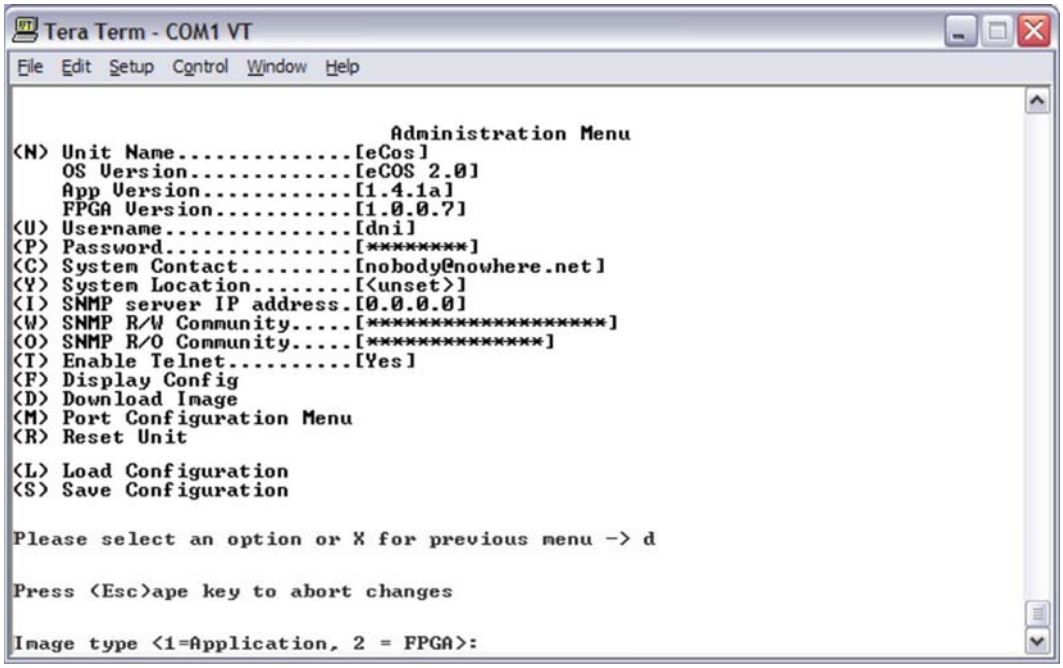


Figure A-2. TFTP Download (via Terminal)

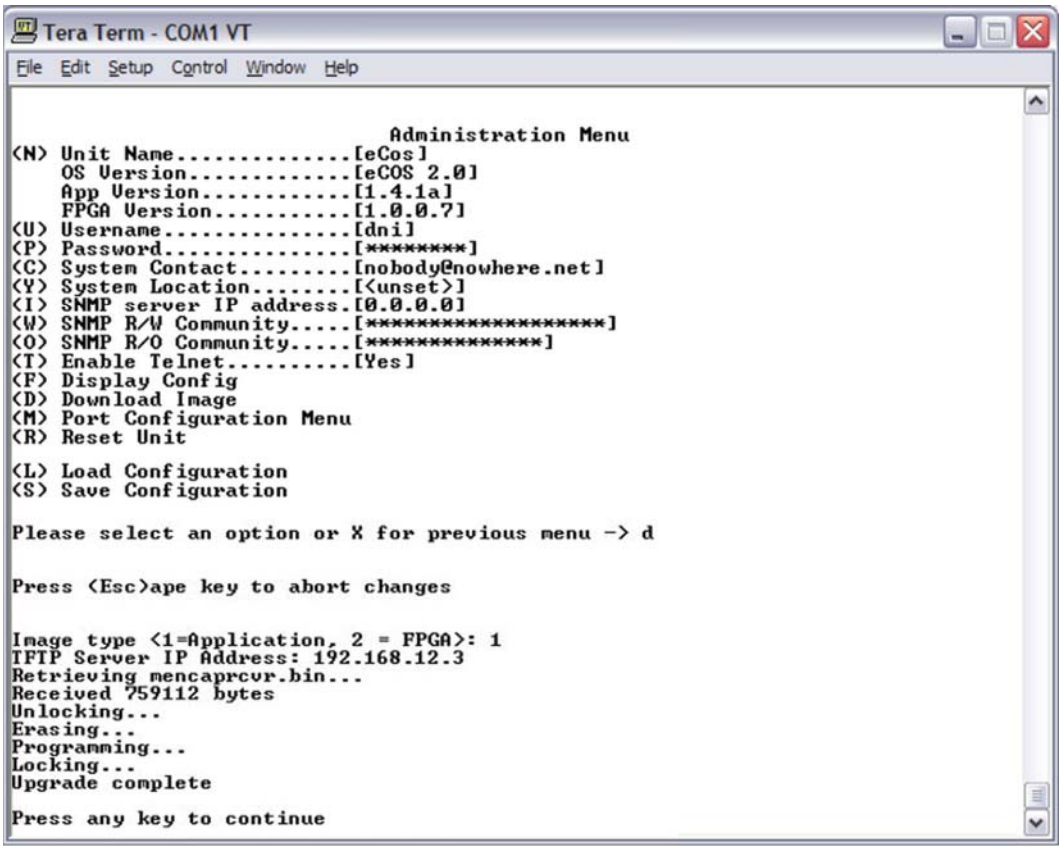


Figure A-3. TFTP Download Complete (via Terminal)

Appendix B. IP ROUTING SUPPORT

B.1 Introduction

The ASI-R provides state-of-the-art MPE decapsulation based on the DVB Specification for Data Broadcasting (EN 301 192). The ASI-R provides the following configuration features:

- IP Decapsulation per Multi-Protocol Encapsulation (EN 301 192)
- Unicast Routing
- Multicast Routing
- Section Packing and Non-Section Packing
- IGMP Version 3

B.2 IP Configuration

Both Unicast and Multicast IP datagrams are encapsulated per the Multi-Protocol Encapsulation specification. Routing of datagrams is accomplished by configuration of PIDs in the ASI-R, as described in the following section.

B.2.1 Unicast Routing

Unicast routing provides point-to-point delivery of IP datagrams. Routes for Unicast IP packets are configured according to the following:

- **IP Addresses**, which fall into three classes, namely: A (0.0.0.0 to 127.255.255.255), B (128.0.0.0 to 191.255.255.255) and C (192.0.0.0 to 223.255.255.255).
- **Medium Access Control (MAC) Addresses,** which identify the destination device (next-hop) to which the packets are sent. The least-significant bit of the

first byte of the six-byte MAC address is a ‘0’. For example, 0x00 11 22 33 44 55 is a Unicast address.

Unicast is supported by the ASI-R as it would be in any routed network. Packets received by the ASI-R are routed to the Ethernet if they meet the subnet criteria or the ASI-R is configured to route non-local packets to a default gateway.

The ASI-R uses Classless Inter-Domain Routing (CIDR) notation in which a ‘slash’ followed by a decimal number is used to represent the number of bits for the mask; e.g., /32 is 255.255.255.255 and /24 is 255.255.255.0.

As stated previously, part of the route configuration is a MAC address that is assigned for delivery of the packet when it is encapsulated into MPE. The MAC address typically identifies the remote receiver (physical device); e.g., satellite terminal, DTV terminal, or cable receiver.

B.2.2 Multicast Routing

Multicast routing provides point-to-multipoint delivery of IP datagrams. Routes for multicast IP packets are configured according to the following:

- **IP Addresses**, which fall into class D (224.0.0.0 to 239.255.255.255)
- **Medium Access Control (MAC) Addresses,** which identify the frames as multicast. The least-significant bit of the first byte of the six-byte MAC address is a ‘1’. For example, 0x01 00 5E 00 00 01 is a multicast address.
- **Broadcast frames** are identified by the MAC Address, 0x FF FF FF FF FF FF.

Multicast IP addresses are related to multicast MAC addresses as follows:

- The lower 23 bits of the IP address are mapped into the lower 23 bits of the MAC address.

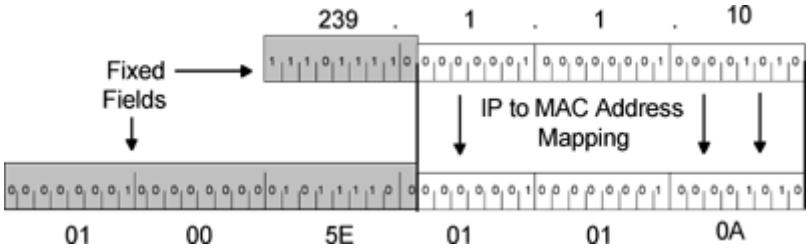


Figure B-1. Multicast Mapping (IP to MAC)

Several examples of the relationship are:

- Received IP: 239.1.1.10 = MAC: 0x01 00 5E 01 01 0A
- Received IP: 224.10.10.10 = MAC: 0x01 00 5E 0A 0A 0A
- Received IP: 228.63.10.10 = MAC: 0x01 00 5E 3F 0A 0A

Note that the upper 5 bits of the multicast IP address are ignored in the MAC so that 32 Multicast group IP addresses map to a single MAC address. This implies further filtering is required at the end device.

B.3 Section Packing

Section packing is a technique to provide more optimal utilization of the MPEG-2 Transport Stream (TS) packet structure. When section packing is not used, each TS packet (containing the MPE section) can carry no more than a single section. This often results in wasted payload capacity when the sections are less than 184 bytes.

The section packing feature allows more than a single MPE section to be carried by an MPEG-2 TS packet, thereby minimizing wasted payload capacity. In the case of a large MPE section that spans multiple MPEG-2 packets, the ending of an MPE section may occur in the middle of an MPEG-2 packet. In this instance, with section packing, a new MPE section begins immediately after the first MPE section has finished without any 'fill' (wasted) bytes having to be inserted before the start of the next MPEG-2 packet.

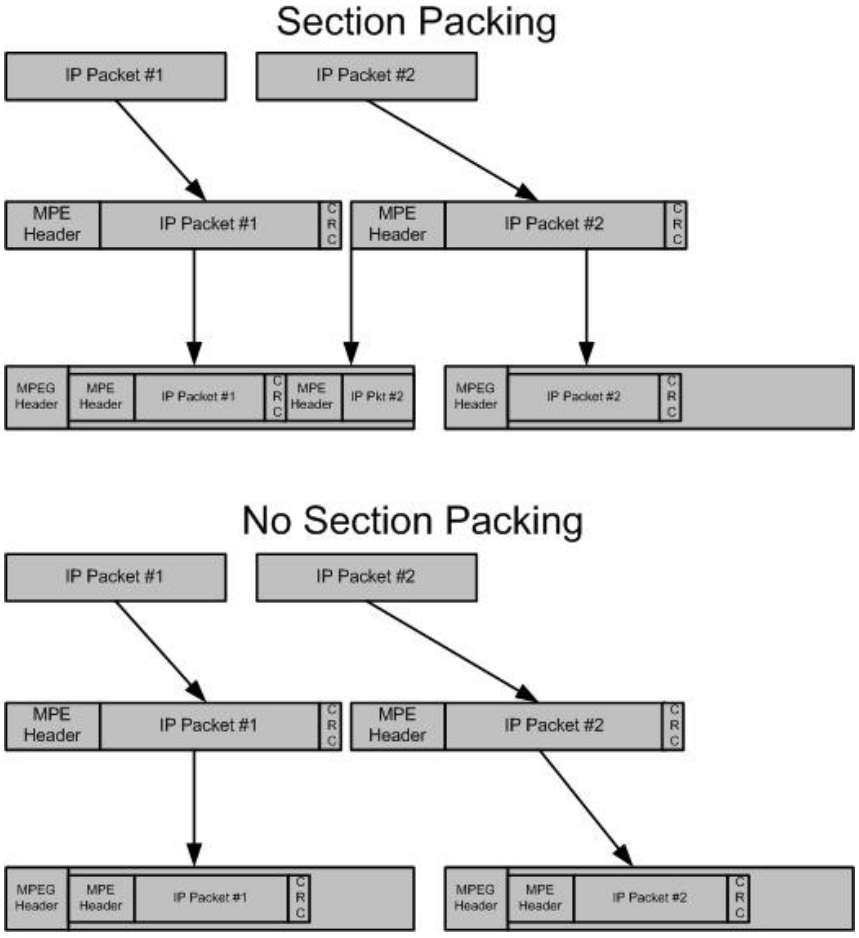


Figure B-2. Section Packing

Notes:

METRIC CONVERSIONS

Units of Length

Unit	Centimeter	Inch	Foot	Yard	Mile	Meter	Kilometer	Millimeter
1 centimeter	—	0.3937	0.03281	0.01094	6.214×10^{-6}	0.01	—	—
1 inch	2.540	—	0.08333	0.2778	1.578×10^{-5}	0.254	—	25.4
1 foot	30.480	12.0	—	0.3333	1.893×10^{-4}	0.3048	—	—
1 yard	91.44	36.0	3.0	—	5.679×10^{-4}	0.9144	—	—
1 meter	100.0	39.37	3.281	1.094	6.214×10^{-4}	—	—	—
1 mile	1.609×10^{5}	6.336×10^{4}	5.280×10^{3}	1.760×10^{3}	—	1.609×10^{3}	1.609	—
1 mm	—	0.03937	—	—	—	—	—	—
1 kilometer	—	—	—	—	0.621	—	—	—

Temperature Conversions

Unit	° Fahrenheit	° Centigrade
32° Fahrenheit	—	0 (water freezes)
212° Fahrenheit	—	100 (water boils)
-459.6° Fahrenheit	—	273.1 (absolute 0)

Formulas
C = (F - 32) * 0.555
F = (C * 1.8) + 32

Units of Weight

Unit	Gram	Ounce Avoirdupois	Ounce Troy	Pound Avoirdupois	Pound Troy	Kilogram
1 gram	—	0.03527	0.03215	0.002205	0.002679	0.001
1 oz. avoir.	28.35	—	0.9115	0.0625	0.07595	0.02835
1 oz. troy	31.10	1.097	—	0.06857	0.08333	0.03110
1 lb. avoir.	453.6	16.0	14.58	—	1.215	0.4536
1 lb. Troy	373.2	13.17	12.0	0.8229	—	0.3732
1 kilogram	1.0×10^{3}	35.27	32.15	2.205	2.679	—

2114 WEST 7TH STREET TEMPE ARIZONA 85281 USA
480 • 333 • 2200 PHONE
480 • 333 • 2161 FAX