

CMR-5910 / CMR-5920

Digicast Media Router Serial IP (SIP)

CMR-5910 – Serial IP Gateway (MG-SIP)

CMR-5920 – Serial IP Router (MR-SIP)

Installation and Operation Manual

Part Number MN/MDRTRIPDC.IOM

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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. xi.

About this Manual

This manual provides installation and operation information, functional capabilities, and performance specifications for the Comtech EF Data (CEFD) Digicast Serial IP Routers – CMR-5910 Digicast Media Gateway (MG-SIP) and CMR-5920 Digicast Media Router (MR-SIP) – referred to throughout this manual as “the MG-SIP” or “the MR-SIP”. The manual additionally provides information on how to connect these products 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 MG-SIP and MR-SIP.

Related Documents

- *ISO/IEC – HDLC Protocol Specifications*
- *IEEE802.x - Ethernet specifications*
- *RFCs – Internet-related official standards & recommendations*
- *EIA – RS-422 Specifications*
- *ISO/IEC 13239 High-Level Data Link Control (HDLC)*

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



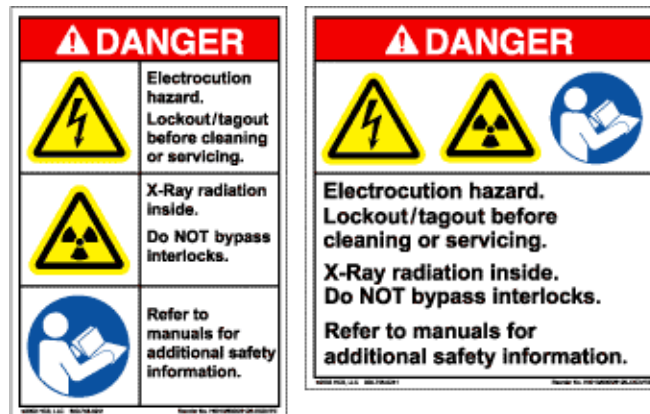
IMPORTANT or **NOTE** indicates a statement that is associated with the task being performed or information critical for proper equipment function.



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 Commission (FCC) rules, and EN55022 Class B requirements (pending).

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 (pending).

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 (pending).


Safety Compliance

EN60950 Compliance


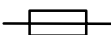
Applicable testing is routinely performed as a condition of manufacturing on all units to ensure compliance with safety requirements of EN60950. This equipment meets the Safety of Information Technology Equipment specification as defined in EN60950.



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. Neutraleiter-Sicherung

International Symbols:

Symbol	Definition
	Alternating Current
	Fuse

Symbol	Definition
	Protective Earth / Safety Ground
	Chassis Ground



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

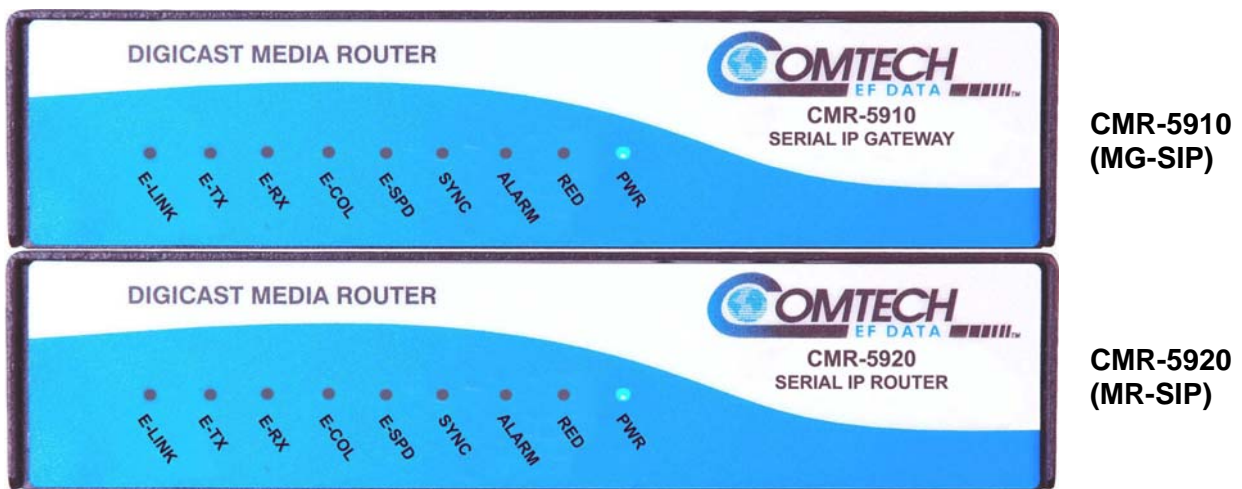


Figure 1-1. Digicast Serial IP MG-SIP / MR-SIP – Front Panels

1.1 Introduction

The Comtech EF Data (CEFD) CMR-5910 Digicast Media Router Serial IP Gateway (MG-SIP) and CMR-5920 Serial IP Router (MR-SIP) – referred to respectively throughout this manual as “the MG-SIP” or “the MR-SIP” – provide the end-points for the transport of IP-formatted content (**Tx** for the MG-SIP, **Rx** for the MR-SIP) using the HDLC protocol across an RS-422/RS-530 serial link.

The MG-SIP and MR-SIP provide an economical solution to upgrading legacy (non-IP enabled) video networks, using Integrated Receiver Decoders (IRDs), to support distribution of IP content to the collocated enterprise LAN.

1.2 Standard Features

Based on an embedded architecture utilizing a Freescale CPU and eCOS Operating System, the MG-SIP and MR-SIP provide the following features:

- High Reliability
- Support for Multicast and Unicast IP datagrams
- HDLC Link-layer protocol
- Multicast Zones
- 64 Routes
- QoS on a route-by-route basis (min/max bandwidth)
- Support for IGMP and ICMP
- Aggregate throughput of 13.5 Mbps with 1,500 byte IP packets
- Color LEDs for status monitoring and rapid fault isolation
- Management (monitor, control and configuration):
 - Web Interface
 - SNMP V2 (Private and MIB II) Support (Future)
 - TFTP for remote field software/firmware upgrade
 - Terminal Interface
 - Telnet

1.3 Performance

The MG-SIP and MR-SIP provide the following performance characteristics:

Item	Value
Maximum Egress Rate Setting	13.5 Mbps
Maximum Bits Per Second (Maximum Packet Size 1,518 Bytes)	13.5 Mbps
Latency	Less than 10 mS

1.4 Configuration

The MG-SIP and MR-SIP enable IP-based multimedia content (video, audio and data) to be delivered over a high-speed RS-422 or RS-530 link and distributed to remote devices connected via an Ethernet LAN, providing an inexpensive upgrade path for deployment of an overlay distribution network across widely dispersed remote locations.

The capabilities of the MG-SIP and MR-SIP are depicted in Figure 1-2.

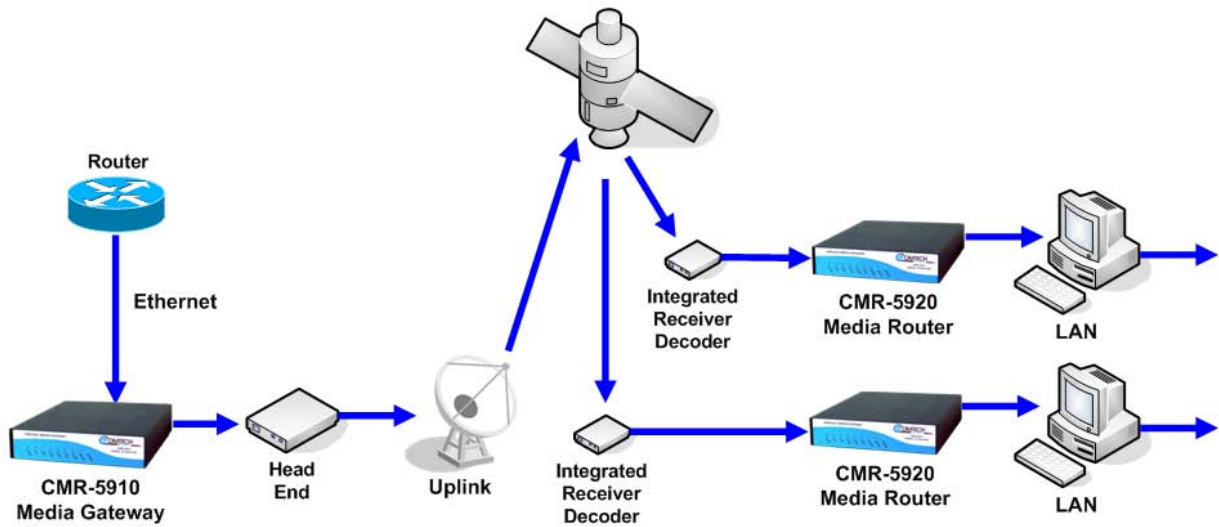


Figure 1-2. Digicast Serial IP MG-SIP / MR-SIP Operational Configuration

1.5 Specifications



Figure 1-3. Digicast Serial IP MG-SIP / MR-SIP – Rear Panel (typical)

Table 1-1. Digicast Serial IP MG-SIP / MR-SIP 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	
	RS-422/RS-530 Interface	15-pin Type D connector (male)	
	Ethernet (10/100BaseT)	RJ-45	
	Terminal	RJ-12	
	Redundancy (future)	RJ-12	
	LEDs	Blue	PWR
		Green	RED
		Red	ALARM
		Green	SYNC
Green		E-SPD	
Amber		E-COL	
Green		E-RX	
Green		E-TX	
Green	E-LINK		
Electrical	Power Input / Consumption	100 to 240 VAC 47-63 Hz converted to +5VDC @ 2.5A / < 7 W	
	RS-422/RS-530	EIA	
	Ethernet (10/100BaseT)	IEEE 802.3u	
	Console	RS-232	
	Redundancy (future)	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 Broadcasting
DVB-S	Digital Video Broadcasting - Satellite
DVB-S2	Digital Video Broadcasting - Satellite (Second Generation)
EBU	European Broadcasting Union
ETS	European Telecommunications Standard
FTP	File Transfer Protocol
HDLC	High-level Data Link Control
HTML	Hypertext Markup Language
HTTP	HyperText Transport 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
Mbps	Mega bits per second
MIB	Management Information Base
MPE	Multi-Protocol Encapsulation
MPEG	Moving Pictures Expert Group
MPEGTS	Moving Pictures Expert Group Transport System
MR	Media Router
MspS	Million samples per second
MUX	Multiplexer
PID	Packet Identifier
RS	Reed Solomon
SNMP	Simple Network Management Protocol
SYSLOG	System Log
TCP	Transmission Control Protocol
TERM	Terminal
TFTP	Trivial File Transfer Protocol
TSD	Transport Stream Demultiplexer
UDP	User Datagram Protocol
VLAN	Virtual Local Area Network

Chapter 2. INSTALLATION & INITIAL CONFIGURATION

2.1 Major Assembly

The MG-SIP and MR-SIP are available in standalone configurations. 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. Digicast Serial IP – Standalone Configuration

Quantity	Description
1	Digicast Media Router Serial IP: CMR-5910 Serial IP Gateway (MG-SIP) OR CMR-5920 Serial IP Router (MR-SIP)
1	SPU24-102 Power Supply
1	IEC Power Cable
1	CA-TERMINAL Terminal Cable
1	CD (includes this manual and the 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 device.
- **Inspect** the device for possible physical damage.
- **Test** the device for proper operation.

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

2.3 Installation

The MG-SIP and MR-SIP are designed for ease of installation and configuration. Once the device has been removed from the packing container, follow these instructions:

Step	Procedure
1	Place the device on a flat surface with free-air flow where the LEDs can be clearly observed with unrestricted access to the rear panel of the device.
2	Connect the DC power connection to the connection labeled PWR on the back of the device 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 IS.
5	Connect the AC power cord between a standard wall outlet and the power supply. The blue LED will illuminate.
6	<div style="display: flex; align-items: center;">  <div> <p><i>The port labeled REDUN is currently not supported.</i></p> <p><i>It is recommended that the RS-422/RS-530 cable NOT be connected until after the device has been completely configured.</i></p> </div> </div>
7	Upon startup, the LEDs on the device front panel become operational as follows:

LED	Function Label	Description
Blue	PWR	LED illuminates if power is properly applied
Green	RED	<i>LED will not illuminate – reserved for future redundancy functionality</i>
Red	ALARM	LED may illuminate since the device is not yet configured
Green	SYNC	LED illuminates if traffic is being routed to the RS-422 interface
Amber	E-COL	LED flashes if there are collisions on the Ethernet switch
Green	E-RX	LED flashes if there is activity on the switch
Green	E-TX	LED flashes if the device is transmitting data to the Ethernet
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: <ul style="list-style-type: none">• 38,400 BAUD• 8 Data Bits• 1 Stop Bit• No Parity• No Flow Control
2	Press the <ENTER> key on the PC – the device’s menu should be displayed.
3	Press “N” for Network Menu.
4	Press “I” for the IP Address. Enter the IP Address and select <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.
For the MG-SIP only:	
10	Press “E” to configure the egress port.
11	Press “M” to configure the egress clock source as external or internal .
12	Press “R” to configure the egress clock rate in bits per second (bps) and press <ENTER>.
13	Press “S” to save the parameters.
14	Press “Y” to confirm the saving of parameters.
15	Press “X” to exit the menu.

At this point, the device has been configured for full operation and the terminal cable may be removed. The RS-422/RS-530 cable may now be safely attached to the DB-15 male connector marked **RS-422**. For continued operation, the device may be managed via the Terminal Interface; however, it is recommended to use the Web Interface for ease of management.

Chapter 3. INTERFACE PINOUTS

3.1 Pinout Overview

The rear panel interface (Figure 3-1) provides all necessary external connections between the MG-SIP or MR-SIP and other equipment.



Figure 3-1. Digicast Serial IP MG-SIP / MR-SIP – Rear Panel (typical)

3.2 DC Power



Pin	Definition
Center	+5VDC
Outer Ring	GND

3.3 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

3.4 RJ-12 Redundancy (future)



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

3.5 RJ-12 Terminal



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

3.6 RS-422



Pin	Definition
1	GND
2	N/C
3	N/C
4	ETxCB(-)
5	TxCB(-)
6	TxDA(-)
7	RxCB(-)
8	RxDB(-)
9	Signal Ground
10	N/C
11	ETxCA(+)
12	TxCA(+)
13	TxDA(+)
14	RxCA(+)
15	RxDA(+)

Chapter 4. DEVICE MANAGEMENT VIA USER INTERFACES: CMR-5910 (MG-SIP)

4.1 Introduction

Management of the CMR-5910 Serial IP Gateway (MG-SIP) is simple and intuitive. This chapter outlines the variety of ways to specifically configure and manage the MG-SIP:

- Web Interface via a LAN-based desktop Web 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 MG-SIP via a HyperText Markup Language-based Graphical User Interface (GUI). To utilize the Web Interface, a LAN connection must exist between the PC with a Web browser and the MG-SIP.

Once a valid IP Address, Subnet Mask and Default Gateway have been entered into the MG-SIP, activate a Web browser on the desktop, then enter the MG-SIP's IP address into the URL field as shown below. 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 MG-SIP

If there is a connection between the PC and the MG-SIP, the response from the MG-SIP will be the “splash page” as shown in Figure 4-2.

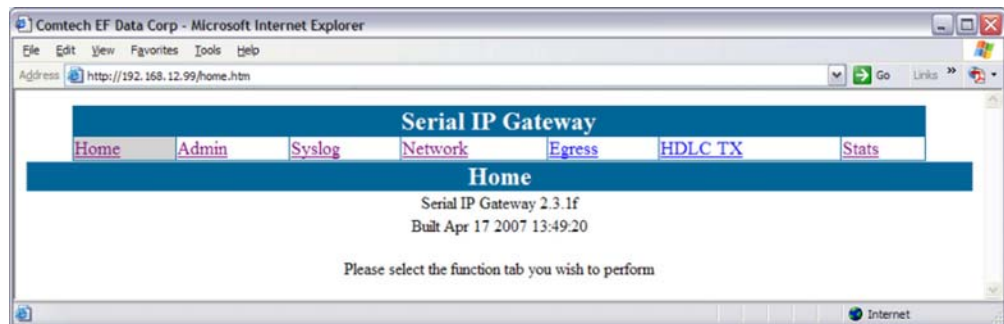


Figure 4-2. MG-SIP Home (‘Splash’) page

4.2.1 Administrative Configuration

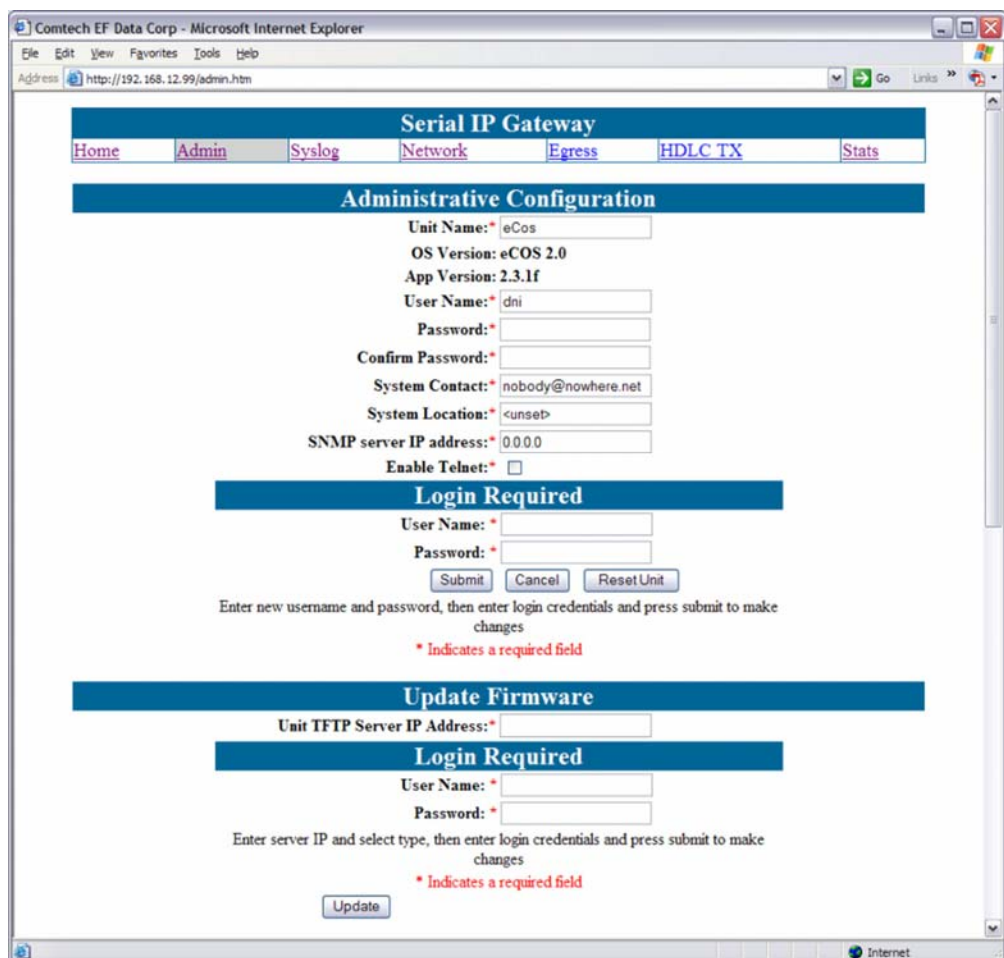


Figure 4-3. Administrative Configuration page



Beginning with the Administrative Configuration page, for pages featuring configurable parameters, changes will not be accepted without a valid user name and password. A login dialog box is available at the bottom of the page for this purpose.

The Administrative Configuration page (Figure 4-3) has the following configurable parameters:

User Name

The 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 Password is user configurable and is used for authenticating a user when connecting via IP management services. Note 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 location (physically) where the unit has been installed.

SNMP server IP Address

Defines the SNMP server that can connect to the unit.

Enable Telnet

Enables Telnet application on the MG-SIP.

Login Required

To make any changes to the MG-SIP, a user name & password are required.

Update Firmware

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

4.2.2 Syslog Configuration

Comtech EF Data Corp - Microsoft Internet Explorer
Address http://192.168.12.99/syslog.htm

Serial IP Gateway

Home Admin Syslog Network Egress HDLC TX Stats

Syslog Configuration

Enable: No Yes or No
IP Address: 0.0.0.0
Port: 514 1-65535

Login Required

User Name:
Password:

Submit Cancel

Enter Syslog settings, then enter login credentials and press submit to make changes
* Indicates a required field

Figure 4-4. Syslog Configuration page

Syslog is a common feature of the Linux operating system. Syslog allows the events that occur on the MG-SIP to be sent to a server where they can be logged. The events are delivered to a configured server over Ethernet IP.

Enable

Enables or disables the Syslog feature.

IP Address

The IP address of the Syslog server.

Port

The port of the Syslog server. The default port number is **514**.

4.2.3 Network Configuration

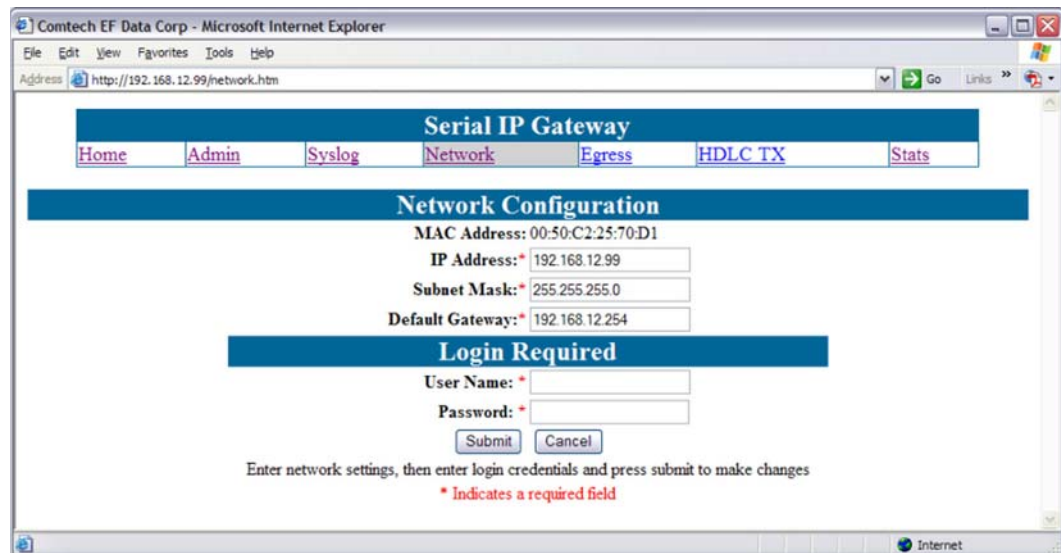


Figure 4-5. Network Configuration page

The Network Configuration page has the following configurable parameters:

IP Address

The IP Address assigned to the MG-SIP LAN interfaces. The IP Address is entered in dotted decimal format.

Subnet Mask

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

Default Gateway

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

4.2.4 HDLC Egress Configuration

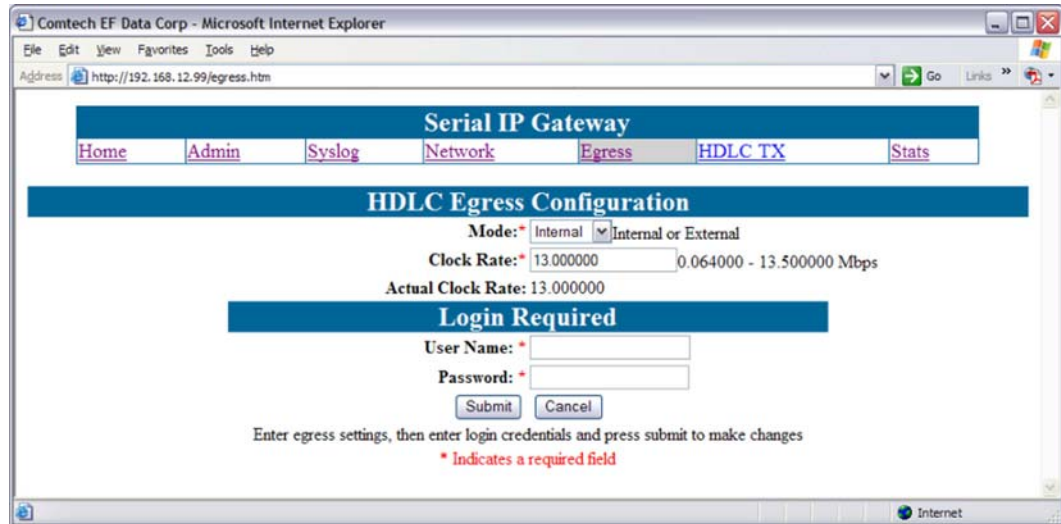


Figure 4-6. HDLC Egress Configuration page

The HDLC Egress Configuration page has the following configurable parameters:

Mode

Configure the unit for internal clock (provided to the network) or external clock (provided by the network).

Clock Rate

Sets the bit rate of the HDLC Egress interface in Mbps. The MG-SIP supports egress clock rates from 64 Kbps to 13.5 Mbps in steps of 1 bps.

Actual Clock Rate

The derived rate for internal clock.

4.2.5 (HDLC TX) Route Configuration

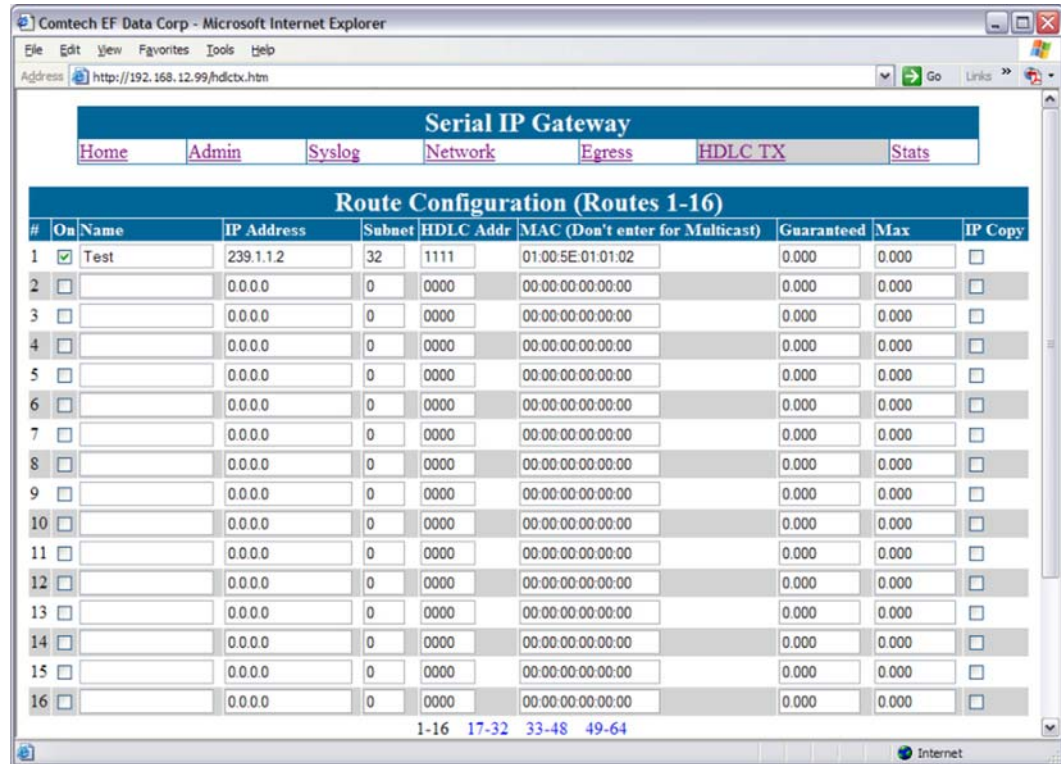


Figure 4-7. (HDLC TX) Route Configuration page

The Route Configuration page supports up to 64 Multicast or Unicast routes. **Page Up** and **Page Down** allow the user to scroll up or down through the configured routes on the MG-SIP. Once a route has been added or edited, the **Submit** button must be pressed to make the change permanent. An advanced link is present on the page to allow the QoS parameters to be set.

The MG-SIP has the following configurable parameters:

On

The route is enabled when checked.

Name

The name assigned to a given route.

IP Address

The IP Address assigned to a given route. Note a unicast route will fall within the range 0.0.0.0 to 223.255.255.255 (excluding broadcast or reserved IP addresses), and a multicast route will fall within the range of 224.0.0.0 to 239.255.255.255.

Subnet Mask (SM)

The Subnet Mask, or SM, defines the range of IP addresses that will be supported by a particular route. It is represented by a 32-bit string of 1's (representing the network and subnet network ID) followed by 0's (representing the host ID). This

string when logically 'ANDED' with the IP address, defines the network/subnet IP address.

The following demonstrates how the subnet mask defines the IP address range. The MG-SIP use Classless Inter-Domain Routing (CIDR) notation for setting the subnet masks.

- 255.255.255.255 is 0 bits
(used for an explicit route for a single IP address)
- 255.0.0.0 is 8 bits (used for an A-Class Mask)
- 255.255.0.0 is 16 bits (used for a B-Class Mask)
- 255.255.255.0 is 24 bits (used for a C-Class Mask)

HDLC Address

The HDLC address is assigned to a particular route. HDLC addresses do not have to be unique and may be assigned to one or more routes.

MAC Address

The MAC address assigned to a given route. For Unicast, this is typically the MAC address the route is assigned to and is determined by the end device (next-hop) to which the data is to be sent. However, for Multicast, this is derived as described previously.

Guaranteed Bandwidth

The guaranteed bandwidth offered to a given route. The route will be guaranteed a minimum of this amount of bandwidth on the MG-SIP.

Max Bandwidth

The maximum bandwidth allowed for a given route. Any traffic that exceeds the maximum bandwidth will be silently discarded.

4.2.6 Statistics

The screenshot shows a web browser window titled "Comtech EF Data Corp - Microsoft Internet Explorer" with the address bar showing "http://192.168.12.99/stats.htm". The page content includes a navigation menu with links: Home, Admin, Syslog, Network, Egress, HDLC TX, and Stats. Below the menu is a section titled "Uplink Route Statistics" with a summary table and a detailed table.

Received	Dropped	Min (Mbps)	Max (Mbps)	Average	Current	Egress Clock Rate (Actual) Mbps
0	0	0.000	0.000	0.000	0.000	13.000 (13.0000000)

#	On	Name	Received	Dropped	Address	Min (Mbps)	Max (Mbps)	Average (Mbps)
1	Yes	Test	0	0	1111	0.000	0.000	0.000
2	No		0	0	0000	0.000	0.000	0.000
3	No		0	0	0000	0.000	0.000	0.000
4	No		0	0	0000	0.000	0.000	0.000
5	No		0	0	0000	0.000	0.000	0.000
6	No		0	0	0000	0.000	0.000	0.000
7	No		0	0	0000	0.000	0.000	0.000
8	No		0	0	0000	0.000	0.000	0.000
9	No		0	0	0000	0.000	0.000	0.000
10	No		0	0	0000	0.000	0.000	0.000
11	No		0	0	0000	0.000	0.000	0.000
12	No		0	0	0000	0.000	0.000	0.000
13	No		0	0	0000	0.000	0.000	0.000
14	No		0	0	0000	0.000	0.000	0.000
15	No		0	0	0000	0.000	0.000	0.000
16	No		0	0	0000	0.000	0.000	0.000
17	No		0	0	0000	0.000	0.000	0.000

Figure 4-8. Uplink Route Statistics page

The Uplink Route Statistics page displays the statistics for all configured routes. **Page Up** and **Down** allows the user to scroll up or down through the configured routes on the MG-SIP.

The **Clear Stats** button allows all statistics to be cleared on the MG-SIP at the same time.

On

'Yes' indicates the route is active.

Name

The name assigned to a given route.

Received

The number of IP packets received on this route since the statistics were last cleared.

Dropped

The number of IP packets dropped on this route since the statistics were last cleared.

HDLC

The address assigned to the associated route.

Min

The minimum bandwidth received on this route since the statistics were last cleared.

Max

The maximum bandwidth received on this route since the statistics were last cleared.

Average

The average bandwidth received on this route.

4.3 Terminal Interface

The Terminal Interface provides the user with a textual configuration dialog for configuring the MG-SIP. 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 MG-SIP and a PC. While the same menu information is displayed via the Telnet interface, there are specific features available only via the ‘serial interface’ access method – these ‘serial interface only’ features are noted in this section.

Figure 4-9 shows the hierarchal structure of the Terminal Interface-based menus, and the sections in this chapter which provide figures of these submenu pages.

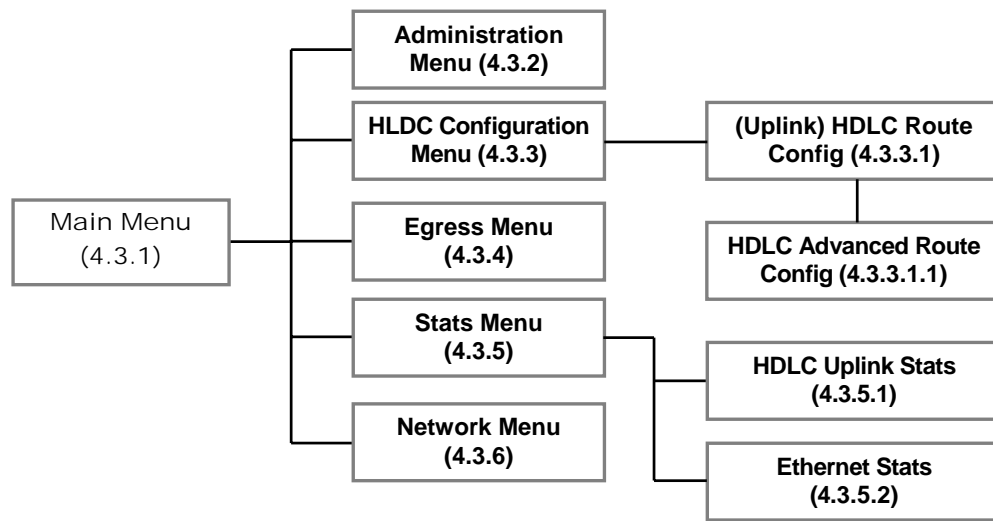


Figure 4-9. Menu Hierarchy (via Terminal Interface)

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, shown in Figure 4-10.

4.3.1 Main Menu

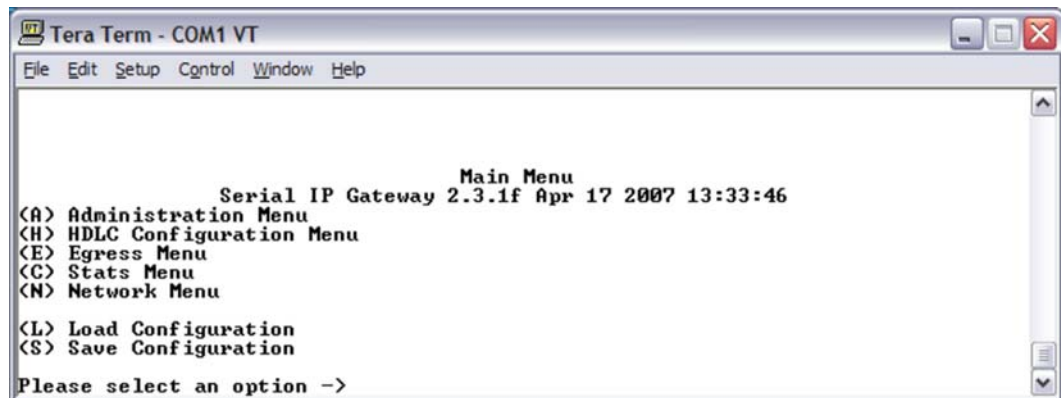


Figure 4-10. Main Menu

4.3.2 Administration Menu

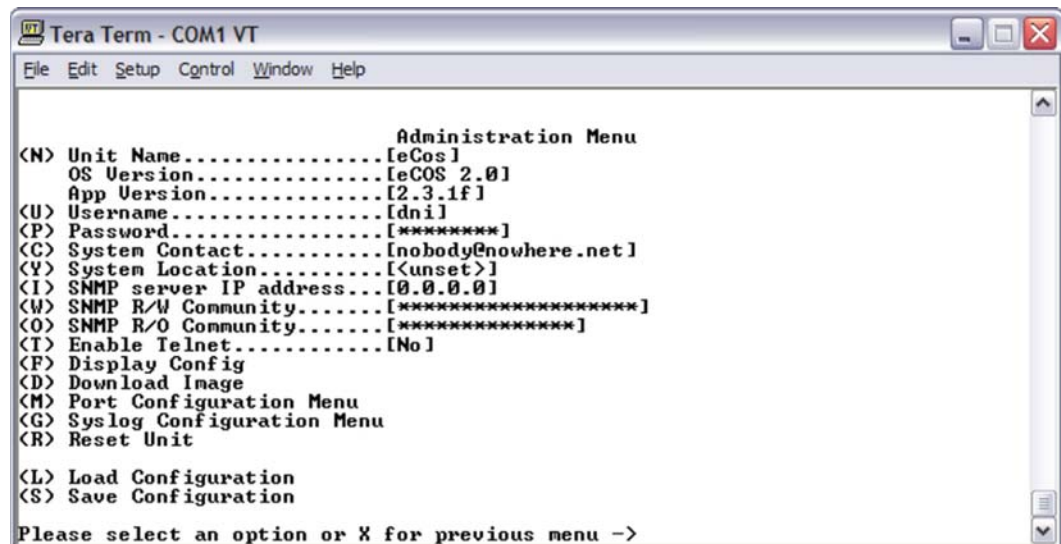


Figure 4-11. Administration Menu

4.3.3 HDLC Configuration Menu

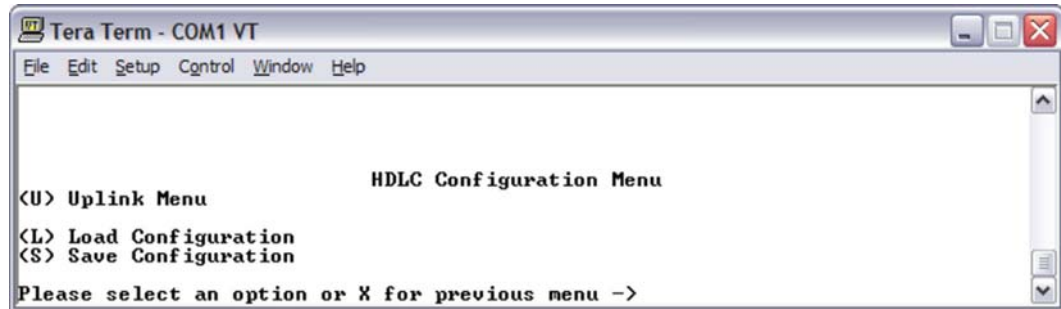


Figure 4-12. HDLC Configuration Menu

4.3.3.1 (Uplink) HDLC Route Configuration Menu

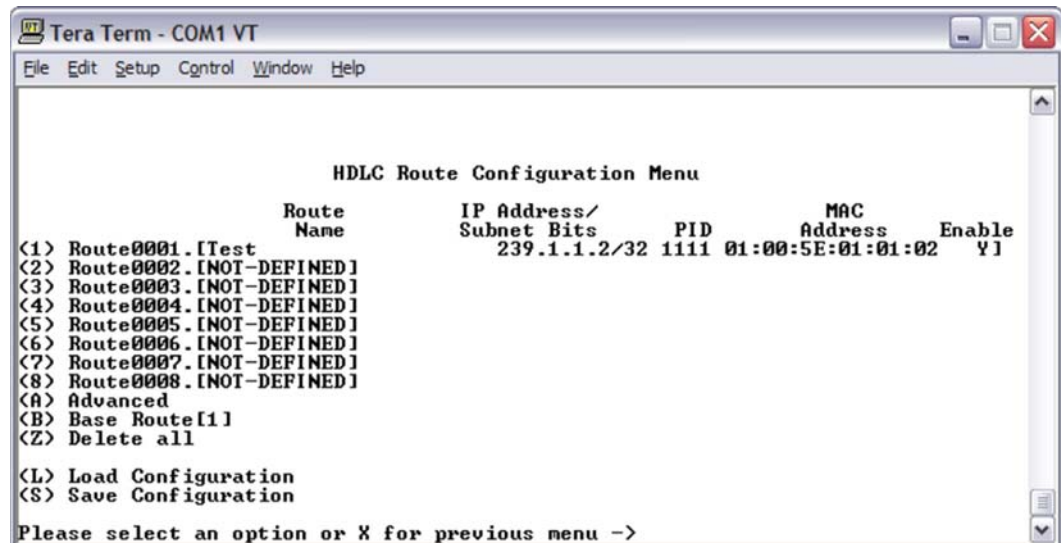


Figure 4-13. (Uplink) HDLC Route Configuration Menu

4.3.3.1.1 HDLC Advanced Route Configuration Menu

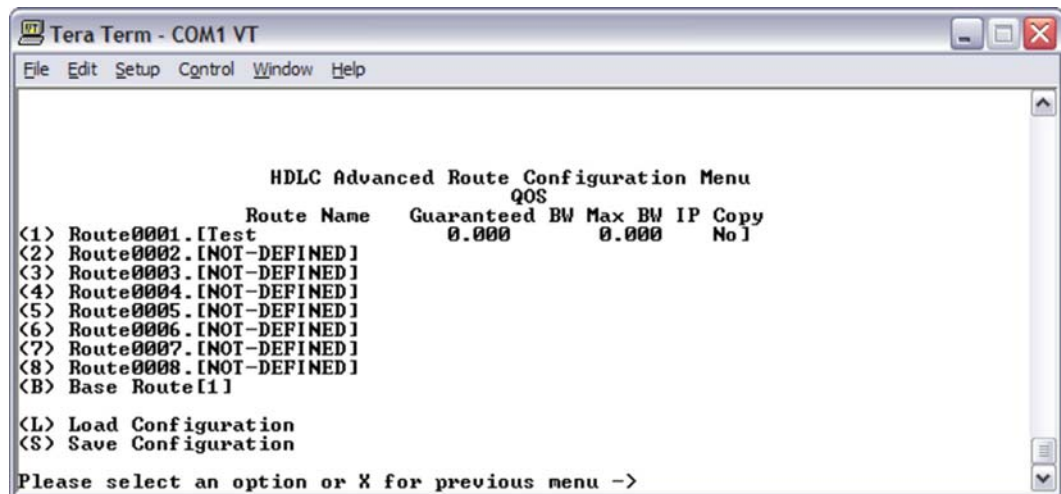


Figure 4-14. HDLC Advanced Route Configuration Menu

4.3.4 Egress Configuration Menu

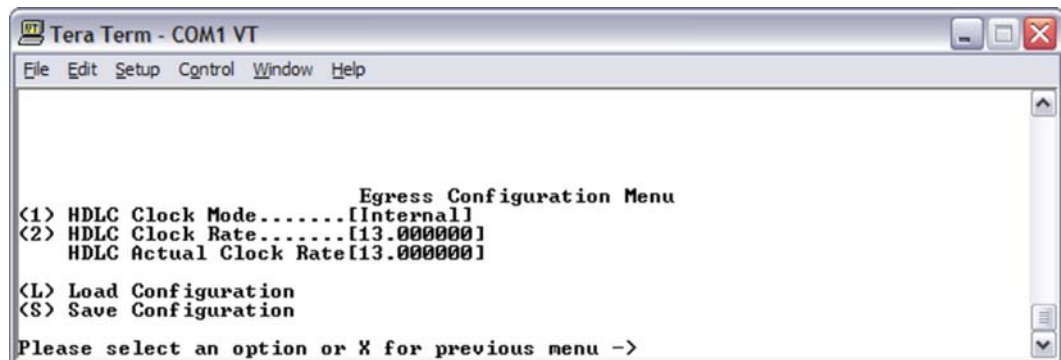


Figure 4-15. Egress Configuration Menu

4.3.5 Stats (Statistics) Menu

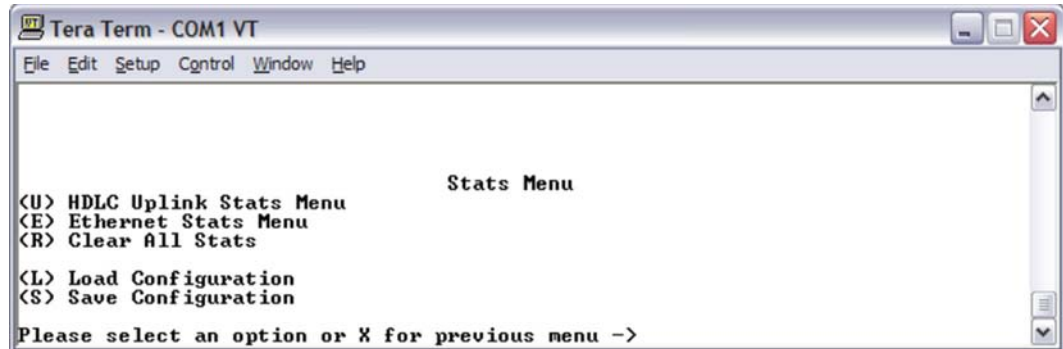


Figure 4-16. Stats Menu

4.3.5.1 HDLC Uplink Stats Menu

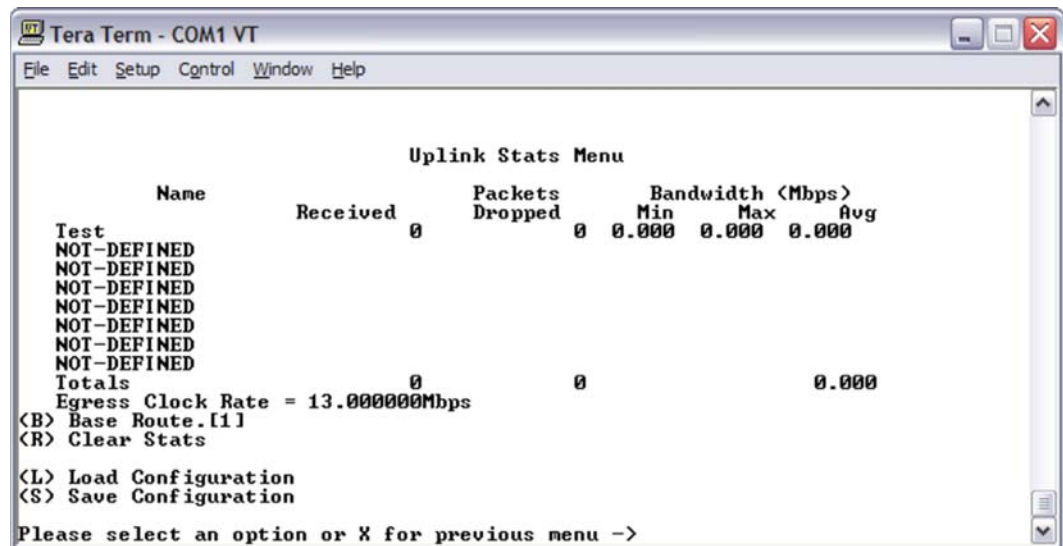
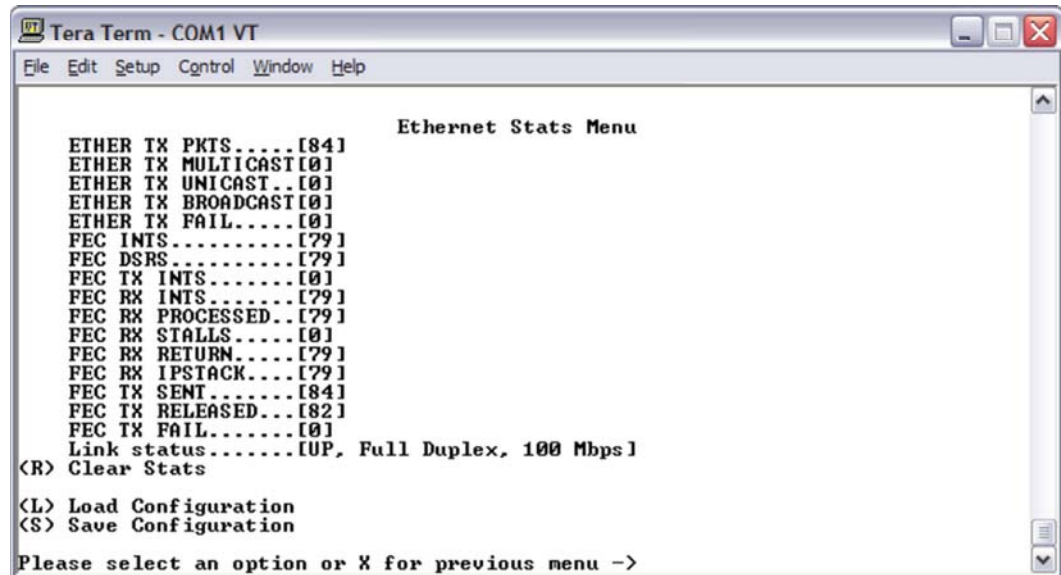


Figure 4-17. HDLC Uplink Stats Menu

4.3.5.2 Ethernet Stats Menu

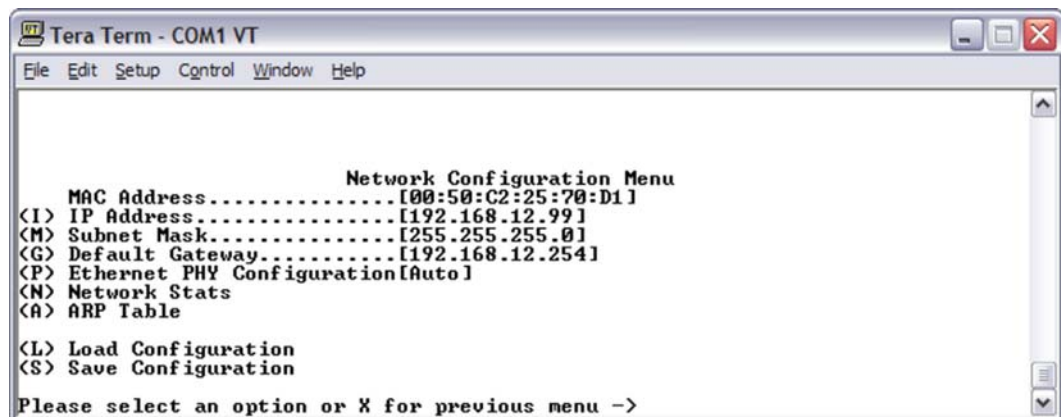


```
Tera Term - COM1 VT
File Edit Setup Control Window Help

Ethernet Stats Menu
ETHER TX PKTS.....[84]
ETHER TX MULTICAST[0]
ETHER TX UNICAST..[0]
ETHER TX BROADCAST[0]
ETHER TX FAIL.....[0]
FEC INTS.....[79]
FEC DSRS.....[79]
FEC TX INTS.....[0]
FEC RX INTS.....[79]
FEC RX PROCESSED..[79]
FEC RX STALLS.....[0]
FEC RX RETURN.....[79]
FEC RX IPSTACK...[79]
FEC TX SENT.....[84]
FEC TX RELEASED..[82]
FEC TX FAIL.....[0]
Link status.....[UP, Full Duplex, 100 Mbps]
(R) Clear Stats
(L) Load Configuration
(S) Save Configuration
Please select an option or X for previous menu ->
```

Figure 4-18. Ethernet Stats Menu

4.3.6 Network Configuration Menu



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

Network Configuration Menu
MAC Address.....[00:50:C2:25:70:D1]
(I) IP Address.....[192.168.12.99]
(M) Subnet Mask.....[255.255.255.0]
(G) Default Gateway.....[192.168.12.254]
(P) Ethernet PHY Configuration[Auto]
(N) Network Stats
(A) ARP Table
(L) Load Configuration
(S) Save Configuration
Please select an option or X for previous menu ->
```

Figure 4-19. Network Configuration 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  then .

The dialog is shown in Figure 4-20. In the Open dialog, enter “telnet xxx.xxx.xxx.xxx” where xxx.xxx.xxx.xxx is the IP address of the MG-SIP. 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.

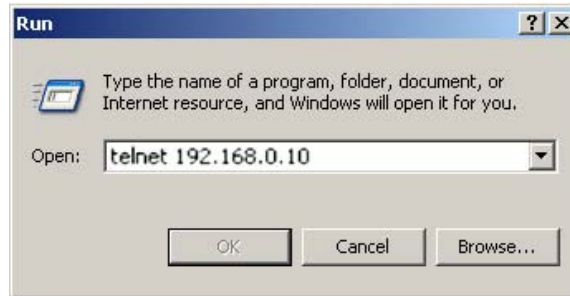


Figure 4-20. Starting Telnet Session

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



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 main menu of the MG-SIP be displayed as shown in Figure 4-21.

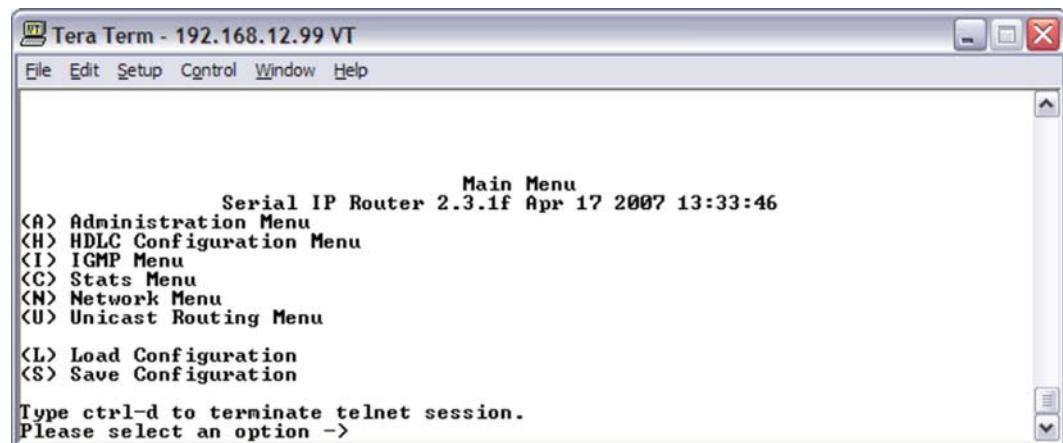


Figure 4-21. Main Menu via Telnet

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 MG-SIP support 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 MG-SIP 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.



Because the MG-SIP 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 MG-SIP as described in the Terminal Interface section.
4	Select ‘ A ’ for Administrative.
5	Select ‘ D ’ for Download.
6	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 Administrative page, or the Terminal Interface under the Main Menu.



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)

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 MG-SIP in an automated fashion.

The MG-SIP supports SNMP versions 1 and 2 (SNMPv1 and SNMPv2). SNMP version 3 (SNMPv3) will be supported in future releases. Two types of Management Information Bases (MIBs) are supported: **MIB II** and **private MIB**.

MIB II is the default MIB 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, which will be found in all elements of the MG-SIP's MIB.



NOTE

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

The MG-SIP support configurable community strings for added security. Note passwords cannot be remotely queried over SNMP as a security precaution.

For SNMP access from a remote network via the public Internet, a VPN connection to the MG-SIP 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.

Chapter 5. DEVICE MANAGEMENT VIA USER INTERFACES: CMR-5920 (MR-SIP)

5.1 Introduction

Management of the CMR-5920 Serial IP Router (MR-SIP) is simple and intuitive. There are a variety of ways to specifically configure and manage the MR-SIP:

- Web Interface via a LAN-based desktop Web 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)

5.2 Web Interface

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

Once a valid IP Address, Subnet Mask and Default Gateway have been entered into the MR-SIP, activate a Web browser on the desktop then enter the IP address of the MR-SIP into the URL field as shown below. 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 5-1. Connecting to the MR-SIP

If there is a connection between the PC and the MR-SIP, the response from the MR-SIP will be the “splash page” as shown in Figure 5-2.

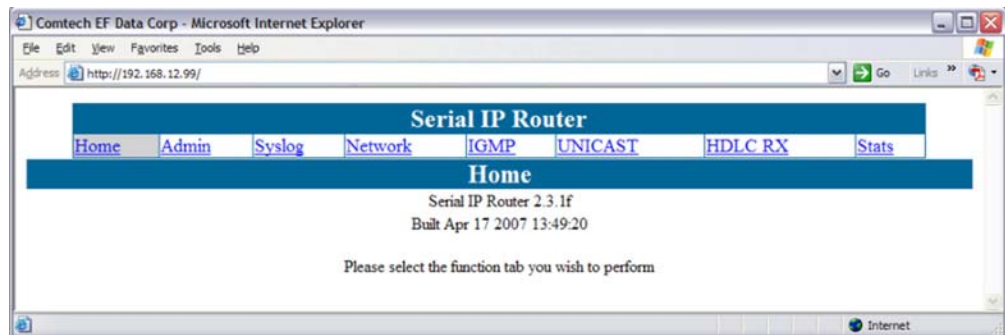


Figure 5-2. MR-SIP Home (“Splash”) page

5.2.1 Administrative Configuration

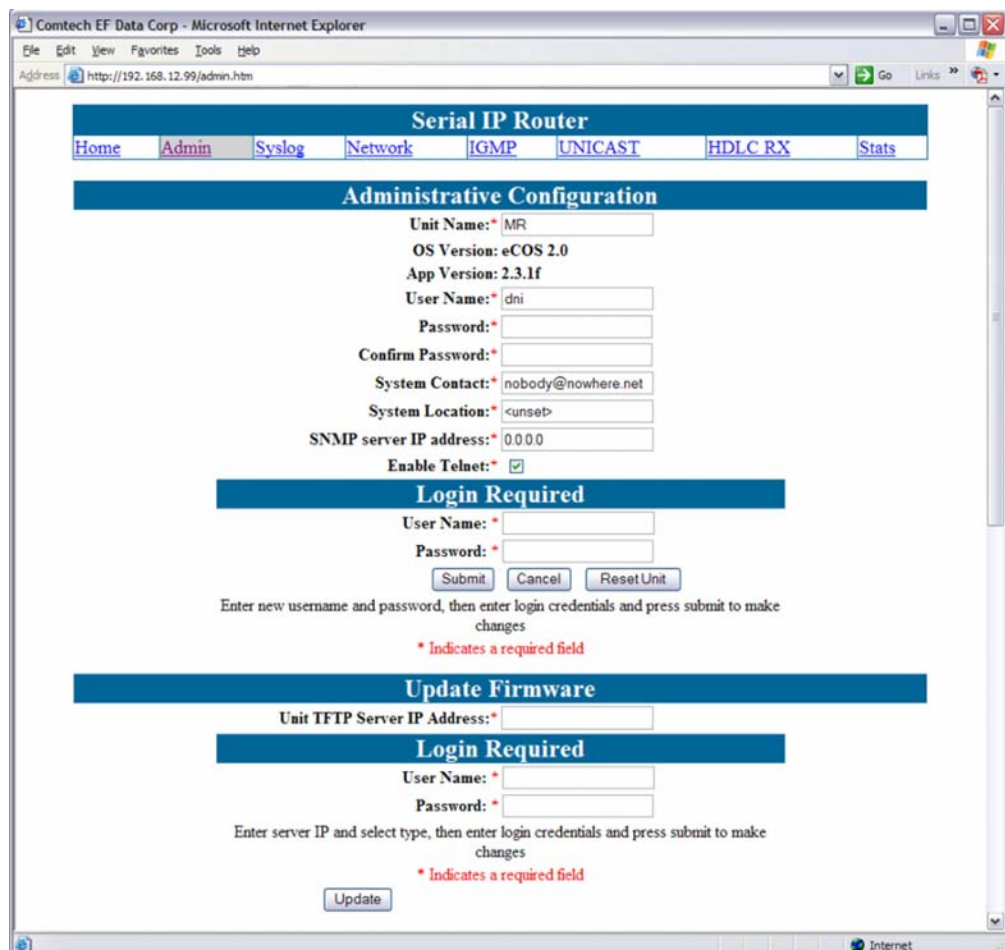


Figure 5-3. Administrative Configuration page



Beginning with the Administrative Configuration page, for pages featuring configurable parameters, changes will not be accepted without a valid user name and password. A login dialog box is available at the bottom of the page for this purpose.

The Administrative Configuration page (Figure 5-3) has the following configurable parameters:

User Name

The 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 Password is user configurable and is used for authenticating a user when connecting via IP management services. Note 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 location (physically) where the unit has been installed.

SNMP server IP Address

Defines the SNMP server that can connect to the unit.

Enable Telnet

Enables Telnet application on the MR-SIP.

Login Required

To make any changes to the MR-SIP, a user name & password are required.

Update Firmware

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

5.2.2 Syslog Configuration

Comtech EF Data Corp - Microsoft Internet Explorer
Address http://192.168.12.99/syslog.htm

Serial IP Router

Home Admin Syslog Network IGMP UNICAST HDLC RX Stats

Syslog Configuration

Enable: * No Yes or No
IP Address: * 0.0.0.0
Port: * 514 1-65535

Login Required

User Name: *
Password: *

Submit Cancel

Enter Syslog settings, then enter login credentials and press submit to make changes
* Indicates a required field

Figure 5-4. Syslog Configuration page

Syslog is a common feature of the Linux operating system. Syslog allows the events that occur on the MR-SIP to be sent to a server where they can be logged. The events are delivered to a configured server over Ethernet IP.

Enable

Enables or disables the Syslog feature.

IP Address

The IP address of the Syslog server.

Port

The port of the Syslog server. The default port number is **514**.

5.2.3 Network Configuration

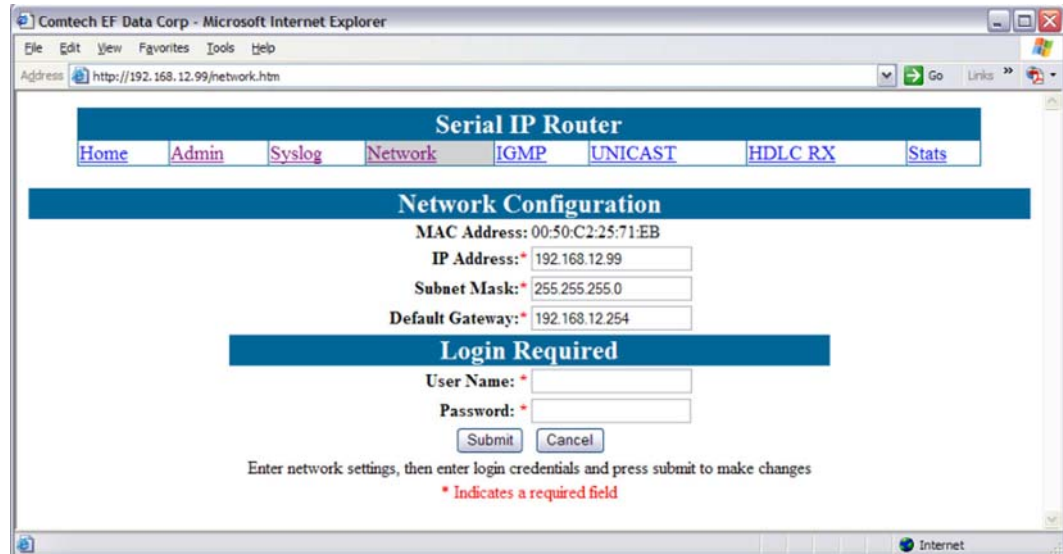


Figure 5-5. Network Configuration page

The Network Configuration page has the following configurable parameters:

IP Address

The IP Address assigned to the MR-SIP LAN interfaces. The IP Address is entered in dotted decimal format.

Subnet Mask

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

Default Gateway

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

5.2.4 IGMP Configuration

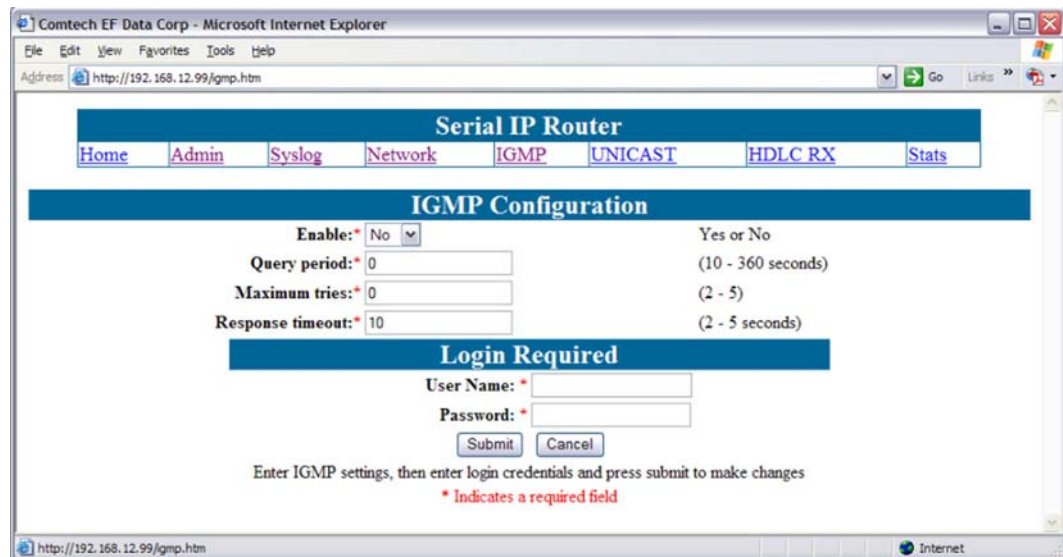


Figure 5-6. IGMP Configuration page

Internet Group Management Protocol (IGMP) is supported on the MR-SIP and prevents unwanted Multicast traffic from being output to the LAN if no receivers are requesting the service. Configuration of the IGMP features are as follows:

Enable

Enables or disables the IGMP feature on the MR-SIP.

Query period

Defines how often a query message is issued to the network. The query message will solicit for Multicast clients.

Maximum tries

Defines the number of attempts made before the Multicast stream is pruned (shut off) to the network.

Response timeout

In addition to the Query Period and the Maximum Tries, the Response Timeout defines the amount of additional time the MR-SIP will wait for a response before pruning (shutting off) a Multicast stream.

5.2.5 Unicast Routing Configuration

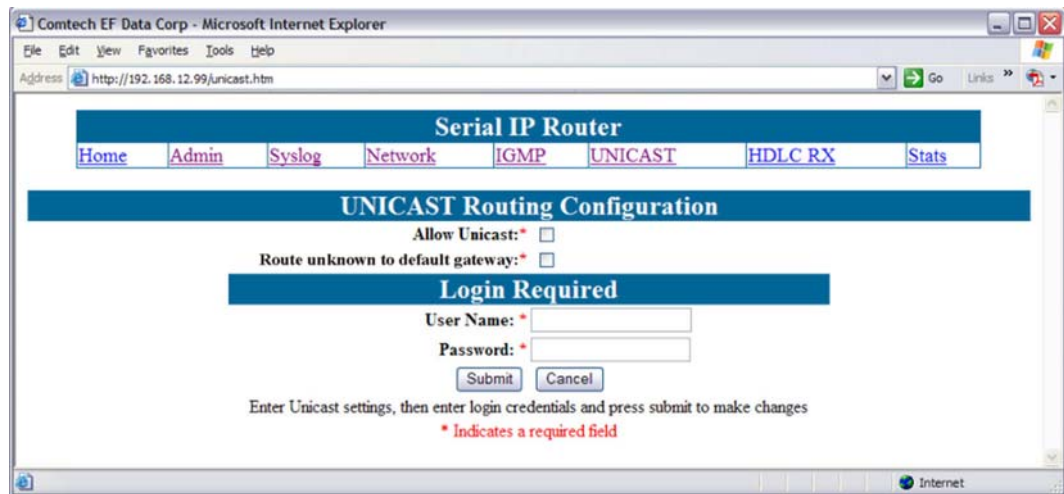


Figure 5-7. Unicast Routing Configuration page

Provides configuration for the support of Unicast traffic.

Allow Unicast

Enables or disables support for Unicast traffic.

Route unknown to default gateway

If a Unicast address is received and not within the local subnet, the packets will instead be forwarded to the configured default gateway instead of being discarded.

5.2.6 HDLC RX Configuration

#	Address	#	Address	#	Address	#	Address
1	1111	17		33		49	
2		18		34		50	
3		19		35		51	
4		20		36		52	
5		21		37		53	
6		22		38		54	
7		23		39		55	
8		24		40		56	
9		25		41		57	
10		26		42		58	
11		27		43		59	
12		28		44		60	
13		29		45		61	
14		30		46		62	
15		31		47		63	
16		32		48		64	

Figure 5-8. HDLC RX Configuration page

Address

The HDLC address entered as four hexadecimal digits. The HDLC addresses must be identical to what are configured for the route entries on the CMR-5910 Digicast Media Router Serial IP Gateway (MG-SIP).

5.2.7 Statistics

Received	Dropped	Min (Mbps)	Max (Mbps)	Average	Current
0	0	0.000	0.000	0.000	0.000

#	Multicast Received	Multicast Dropped	Unicast Received	Unicast Dropped	Address	Min (Mbps)	Max (Mbps)	Average (Mbps)
1	0	0	0	0	1111	0.000	0.000	0.000
2	0	0	0	0		0.000	0.000	0.000
3	0	0	0	0		0.000	0.000	0.000
4	0	0	0	0		0.000	0.000	0.000
5	0	0	0	0		0.000	0.000	0.000
6	0	0	0	0		0.000	0.000	0.000
7	0	0	0	0		0.000	0.000	0.000
8	0	0	0	0		0.000	0.000	0.000
9	0	0	0	0		0.000	0.000	0.000
10	0	0	0	0		0.000	0.000	0.000
11	0	0	0	0		0.000	0.000	0.000
12	0	0	0	0		0.000	0.000	0.000
13	0	0	0	0		0.000	0.000	0.000
14	0	0	0	0		0.000	0.000	0.000
15	0	0	0	0		0.000	0.000	0.000
16	0	0	0	0		0.000	0.000	0.000
17	0	0	0	0		0.000	0.000	0.000

Figure 5-9. HDLC Downlink Route Statistics page

The HDLC Downlink Route Statistics page displays the statistics for all configured routes. Pressing **Page Up** and **Down** on the keyboard allows the user to scroll up or down through the configured routes on the MR-SIP.

Multicast / Unicast Received

The number of IP packets received on this route since the statistics were last cleared.

Multicast / Unicast Dropped

The number of IP packets dropped on this route since the statistics were last cleared.

Address

The address assigned to the associated route.

Min (Mbps)

The minimum bandwidth received on this route since the statistics were last cleared.

Max (Mbps)

The maximum bandwidth received on this route since the statistics were last cleared.

Average (Mbps)

The average bandwidth received on this route.

5.3 Terminal Interface

The Terminal Interface provides the user with a textual configuration dialog for configuring the MR-SIP. 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 MR-SIP and a PC. While the same menu information is displayed via the Telnet interface, there are specific features available only via the ‘serial interface’ access method – these ‘serial interface only’ features are noted in this section.

Figure 5-10 shows the hierarchal structure of the Terminal Interface-based menus, and the sections in this chapter which provide figures of these submenu pages.

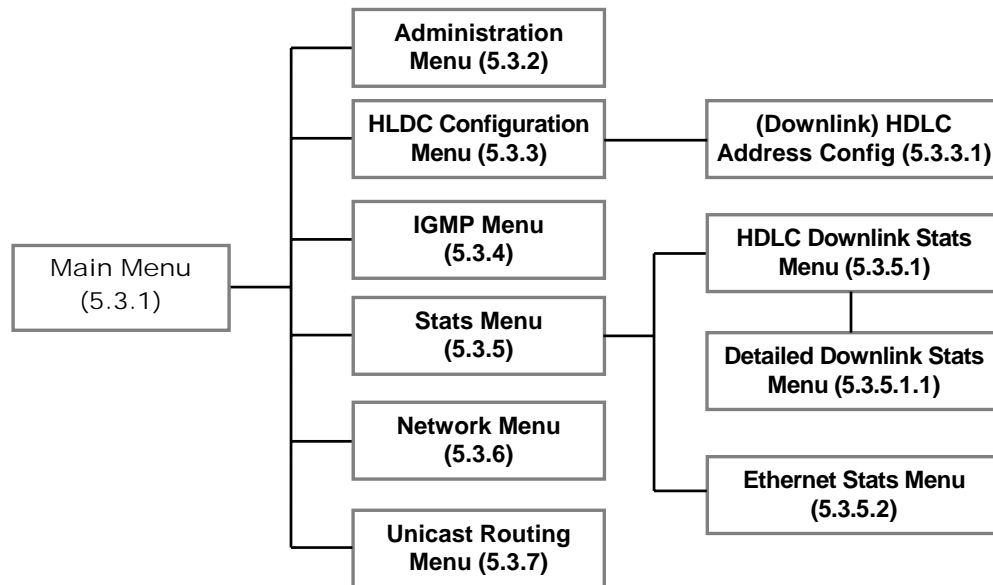


Figure 5-10. Menu Hierarchy (via Terminal Interface)

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, shown in Figure 5-11.

5.3.1 Main Menu

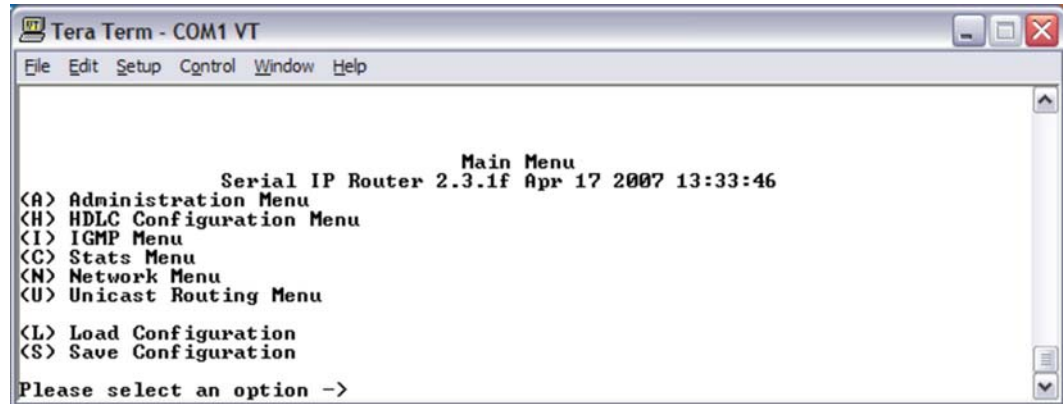


Figure 5-11. Main Menu

5.3.2 Administration Menu

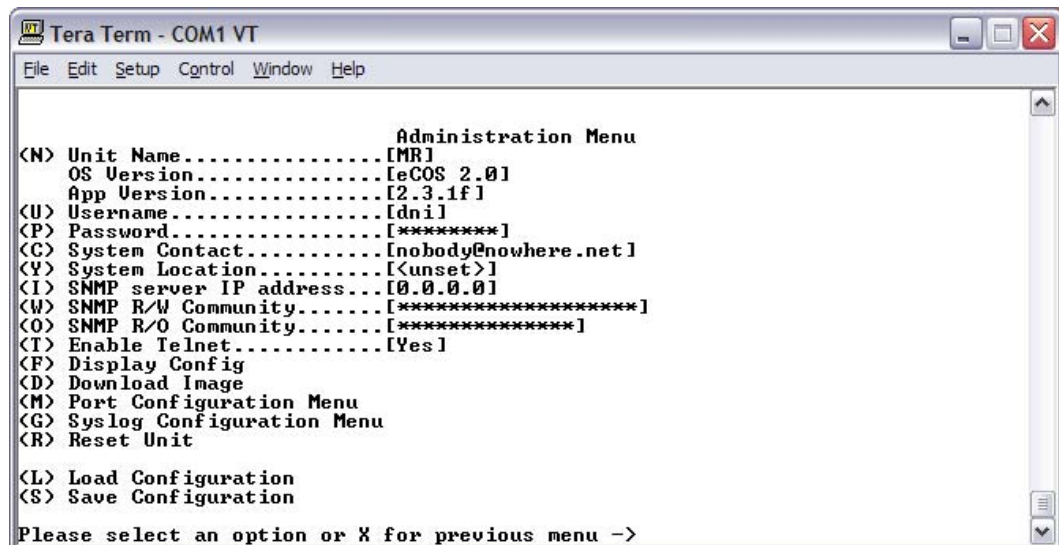


Figure 5-12. Administration Menu

5.3.3 HDLC Configuration Menu

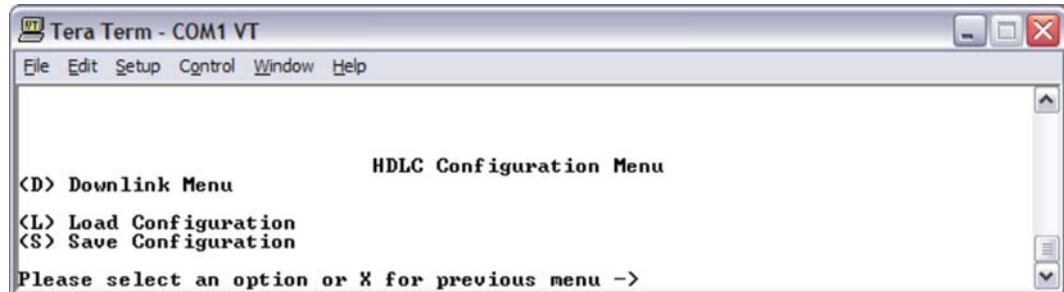


Figure 5-13. HDLC Configuration Menu

5.3.3.1 (Downlink) HDLC Address Configuration Menu

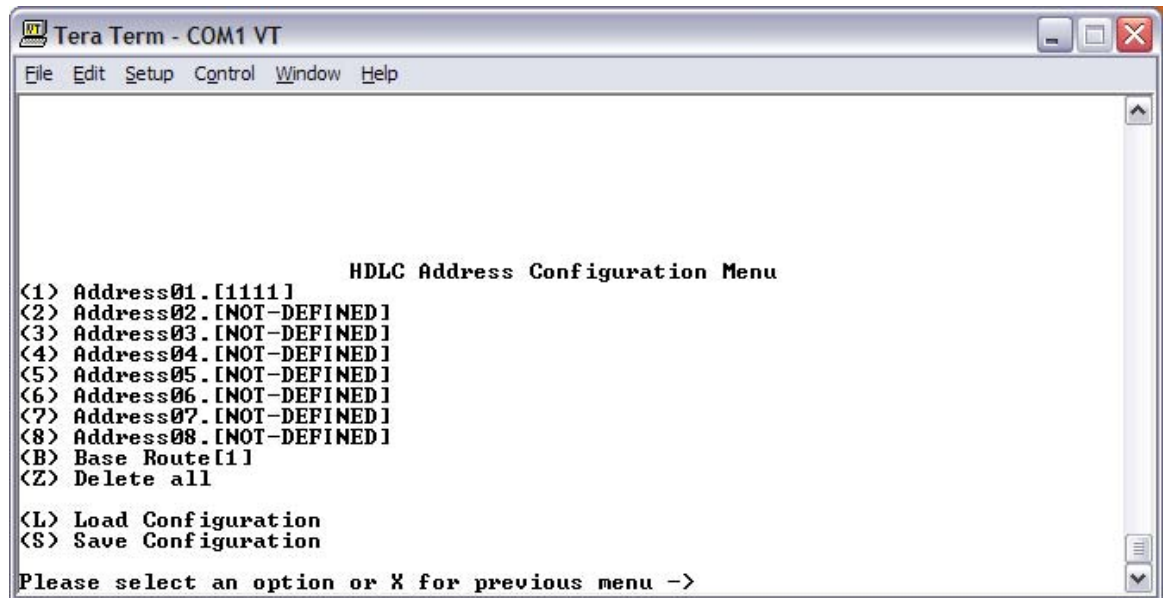


Figure 5-14. (Downlink) HDLC Address Configuration Menu

5.3.4 IGMP Configuration Menu

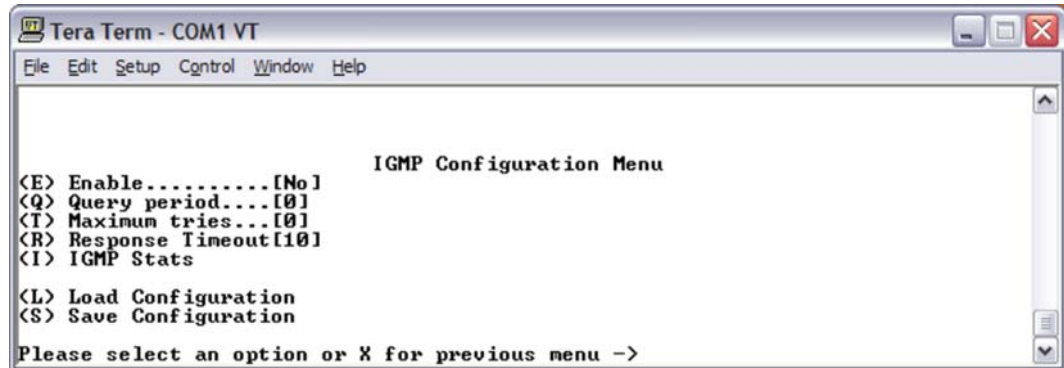


Figure 5-15. IGMP Configuration Menu

5.3.5 Stats (Statistics) Menu

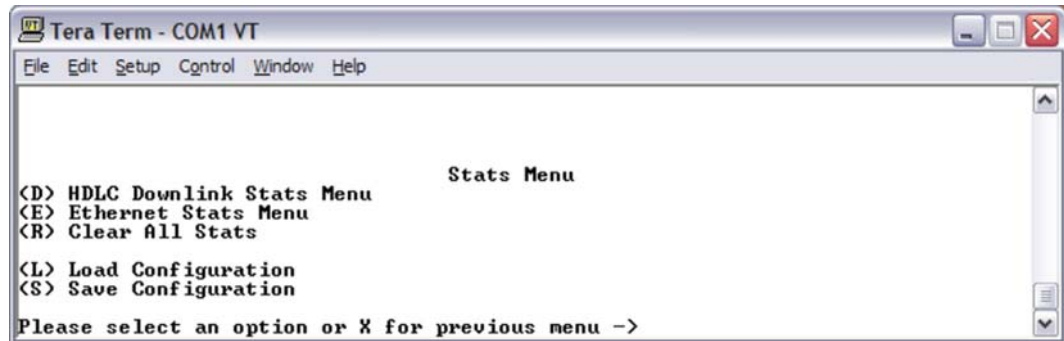


Figure 5-16. Stats Menu

5.3.5.1 HDLC Downlink Stats Menu

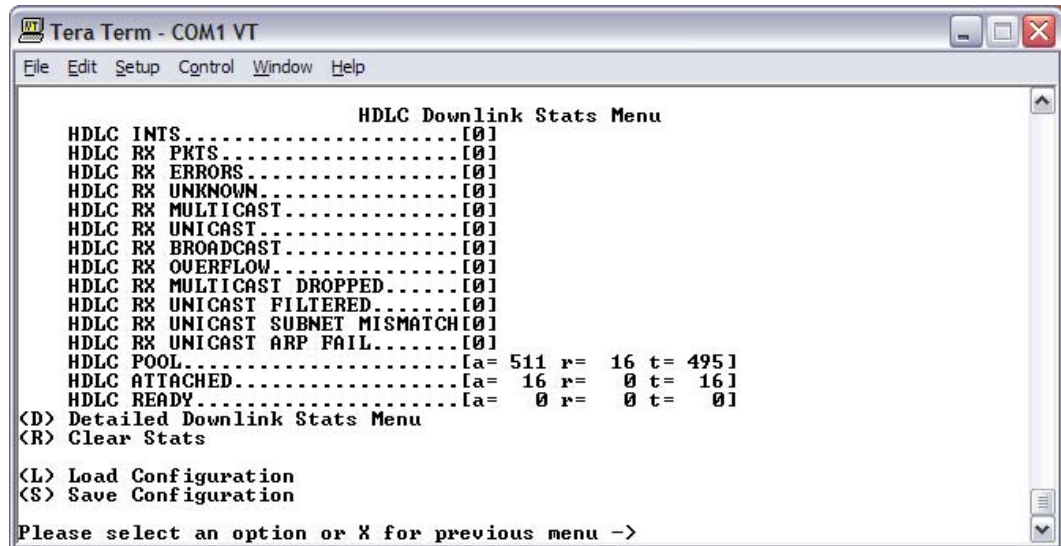


Figure 5-17. HDLC Downlink Stats Menu

5.3.5.1.1 Detailed Downlink Stats Menu

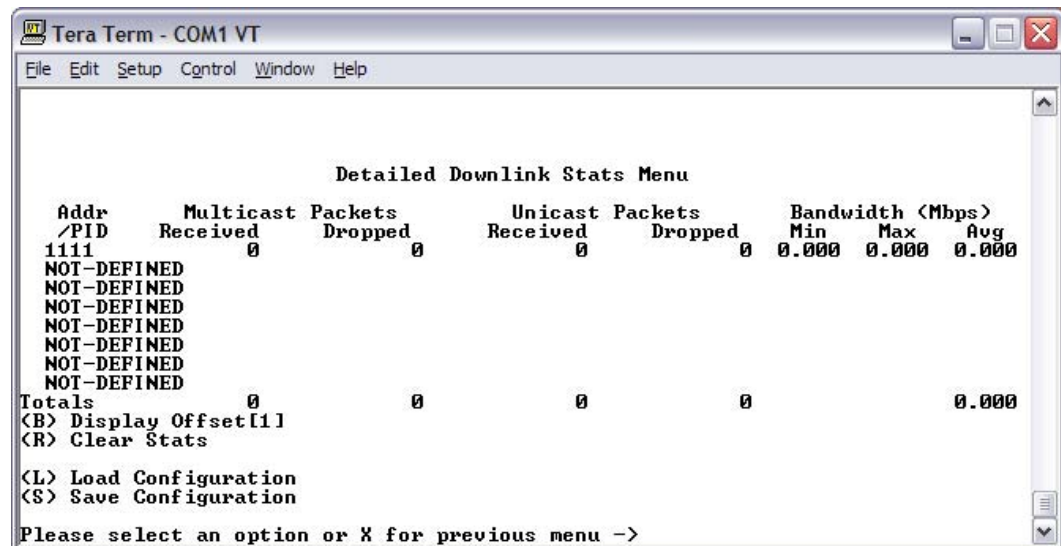
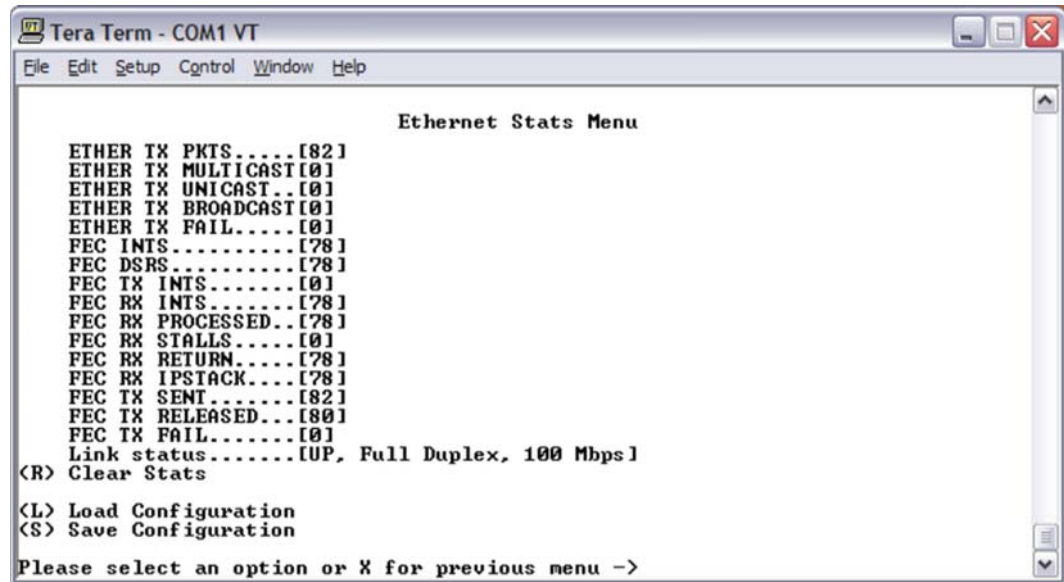


Figure 5-18. Detailed Downlink Stats Menu

5.3.5.2 Ethernet Stats Menu



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

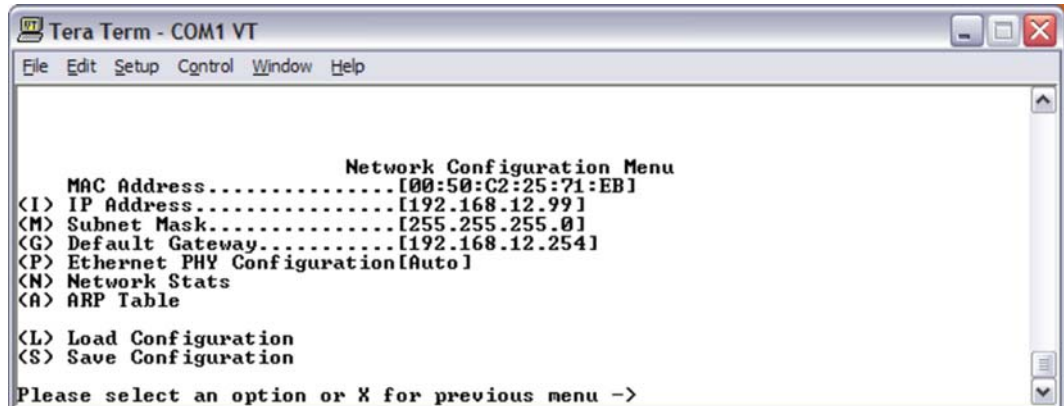
Ethernet Stats Menu

ETHER TX PKTS.....[82]
ETHER TX MULTICAST[0]
ETHER TX UNICAST..[0]
ETHER TX BROADCAST[0]
ETHER TX FAIL.....[0]
FEC INTS.....[78]
FEC DSRS.....[78]
FEC TX INTS.....[0]
FEC RX INTS.....[78]
FEC RX PROCESSED..[78]
FEC RX STALLS.....[0]
FEC RX RETURN.....[78]
FEC RX IPSTACK....[78]
FEC TX SENT.....[82]
FEC TX RELEASED...[80]
FEC TX FAIL.....[0]
Link status.....[UP, Full Duplex, 100 Mbps]
<R> Clear Stats
<L> Load Configuration
<S> Save Configuration

Please select an option or X for previous menu ->
```

Figure 5-19. Ethernet Stats Menu

5.3.6 Network Configuration Menu



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

Network Configuration Menu

MAC Address.....[00:50:C2:25:71:EB]
<I> IP Address.....[192.168.12.99]
<M> Subnet Mask.....[255.255.255.0]
<G> Default Gateway.....[192.168.12.254]
<P> Ethernet PHY Configuration[Auto]
<N> Network Stats
<A> ARP Table

<L> Load Configuration
<S> Save Configuration

Please select an option or X for previous menu ->
```

Figure 5-20. Network Configuration Menu

5.3.7 Unicast Routing Configuration Menu

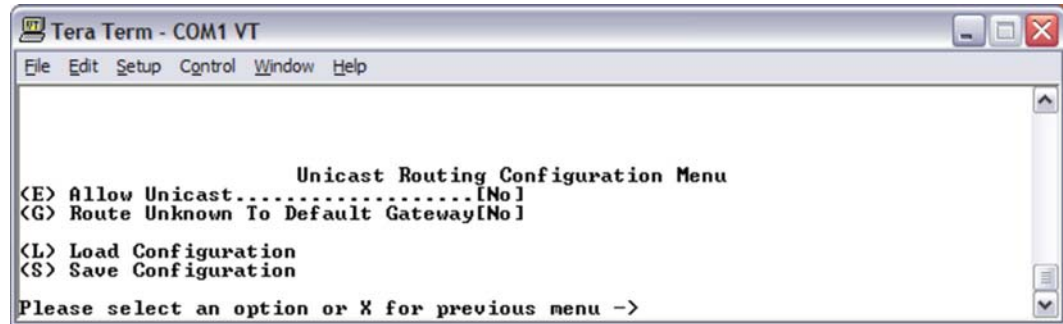


Figure 5-21. Unicast Routing Configuration Menu

5.4 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  then .

The dialog is shown in Figure 5-22. In the Open dialog, enter “telnet xxx.xxx.xxx.xxx” where xxx.xxx.xxx.xxx is the IP address of the MR-SIP. 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.

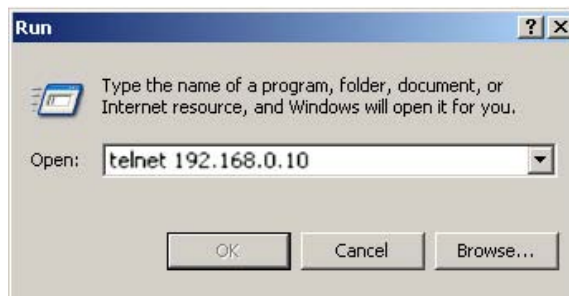


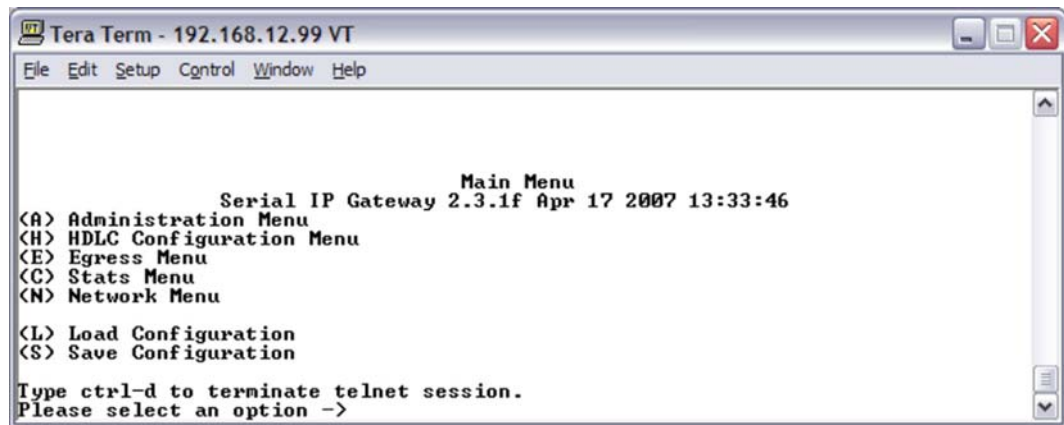
Figure 5-22. Starting Telnet Session

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



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 main menu of the MR-SIP be displayed as shown in Figure 5-23.



```
Tera Term - 192.168.12.99 VT
File Edit Setup Control Window Help

                               Main Menu
Serial IP Gateway 2.3.1f Apr 17 2007 13:33:46
<A> Administration Menu
<H> HDLC Configuration Menu
<E> Egress Menu
<C> Stats Menu
<N> Network Menu

<L> Load Configuration
<S> Save Configuration

Type ctrl-d to terminate telnet session.
Please select an option ->
```

Figure 5-23. 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.

5.5 Trivial File Transfer Protocol (TFTP)

The MR-SIP support 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:

- File** → **Configuration** → Select the ‘**TFTP Root Directory**’. Set up the location of the MR-SIP files.
- File** → **Configuration** → Select the ‘**Security**’ tab and make sure ‘**Transmit and Receive**’ are selected.
- Save configuration.

The server is now configured for the file transfer process.



Because the MR-SIP 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 MR-SIP as described in the Terminal Interface section.
4	Select 'A' for Administrative.
5	Select 'D' for Download.
6	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 Administrative page, or the Terminal Interface under the Main Menu.



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.

5.6 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 MR-SIP in an automated fashion.

The MR-SIP supports SNMP versions 1 and 2 (SNMPv1 and SNMPv2). SNMP version 3 (SNMPv3) will be supported in future releases. 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 MR-SIP's MIB will be listed in the appendix of a future revision of this manual. CEFD has been assigned an SNMP designator by the IEEE, which will be found in all elements of the MR-SIP's MIB.



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

The MR-SIP support configurable community strings for added security. Note passwords cannot be remotely queried over SNMP as a security precaution.

For SNMP access from a remote network via the public Internet, a VPN connection to the MR-SIP 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.

Notes:

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Appendix A. SOFTWARE UPGRADE

A.1 Introduction

The MG-SIP and MR-SIP are enabled to receive an upgrade via Trivial File Transfer Protocol (TFTP) transmission. It is recommended to use the Solarwinds TFTP server application (available at <http://support.solarwinds.net/updates/SelectProgramFree.cfm>) for upgrading the device.



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 following procedures may be used to upgrade the device.

A.2 Web Interface

Access the **Administrative Configuration** page (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) In the second **Login Required** section, enter a valid username and password, 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) When the unit has been upgraded, reset the unit by entering a valid username and password in the first **Login Required** section and selecting **Reset Unit**.

The screenshot shows a web browser window titled "Comtech EF Data Corp - Microsoft Internet Explorer" with the address bar showing "http://192.168.12.99/admin.htm". The page content is as follows:

- Serial IP Gateway** navigation menu: Home, Admin, Syslog, Network, Egress, HDLC TX, Stats.
- Administrative Configuration** section with fields: Unit Name (eCos), OS Version (eCOS 2.0), App Version (2.3.1f), User Name (dni), Password, Confirm Password, System Contact (nobody@nowhere.net), System Location (unset), SNMP server IP address (0.0.0.0), and Enable Telnet (checkbox).
- Login Required** section with fields: User Name, Password, and buttons: Submit, Cancel, Reset Unit. Below the fields is the instruction: "Enter new username and password, then enter login credentials and press submit to make changes".
- Update Firmware** section with a field: Unit TFTP Server IP Address.
- Login Required** section with fields: User Name, Password, and an Update button. Below the fields is the instruction: "Enter server IP and select type, then enter login credentials and press submit to make changes".

Figure A-1. TFTP Download (via Web Interface – MG-SIP shown)

A.3 Telnet or Terminal Interface

Access the **Administration 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) When the unit has been upgraded, reset the unit by selecting **(R)** for Reset and ‘**Y**’ to confirm the reset.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help

Administration Menu
<N> Unit Name.....[eCos]
    OS Version.....[eCOS 2.0]
    App Version.....[2.3.1f]
<U> Username.....[dni]
<P> Password.....[*****]
<C> System Contact.....[nobody@nowhere.net]
<Y> System Location.....[<unset>]
<I> SNMP server IP address...[0.0.0.0]
<W> SNMP R/W Community.....[*****]
<O> SNMP R/O Community.....[*****]
<T> Enable Telnet.....[No]
<F> Display Config
<D> Download Image
<M> Port Configuration Menu
<G> Syslog Configuration Menu
<R> Reset Unit

<L> Load Configuration
<S> Save Configuration

Please select an option or X for previous menu ->
```

Figure A-2. Sample TFTP (via Terminal Interface – MG-SIP shown)

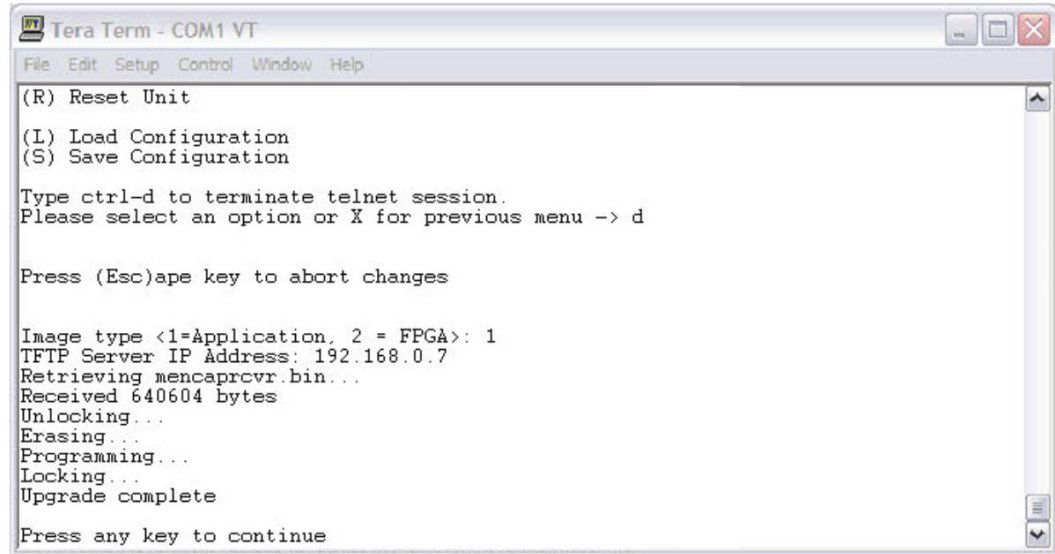


Figure A-3. TFTP Download (via Telnet Interface)

Notes:

Appendix B. IP ROUTING SUPPORT

B.1 Introduction

The MG-SIP provides state-of-the-art encapsulation based on the HDLC Specification (ISO/IEC 13239). The MG-SIP provides the following configuration features:

- HDLC Encapsulation of IP datagrams
- Unicast Routing
- Multicast Routing
- 64 Configurable Routes
- Multicast Zones

B.2 Route Configuration

Both Unicast and Multicast IP datagrams are encapsulated per the HDLC specification. Routing of datagrams is accomplished by configuration of the MG Route Table, 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: Class A (0.0.0.0 to 127.255.255.255), Class B (128.0.0.0 to 191.255.255.255), and Class C (192.0.0.0 to 223.255.255.255).
- **HDLC Addresses**, to which a specific IP destination address is mapped. This identifies the packets in the HDLC stream for a particular route. The MR-SIP

uses the HDLC addresses to filter required IP datagrams. An MR-SIP may be configured to filter up to 32 unique HDLC addresses.

Unicast is supported by the MG-SIP as it would be in any routed network. A route is created and a subnet mask is assigned to the route.

The MG-SIP 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 HDLC address which identifies the IP route in the data stream.

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)
- **HDLC Addresses**, to which a specific IP destination address is mapped. This identifies the packets in the HDLC stream for a particular route. The MR-SIP uses the HDLC addresses to filter required IP datagrams.

B.3 64 Routes

The MG-SIP and MR-SIP are capable of providing up to 64 unique IP routes. Each IP route can be configured as Unicast or Multicast. Additional routes may be supported by using the Multicast Zones feature described in the next section.

Routes can be assigned to HDLC addresses in the range 0000 to FFFF.

B.4 Multicast Zones

The Multicast Zones feature allows the user to more efficiently configure the Gateway when supporting multicasting. Using the IP subnetting techniques of Unicast routing, Multicast Zones allows a single IP address to be specified on a route and a subnet mask assigned to the route.

The MG-SIP 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. The subnet mask defines how many multicast IP addresses are allowed to be mapped to a single route. Care must be taken when using the multicast zone feature since IP traffic present within the multicast zone will be routed over the network.

An example of multicast zone is as follows:

Multicast Route = 239.0.10.1

Multicast Zone Mask = 255.255.255.252

Multicast groups mapped to the 239.0.10.1 route:

- 239.0.10.1
- 239.0.10.2
- 239.0.10.3
- 239.0.10.4

B.5 Quality of Service (QoS)

Each route defined can be configured to provide a determined bandwidth. Note all QoS rates are for the HDLC transport stream and are based on HDLC payloads. Therefore, IP data rates may be slightly less due to the protocol overhead of HDLC. The bandwidth attributes that may be set are as follows:

- **Minimum:** The guaranteed amount of bandwidth the MG will provide for this route. The total number of routes with guaranteed bandwidth must always be less than the rate of the egress port.
- **Maximum:** The maximum amount of bandwidth a route will be allowed to have. Once the traffic for this route exceeds this level, packets will be silently discarded to ensure that the maximum is not exceeded
- **No Setting:** If neither the Guaranteed nor the Maximum values are set, the route will be allowed to use as much bandwidth as possible and possibly attempt to exceed the egress bandwidth, which will result in lost data. Conversely, there is not guaranteed bandwidth for the route – another route may utilize all available bandwidth.

Appendix C. SYSTEM LOG CONFIGURATION

C.1 Introduction

The MG-SIP and MR-SIP support a feature known as **system logging**, more commonly called **Syslog**.

This section illustrates how a **system logger** can be set up on a Linux or Unix system¹, allowing the device to report system events to a logger attached via an Ethernet connection.

C.2 Enabling a System Logger

To enable system logging, add the following command string to the bottom of the `/etc/syslog.conf` file on the Logging Server:

```
=====
# log the mux messages to here
*.=info                                /var/log/mux.log
=====
```

Where:

***.=info** tells the logger to send all messages it receives from the Mux to the Dir/file

¹ Note that this is merely a sample configuration. CEFD does not support the setup of a syslog server, since it is assumed that one is already configured and operational for use.

Looking in the top of file `/etc/init.d/syslog2`, the following is usually displayed:

```
#!/bin/bash
#
# syslog      Starts syslogd/klogd.
#
#
# chkconfig: 2345 12 88
# description: Syslog is the facility by which many daemons use to log \
# messages to various system log files. It is a good idea to always \
# run syslog.

# Source function library.
. /etc/init.d/functions

[ -f /sbin/syslogd ] || exit 0
[ -f /sbin/klogd ] || exit 0

# Source config
if [ -f /etc/sysconfig/syslog ] ; then
    . /etc/sysconfig/syslog
else
    SYSLOGD_OPTIONS="-m 0"
    KLOGD_OPTIONS="-2"
fi
```

Of specific interest is the following line:

```
SYSLOGD_OPTIONS="-m 0"
```

By adding a `-r` suffix, this allows the server to accept messages from remote machines. The edited line should read as follows:

```
SYSLOGD_OPTIONS="-m 0 -r"
```

Check the services file, normally at `/etc/services`, to ensure that **PORT 514** is defined. By default this should be enabled on most machines.



NOTE

After making the changes you must restart `syslogd`.

On most machines, entering “`service syslog restart`” should complete the configuration.

² This file may be in a different location.

Appendix D. TROUBLESHOOTING

This section covers suggestions to assist the user in troubleshooting the MG-SIP or MR-SIP. If the suggestions in this section do not result in correct operation of the device, please contact Comtech EF Data Customer Support for further assistance.

SYMPTOM: Device does not power up

When the device power is on, the blue **PWR** LED should be illuminated. If this LED is not illuminated, ensure the power supply is plugged in and tightly connected to the device.

SYMPTOM: Cannot communicate with the device using a terminal/PC

If the user cannot communicate with the device using a CEFD-supplied terminal cable and a communications port on a desktop PC or notebook PC:

- Ensure the terminal cable is connected to the PC's communications port and the **TERM** port on the device.
- The communication program (HyperTerminal or TeraTerminal) should be configured as 38,400 BAUD rate, 8 Data bits and No Parity and 1 Stop bit – commonly referred to as 38,400/8/N/1.
- Flow control should also be disabled.

SYMPTOM: Cannot get E-LINK LED to illuminate on the device

The most common mistake is using an “Ethernet Crossover Cable” instead of a standard “patch cord” or “straight-through cable.” A crossover cable should only be used if connecting the device directly to a PC. Otherwise, a patch cord to an Ethernet concentrator (Hub) or switch should be used.

SYMPTOM: Cannot ping the device

If the **E-LINK** LED is illuminated but the user cannot ping the device, the most likely causes are incorrect settings for the IP address or subnet mask. Ensure the device and the PC are set with unique IP addresses that are in the same subnet.

If the device and the PC are not in the same subnet, then both the device and PC must have a valid “Default Gateway” defined so that non-local traffic will be redirected to this device for routing the IP messages between the two devices.

SYMPTOM: Device will not synchronize with an IRD or Encoder

The device may be connected directly from an RS-422/RS-530 output port to an RS-422/RS-530 input port on a modem. If the modem will not lock, the most likely cause is the data rate on the device or modem are not set correctly.

SYMPTOM: Device reports dropped packets

The most likely cause of this problem is the incoming data on a route or all routes exceeds the configured egress bandwidth.

To remedy the problem:

- Look at the route statistics for the device and identify the routes with dropped packets.
- Lower the rate of the incoming data or increase the maximum bandwidth assigned to the route if QoS is set.

SYMPTOM: Device has a RED Alarm displayed

The most likely cause of the **ALARM** LED is the maximum bandwidth has been exceeded. Please refer to the previous item to troubleshoot this problem.

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. avoird.	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. avoird.	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

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1 mm	—	0.03937	—	—	—	—	—	—
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