



# CMR-5970 / CMR-5990

Digicast Media Router S2 Receiver

CMR-5970 – MR-S2

CMR-5990 – MR-S2-ASI

Installation and Operation Manual

Part Number MN/MRS2ASIDC.IOM

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# Table of Contents

<b>PREFACE .....</b>	<b>VII</b>
<b>Customer Support.....</b>	<b>vii</b>
<b>About this Manual .....</b>	<b>viii</b>
Reporting Comments or Suggestions Concerning this Manual.....	viii
<b>Conventions and References .....</b>	<b>viii</b>
Cautions and Warnings .....	viii
Metric Conversion .....	ix
Recommended Standard Designations .....	ix
Trademarks .....	ix
<b>Electromagnetic Compatibility (EMC) Compliance .....</b>	<b>ix</b>
Emissions Compliance.....	ix
EN61000 Compliance.....	ix
<b>Safety Compliance .....</b>	<b>x</b>
EN60950 Compliance.....	x
Low Voltage Directive (LVD).....	x
<b>Warranty Policy .....</b>	<b>xi</b>
Limitations of Warranty.....	xi
Exclusive Remedies .....	xii
<b>CHAPTER 1. INTRODUCTION.....</b>	<b>1-1</b>
<b>1.1 Introduction.....</b>	<b>1-1</b>
<b>1.2 Standard Features.....</b>	<b>1-2</b>
<b>1.3 Performance .....</b>	<b>1-3</b>
<b>1.4 Configurations.....</b>	<b>1-3</b>
<b>1.5 Specifications.....</b>	<b>1-4</b>
<b>1.6 Terminology.....</b>	<b>1-6</b>

<b>CHAPTER 2. INSTALLATION &amp; INITIAL CONFIGURATION .....</b>	<b>2-1</b>
2.1 Major Assembly .....	2-1
2.2 Unpacking.....	2-1
2.3 Installation.....	2-2
2.4 Initial Configuration.....	2-3
<b>CHAPTER 3. INTERFACE PINOUTS .....</b>	<b>3-1</b>
3.1 Pinout Overview.....	3-1
3.2 DC Power .....	3-1
3.3 RJ-45 Ethernet .....	3-1
3.4 RJ-12 Redundancy.....	3-2
3.5 RJ-12 Terminal .....	3-2
3.1 BNC .....	3-2
3.6 ASI (Typical RX and TX) – MR-S2-ASI Only.....	3-2
3.7 F-Type L-Band.....	3-2
<b>CHAPTER 4. DEVICE MANAGEMENT VIA USER INTERFACES .....</b>	<b>4-1</b>
4.1 Introduction.....	4-1
4.2 Web Interface.....	4-1
4.2.1 Administrative Configuration .....	4-2
4.2.2 Syslog Configuration .....	4-4
4.2.3 Network Configuration .....	4-5
4.2.4 Egress Configuration (MR-S2-ASI only) .....	4-6
4.2.5 IGMP Configuration .....	4-7
4.2.6 Unicast Routing Configuration .....	4-8
4.2.7 MPE/IP Configuration (Tuner or MR-S2-ASI only).....	4-9
4.2.8 Tuner MPEG TS Route Configuration .....	4-10
4.2.9 Service Filter Route Configuration (MR-S2-ASI only).....	4-12
4.2.10 Tuner Configuration.....	4-13
4.2.11 Tuner Statistics.....	4-16
4.3 Terminal Interface.....	4-18
4.3.1 Main Menu.....	4-19

4.3.2	Administration Menu .....	4-19
4.3.2.1	Port Number Configuration .....	4-19
4.3.3	ASI Configuration Menu (MR-S2-ASI only) .....	4-20
4.3.3.1	ASI MPE/IP Configuration Menu (MR-S2-ASI only) .....	4-20
4.3.3.2	ASI Service Filter Configuration Menu (MR-S2-ASI only) .....	4-21
4.3.3.3	ASI MPEG TS Configuration Menu (MR-S2-ASI only) .....	4-21
4.3.4	IGMP Configuration Menu .....	4-22
4.3.5	Egress Configuration Menu (MR-S2-ASI only) .....	4-22
4.3.6	Stats Menu .....	4-23
4.3.6.1	DMA Stats Menu .....	4-24
4.3.6.2	Ethernet Stats Menus .....	4-24
4.3.6.3	ASI Stats menu (MR-S2-ASI only) .....	4-25
4.3.6.3.1	ASI MPE/IP Stats Menu .....	4-25
4.3.6.3.1.1	ASI Detailed MPE/IP Stats Menu .....	4-26
4.3.6.3.1.2	ASI Detailed MPE/IP Advanced Stats Menu .....	4-26
4.3.6.3.2	ASI MPEG TS Stats Menu .....	4-27
4.3.6.3.2.1	Detailed ASI MPEG TS Stats Menu .....	4-27
4.3.6.3.2.2	Detailed ASI MPEG TS Advanced Stats Menu .....	4-28
4.3.6.3.3	ASI Service Filter Stats Menu .....	4-28
4.3.6.4	Tuner Stats Menu .....	4-29
4.3.6.4.1	Tuner MPE/IP Stats Menu .....	4-29
4.3.6.4.1.1	Detailed Tuner MPE/IP Stats Menu .....	4-30
4.3.6.4.1.2	Detailed Tuner MPE/IP Advanced Stats Menu .....	4-30
4.3.6.4.2	Tuner MPEG TS Stats Menu .....	4-31
4.3.6.4.2.1	Detailed Tuner MPEG TS Stats .....	4-31
4.3.6.4.2.2	Detailed Tuner MPEG TS Advanced Stats Menu .....	4-32
4.3.6.4.3	Detailed Tuner Stats Menu .....	4-32
4.3.7	Network Configuration Menu .....	4-33
4.3.8	Unicast Routing Configuration Menu .....	4-33
4.3.9	Tuner Menu .....	4-34
4.3.9.1	Tuner Configuration Menu .....	4-34
4.3.9.2	Tuner MPE/IP Configuration Menu .....	4-35
4.3.9.3	Tuner MPEG TS Configuration Menu .....	4-35
4.3.9.4	Tuner Service Filter Configuration Menu (MR-S2-ASI only) .....	4-36
<b>4.4</b>	<b>Telnet Interface .....</b>	<b>4-37</b>
<b>4.5</b>	<b>Trivial File Transfer Protocol (TFTP) .....</b>	<b>4-38</b>
<b>4.6</b>	<b>Simple Network Management Protocol (SNMP) (Future) .....</b>	<b>4-39</b>
<b>APPENDIX A. SOFTWARE UPGRADE .....</b>		<b>A-1</b>
<b>A.1</b>	<b>Introduction .....</b>	<b>A-1</b>
<b>A.2</b>	<b>Web Interface .....</b>	<b>A-2</b>

**A.3 Telnet or Terminal Interface .....A-3**

**APPENDIX B. IP ROUTING SUPPORT..... B-1**

**B.1 Introduction.....B-1**

**B.2 IP Configuration .....B-1**

    B.2.1 Unicast Routing .....B-2

    B.2.2 Multicast Routing.....B-2

**B.3 Section Packing .....B-3**

**APPENDIX C. SYSTEM LOG CONFIGURATION ..... C-1**

**C.1 Introduction.....C-1**

**C.2 Enabling a System Logger.....C-1**

## Tables

Table 1-1. Digicast Media Router S2 Receiver – Specifications..... 1-5

Table 2-1. Digicast Media Router S2 Receiver – Standalone Configuration .....2-1

## Figures

Figure 1-1. Digicast Media Router S2 Receiver – Front Panels ..... 1-1

Figure 1-2. Digicast Media Router S2 Receiver – CMR-5970 (MR-S2)..... 1-3

Figure 1-3. Digicast Media Router S2 Receiver – CMR-5990 (MR-S2-ASI)..... 1-4

Figure 1-4. Digicast Media Router S2 Receiver – Rear Panels ..... 1-4

Figure 3-1. Digicast Media Router S2 Receiver – Rear Panel (MR-S2-ASI shown) ..... 3-1

Figure 4-1. Connecting to the MR-S2.....4-1

Figure 4-2. MR-S2 Home (“Splash”) page .....4-2

Figure 4-3. MR-S2 Administrative Configuration page .....4-2

Figure 4-4. Syslog Configuration page .....4-4

Figure 4-5. Network Configuration page .....4-5

Figure 4-6. Egress Configuration page (MR-S2-ASI only) .....4-6

Figure 4-7. IGMP Configuration page .....4-7

Figure 4-8. Unicast Routing Configuration page.....4-8

Figure 4-9. MPE/IP Configuration page (Tuner or MR-S2-ASI only) .....4-9

Figure 4-10. Tuner MPEG TS Route Configuration page .....4-10

Figure 4-11. Service Filter Route Configuration page (MR-S2-ASI only).....4-12

Figure 4-12. Tuner Configuration page .....	4-13
Figure 4-13. Tuner Statistics page .....	4-16
Figure 4-14. Menu Hierarchy (via Terminal Interface) .....	4-18
Figure 4-15. Main Menu .....	4-19
Figure 4-16. Admin Menu .....	4-19
Figure 4-17. ASI Configuration Menu.....	4-20
Figure 4-18. ASI MPE/IP Configuration Menu.....	4-20
Figure 4-19. ASI Service Filter Configuration Menu .....	4-21
Figure 4-20. ASI MPEG TS Configuration Menu .....	4-21
Figure 4-21. IGMP Configuration Menu .....	4-22
Figure 4-22. Egress Configuration Menu .....	4-22
Figure 4-23. MR-S2 or MR-S2-ASI Stats Menu .....	4-23
Figure 4-24. Stats Menu Hierarchy (via Terminal Interface) .....	4-23
Figure 4-25. DMA Stats Menu .....	4-24
Figure 4-26. Ethernet Stats Menu .....	4-24
Figure 4-27. MR-S2-ASI ASI Stats Menu.....	4-25
Figure 4-28. MPE/IP Stats Menu .....	4-25
Figure 4-29. ASI Detailed MPE/IP Stats Menu .....	4-26
Figure 4-30. ASI Detailed MPE/IP Advanced Stats Menu.....	4-26
Figure 4-31. ASI MPEG TS Stats Menu.....	4-27
Figure 4-32. Detailed ASI MPEG TS Stats Menu .....	4-27
Figure 4-33. Detailed ASI MPEG TS Stats Menu .....	4-28
Figure 4-34. ASI Service Filter Stats Menu.....	4-28
Figure 4-35. Tuner Stats Menu .....	4-29
Figure 4-36. Tuner MPE/IP Stats Menu .....	4-29
Figure 4-37. Detailed Tuner MPE/IP Stats Menu.....	4-30
Figure 4-38. Detailed Tuner MPE/IP Advanced Stats Menu.....	4-30
Figure 4-39. Tuner MPEG TS Stats Menu .....	4-31
Figure 4-40. Detailed Tuner MPEG TS Stats .....	4-31
Figure 4-41. Detailed Tuner MPEG TS Advanced Stats Menu.....	4-32
Figure 4-42. Detailed Tuner Stats Menu.....	4-32
Figure 4-43. Network Configuration Menu .....	4-33
Figure 4-44. Unicast Routing Configuration Menu .....	4-33
Figure 4-45. Tuner Menu .....	4-34
Figure 4-46. Tuner Configuration Menu.....	4-34
Figure 4-47. Tuner MPE/IP Configuration Menu.....	4-35
Figure 4-48. Tuner MPEG TS Configuration Menu.....	4-35
Figure 4-49. Tuner Service Filter Configuration Menu .....	4-36
Figure 4-50. Starting Telnet Session.....	4-37
Figure 4-51. Main Menu via Telnet.....	4-37
Figure A-1. TFTP Download (via Web).....	A-2
Figure A-2. TFTP Download (via Terminal).....	A-3
Figure A-3. TFTP Download Complete (via Terminal) .....	A-4
Figure B-1. Multicast Mapping (IP to MAC) .....	B-3
Figure B-2. Section Packing .....	B-3

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# Preface

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## 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](http://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](mailto:service@comtechefdata.com).

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

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## About this Manual

This manual provides installation and operation information, functional capabilities, and performance specifications for the Comtech EF Data (CEFD) CMR-5970 (MR-S2) and CMR-5990 (MR-S2-ASI) Digicast Media Router S2 Receivers – referred to collectively throughout this manual as “the MR-S2”. The manual additionally provides information on how to connect the MR-S2 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 CEFD Digicast CMR-5970 (MR-S2) and CMR-5990 (MR-S2-ASI) Media Router S2 Receivers.

## 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](mailto:techpub@comtechefdata.com).

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## Conventions and References

### Cautions and Warnings



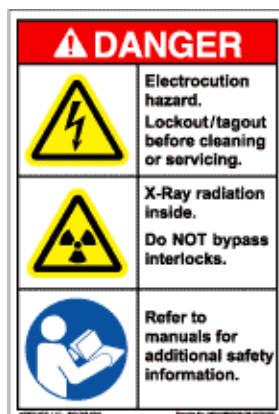
**IMPORTANT** or **NOTE** indicates a statement that is associated with the task being performed or information critical for proper equipment function.



**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.

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## 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


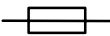
Applicable testing is routinely performed as a condition of manufacturing on all units to ensure compliance with safety requirements of EN60950. This equipment meets the Safety of Information Technology Equipment specification as defined in EN60950.



### 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.
	<b>CAUTION:</b> Double-pole/Neutral Fusing <b>ACHTUNG:</b> Zweipolige bzw. Neutralleiter-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.**

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## 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 Media Router S2 Receiver – Front Panels

## 1.1 Introduction

The Comtech EF Data (CEFD) Digicast Media Router S2 Receivers – referred to collectively throughout this manual as “the MR-S2” – come in one of two configurations:

- **CEFD Digicast Media Router S2 Receiver – CMR-5970 (MR-S2)**  
L-Band to IP Receiver
- **CEFD Digicast Media Router S2 Receiver – CMR-5990 (MR-S2-ASI)**  
L-Band / Asynchronous Serial Interface (ASI) to IP/ASI Receiver

The MR-S2 is an economical L-Band-to-IP Receiver providing price-versus-performance unparalleled in today’s market. Additionally, the MR-S2-ASI provides the ability to multiplex the L-band tuner stream to an incoming ASI transport stream.

The MR-S2 receives Multiprotocol Encapsulated (MPE) data as specified in ETSI EN 301 192 over MPEG-2 packets or raw Transports Streams (TS) carrying audio, video or data over an L-Band or ASI input.

The MR-S2 supports:

- DVB-S (2 to 45 Msps)
  - FEC Rates: 1/2, 2/3, 3/4, 5/6 and 7/8
- DVB-S2 QPSK (6 to 32 Msps)
  - FEC Rates: 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9 and 9/10
- DVB-S2 8PSK (6 to 32 Msps)
  - FEC Rates: 3/5, 2/3, 3/4, 5/6, 8/9 and 9/10

---

## 1.2 Standard Features

Based on an embedded architecture, utilizing a FreeScale MPC859 CPU and eCOS Operating System, the MR-S2 provides the following features:

- High Reliability
- DVB-S and DVB-S2 L-Band Input
- ASI Input at rates as high as 213 Mbps (*option with MR-S2-ASI only*)
- Ethernet Output rates as high as 85 Mbps (1,500 byte packets)
- ASI Output rates as high as 213 Mbps (*option with MR-S2-ASI only*)
- Support for Multicast and Unicast IP datagrams
- Supports the decapsulation of MPE
- MPE Section Packing and Non-Section Packing on a PID-by-PID basis
- Supports encapsulation of transport streams over IP
- Support for all valid PIDs in 8192 range
- 64 PIDs on each input (ASI or L-Band)
- 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
- Management (monitor, control and configuration):
  - Web Interface
  - TFTP for field software/firmware upgrade
  - Terminal Interface
  - Telnet
  - SNMP V2 (Private and MIB II) Support (*Future release*)



### 1.3 Performance

The MR-S2 provides the following performance characteristics:

Item	Value
Maximum Ingress (ASI Input)	213 Mbps 188-Byte Mode
Maximum Egress (ASI Output)	213 Mbps 188-Byte Mode
ASI to ASI PCR Jitter	<75nS
Maximum Bits Per Second (Maximum Packet Size 1,518 Bytes)	85 Mbps
Latency	Less than 10 ms

### 1.4 Configurations

The MR-S2 comes in two configuration modes. The MR-S2, shown in in Figure 1-2, is a Satellite-to-Ethernet IP router.

The MR-S2-ASI has the same feature set as the MR-S2; however, it contains an ASI input and ASI output port. The MR-S2 not only can route ASI data from the input, it also is capable of multiplexing the satellite feed to an existing ASI stream. The capabilities of the MR-S2-ASI are shown in Figure 1-3.

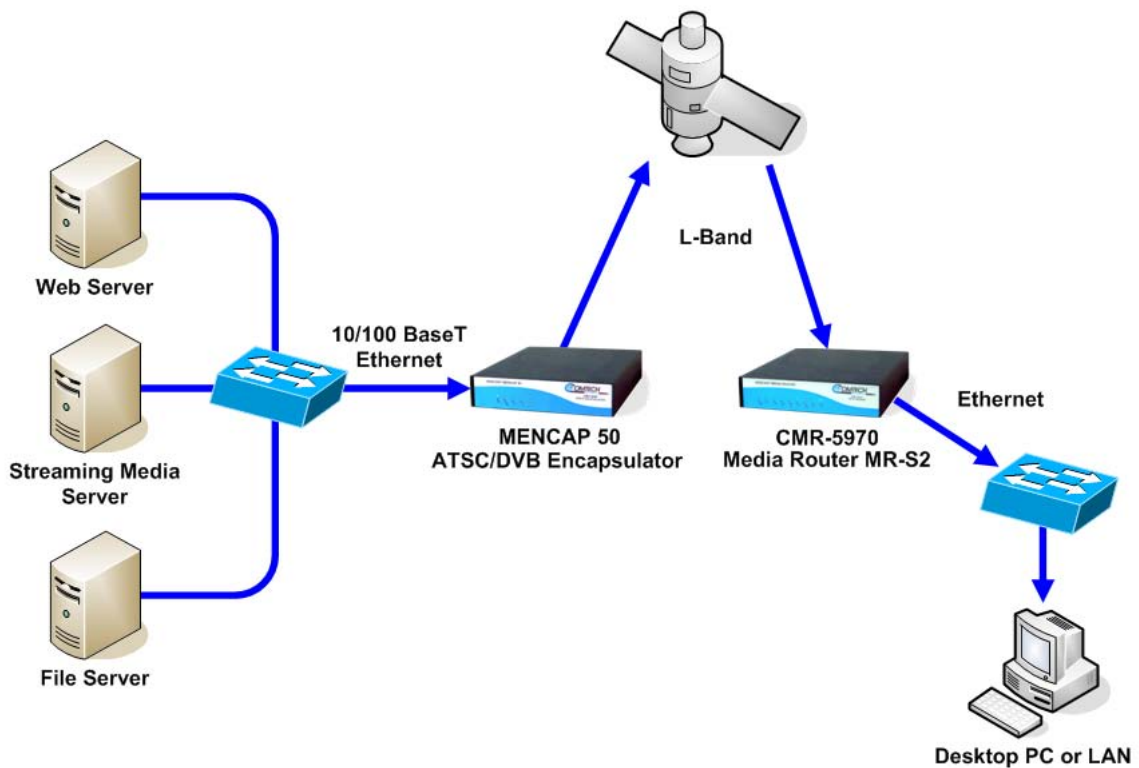


Figure 1-2. Digicast Media Router S2 Receiver – CMR-5970 (MR-S2)

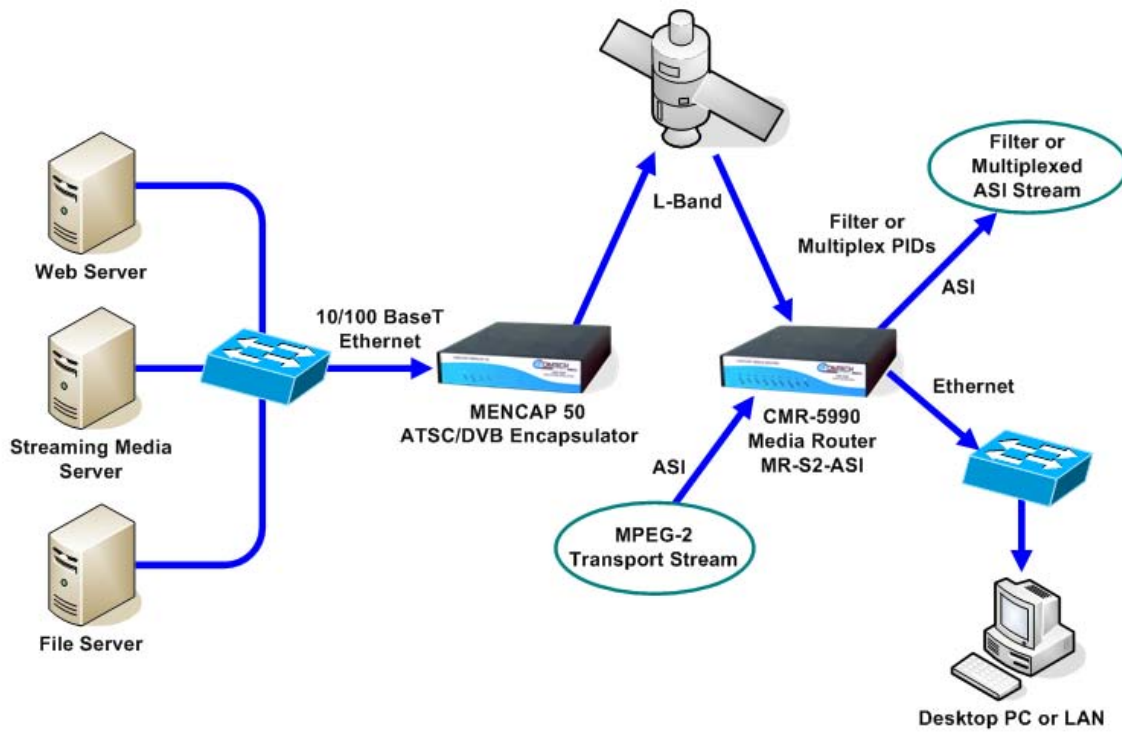


Figure 1-3. Digicast Media Router S2 Receiver – CMR-5990 (MR-S2-ASI)

## 1.5 Specifications



Figure 1-4. Digicast Media Router S2 Receiver – Rear Panels

**Table 1-1. Digicast Media Router S2 Receiver – Specifications**

Parameter		Specification	
<b>Physical</b>	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) <b>[CMR-5990 (MR-S2-ASI) only]</b>	
	ASI Copper Output		
	L-Band Input	F-Type (75Ω)	
	Ethernet (10/100BaseT)	RJ-45	
	Terminal	RJ-12	
	Redundancy	RJ-12	
	LEDs	Blue	PWR
		Green	RED
		Red	ALARM
		Green	LOCK
		Green	E-SPD
Amber		E-COL	
Green		E-RX	
Green		E-TX	
Green	E-LINK		
<b>Electrical</b>	Power Input / Consumption	48 to 248 VAC 50/60 Hz converted to +5VDC @ 5.0A / < 25 W	
	ASI-RX (Copper)	EN50083-9 <b>[CMR-5990 (MR-S2-ASI) only]</b>	
	ASI-TX (Copper)		
	L-Band Input	DVB-S ETSI EN 300 421 DVB-S2 ETSI EN 302 307	
	Ethernet (10/100BaseT)	IEEE 802.3u	
	Console	RS-232	
	Redundancy	RS-232	
<b>Environmental</b>	<b>Temperature</b>		
	Operating	32° to 104° Farenheit (0° to 40° Celsius)	
	Storage (Non-operating)	-22° to 150° Farenheit (-30° to 65° Celsius)	
	<b>Humidity</b>		
	Operating	10% to 75% Non-condensing	
	Storage (Non-operating)	Relative humidity to 95% with temperature ≤ 95° Farenheit (35° Celsius)	
	<b>Altitude</b>		
	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:

<b>Acronym</b>	<b>Definition</b>
<b>ASI</b>	Asynchronous Serial Interface
<b>ARP</b>	Address Resolution Protocol
<b>CEFD</b>	Comtech EF Data
<b>DVB</b>	Digital Video Broadcasting
<b>DVB-S</b>	Digital Video Broadcasting - Satellite
<b>DVB-S2</b>	Digital Video Broadcasting - Satellite (Second Generation)
<b>EBU</b>	European Broadcasting Union
<b>ETS</b>	European Telecommunications Standard
<b>FTP</b>	File Transfer Protocol
<b>HTML</b>	Hypertext Markup Language
<b>HTTP</b>	HyperText Transport Protocol
<b>IANA</b>	Internet Assigned Number Authority
<b>IGMP</b>	Internet Gateway Messaging Protocol
<b>IP</b>	Internet Protocol
<b>IRD</b>	Integrated Receiver Decoder
<b>LAN</b>	Local Area Network
<b>MAC</b>	Media Access Control
<b>Mbps</b>	Mega bits per second
<b>MIB</b>	Management Information Base
<b>MPE</b>	Multi-Protocol Encapsulation
<b>MPEG</b>	Moving Pictures Expert Group
<b>MPEGTS</b>	Moving Pictures Expert Group Transport System
<b>MR</b>	Media Router
<b>Msp</b>	Million samples per second
<b>MUX</b>	Multiplexer
<b>PID</b>	Packet Identifier
<b>RS</b>	Reed Solomon
<b>SNMP</b>	Simple Network Management Protocol
<b>SYSLOG</b>	System Log
<b>TCP</b>	Transmission Control Protocol
<b>TERM</b>	Terminal
<b>TFTP</b>	Trivial File Transfer Protocol
<b>TSD</b>	Transport Stream Demultiplexer
<b>UDP</b>	User Datagram Protocol
<b>VLAN</b>	Virtual Local Area Network

# Chapter 2. INSTALLATION & INITIAL CONFIGURATION

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## 2.1 Major Assembly

The CEFD MR-S2 and MR-S2-ASI are each 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. Digicast Media Router S2 Receiver – Standalone Configuration**

Quantity	Description
1	CMR-5970 [MR-S2] <b>or</b> CMR-5990 [MR-S2-ASI]
1	SPU30-102 Power Supply
1	IEC Power Cable
1	CA-TERMINAL Terminal Cable
1	CD (includes this manual and a Quick Start reference)
1	Quick Start sheet

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## 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 router for possible physical damage.
- **Test** the router for proper operation.

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

## 2.3 Installation

The MR-S2 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 MR-S2 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	It is suggested that the coaxial connection to the Low Noise Block (LNB) NOT be connected to the unit until the unit has been fully configured. If the unit will not be powering the LNB, it is recommend that an F-Type DC Block be installed on the input to the MR-S2's L-Band input
3	Connect the DC power connection to the connection labeled <b>PWR</b> on the back of the unit and tighten the restraining nut to ensure secure operation.
4	Connect an RJ-45 Ethernet cable (patch cord) to the port labeled <b>ETHERNET</b> . This cable should be connected to an Ethernet concentrator (hub) or switch.
5	Connect a terminal cable (supplied) to the port labeled <b>TERM</b> . This cable should be connected to a PC's serial port (DB-9) to initially configure the MR-S2.
6	Connect the AC power cord between a standard wall outlet and the power supply. The Blue LED will illuminate.
7	 <i>It is recommend that the ASI cable <b>NOT</b> be connected until the unit has been completely configured.</i>
8	Upon startup, the following LEDs will illuminate on the MS-R2 front panel:

LED	Function Label	Description
Blue	<b>PWR</b>	LED illuminates if power is properly applied
Red	<b>ALARM</b>	LED may illuminate since the unit is not yet configured
Green	<b>LOCK</b>	LED illuminates if the tuner is locked
Green	<b>E-RX</b>	LED flashes if there is Ethernet traffic/activity
Green	<b>E-TX</b>	
Green	<b>E-LINK</b>	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"><li>• 38,400 BAUD</li><li>• 8 Data Bits</li><li>• 1 Stop Bit</li><li>• No Parity</li><li>• No Flow Control</li></ul>
2	Press the <b>&lt;ENTER&gt;</b> key on the PC – the MR-S2's menu should be displayed.
3	Press <b>"N"</b> for Network Menu.
4	Press <b>"I"</b> for the IP Address, Enter the IP Address and press <b>&lt;ENTER&gt;</b> .
5	Press <b>"M"</b> for the Subnet Mask. Enter the Subnet Mask and press <b>&lt;ENTER&gt;</b> .
6	Press <b>"G"</b> for the Default Gateway IP Address. Enter the Default Gateway Address and press <b>&lt;ENTER&gt;</b> .
7	Press <b>"S"</b> to save the parameters.
8	Press <b>"Y"</b> to confirm the saving of parameters.
9	Press <b>"X"</b> 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 coaxial connection to the Low Noise Block (LNB) and ASI Input (for the CMR-5990 [MR-S2-ASI]) may now be safely attached to the L-Band 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:**

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# Chapter 3. INTERFACE PINOUTS

## 3.1 Pinout Overview

The rear panel interface (Figure 3-1) provides all necessary external connections between the MR-S2 / MR-S2-ASI and other equipment.



Figure 3-1. Digicast Media Router S2 Receiver – Rear Panel (MR-S2-ASI shown)

## 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



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 BNC ASI (Typical RX and TX) – MR-S2-ASI Only



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

### 3.7 F-Type L-Band



Pin	Definition
Center	<b>Input</b> 950-2150 MHz <b>Output</b> +13VDC or + 18VDC 0.5A
Outer Ring	GND

# Chapter 4. DEVICE MANAGEMENT VIA USER INTERFACES

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## 4.1 Introduction

Management of the MR-S2 is simple and intuitive. There are a variety of ways to configure and manage the MR-S2:

- 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)

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## 4.2 Web Interface

The Web Interface, operating under standard HyperText Transport Protocol (HTTP), is used to communicate with and command the MR-S2 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 browser and the MR-S2.

Once a valid IP Address, Subnet Mask and Default Gateway have been entered into the MR-S2, activate a browser on the desktop. Enter the IP address for the MR-S2 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 MR-S2**

A successful connection between the PC and the MR-S2 will result in the display of the “splash page” shown in Figure 4-2.

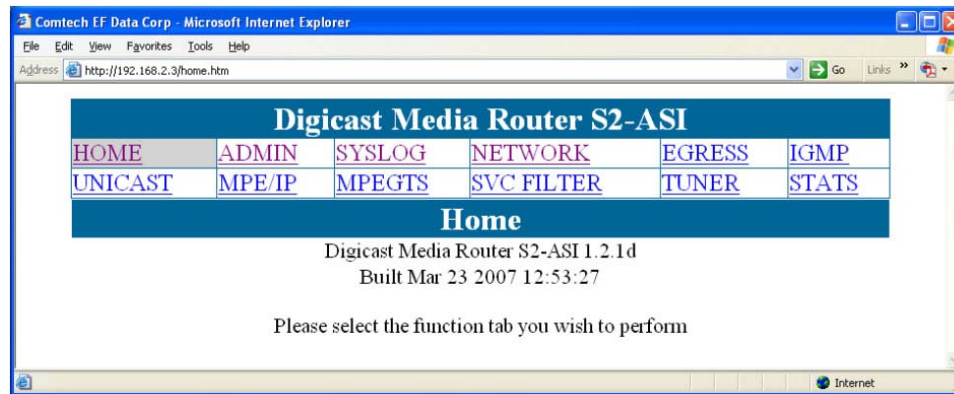


Figure 4-2. MR-S2 Home (“Splash”) page

## 4.2.1 Administrative Configuration

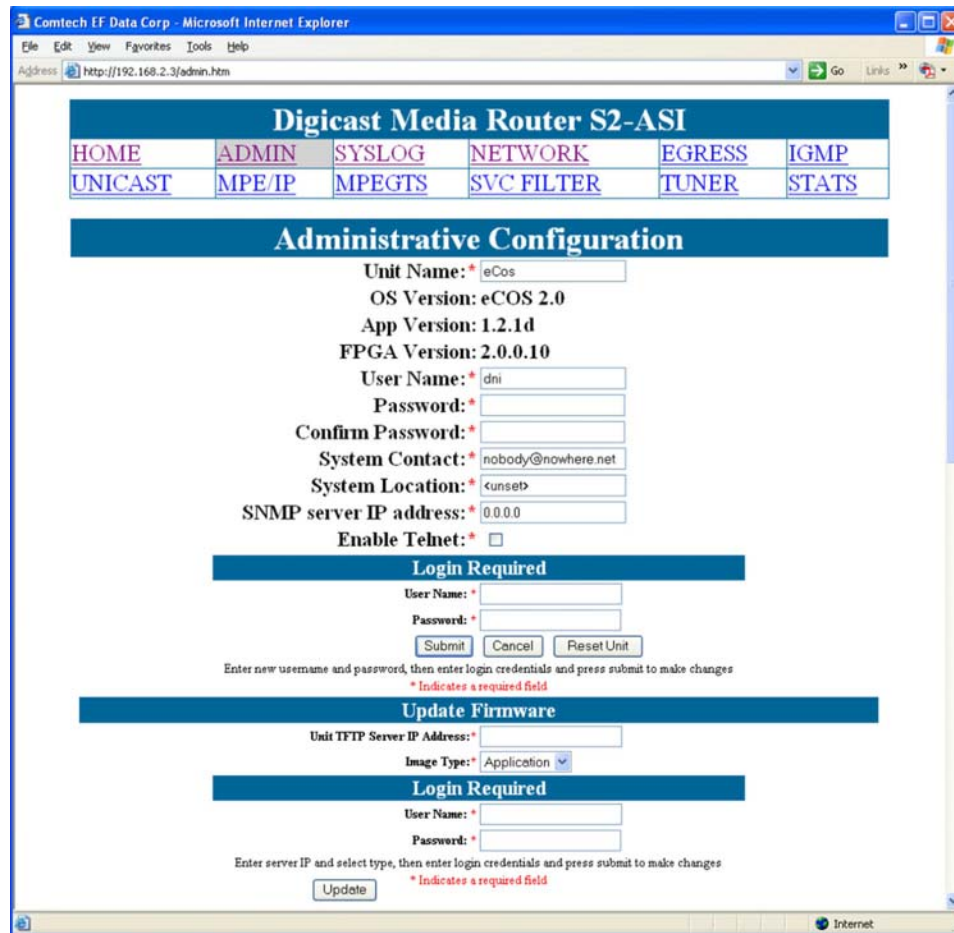


Figure 4-3. MR-S2 Administrative Configuration page



***Beginning with the Administrative Configuration Menu page (Figure 4-3), all pages containing configurable parameters feature a login dialog box at the bottom of the page. Changes to the MR-S2 configuration will not be accepted without a valid user name and password.***

The MR-S2 Administrative Configuration page contains the following configurable parameters:

### **User Name**

The MR-S2'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 MR-S2's Password is user configurable and is used for authenticating a user when connecting via IP management services.

The default password is **comtech**. *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.

### **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 MR-S2.

### **SNMP IP Address**

Defines the SNMP server that can connect to the unit.

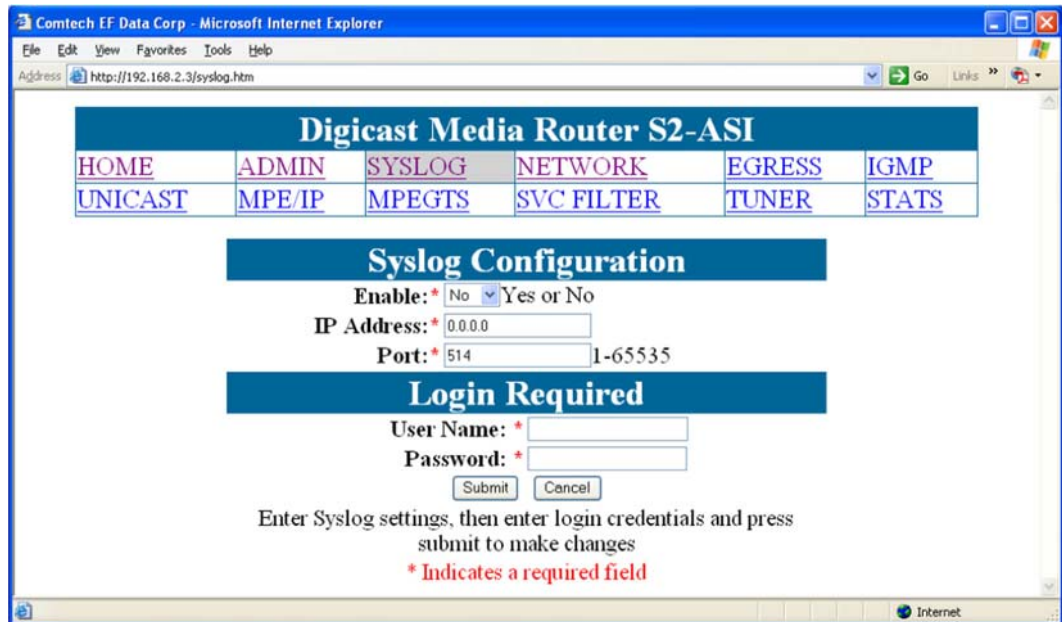
### **Login Required**

A user name and password are required to make any changes to the MR-S2 configuration.

### **Update Firmware**

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

## 4.2.2 Syslog Configuration



**Figure 4-4. Syslog Configuration page**

Syslog is a common feature of the Linux operating system. Syslog allows the events that occur on the MR-S2 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

Comtech EF Data Corp - Microsoft Internet Explorer  
Address http://192.168.2.3/network.htm

**Digicast Media Router S2-ASI**

<a href="#">HOME</a>	<a href="#">ADMIN</a>	<a href="#">SYSLOG</a>	<a href="#">NETWORK</a>	<a href="#">EGRESS</a>	<a href="#">IGMP</a>
<a href="#">UNICAST</a>	<a href="#">MPE/IP</a>	<a href="#">MPEGTS</a>	<a href="#">SVC FILTER</a>	<a href="#">TUNER</a>	<a href="#">STATS</a>

**Network Configuration**

MAC Address: 00:06:B0:00:91:8A  
IP Address: \*   
Subnet Mask: \*   
Default Gateway: \*

**Login Required**

User Name: \*   
Password: \*

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

Figure 4-5. Network Configuration page

The Network Configuration page has the following configurable parameters:

### IP Address

The IP Address assigned to the MR-S2's LAN interface. The IP Address is entered in dotted decimal format.

### Subnet Mask

The Subnet Mask assigned to the MR-S2'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 MR-S2'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 MR-S2 configuration.

## 4.2.4 Egress Configuration (MR-S2-ASI only)

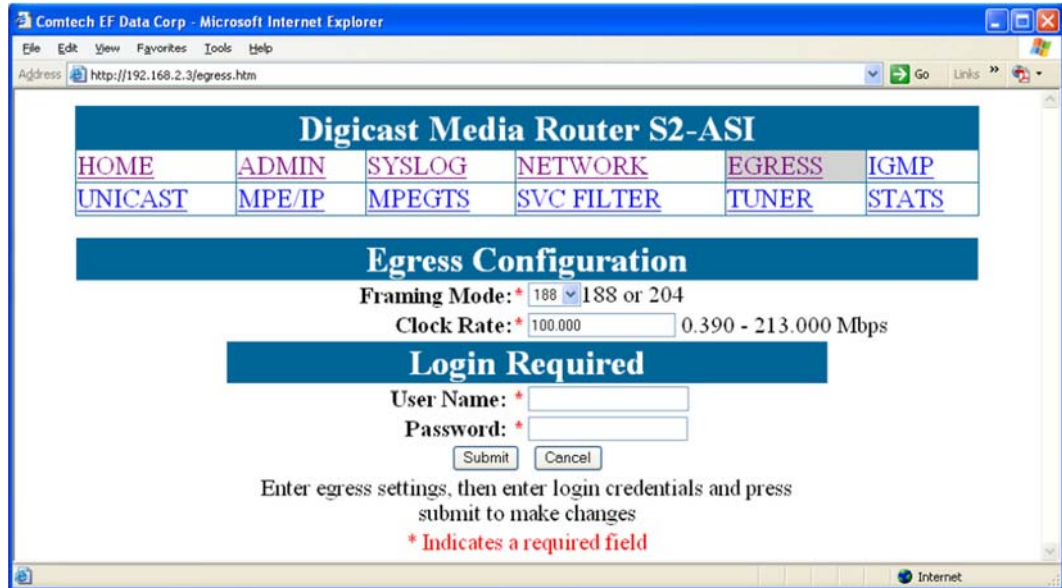


Figure 4-6. Egress Configuration page (MR-S2-ASI only)

The Egress Configuration page addresses the PID Filter's configuration for the ASI egress interface, and has following configurable parameters:

### Framing Mode

Selects whether the ASI operates with either 188-byte or 204-byte packets.

### Clock Rate

Sets the bit rate of the ASI Output interface in Mbps.



## 4.2.5 IGMP Configuration

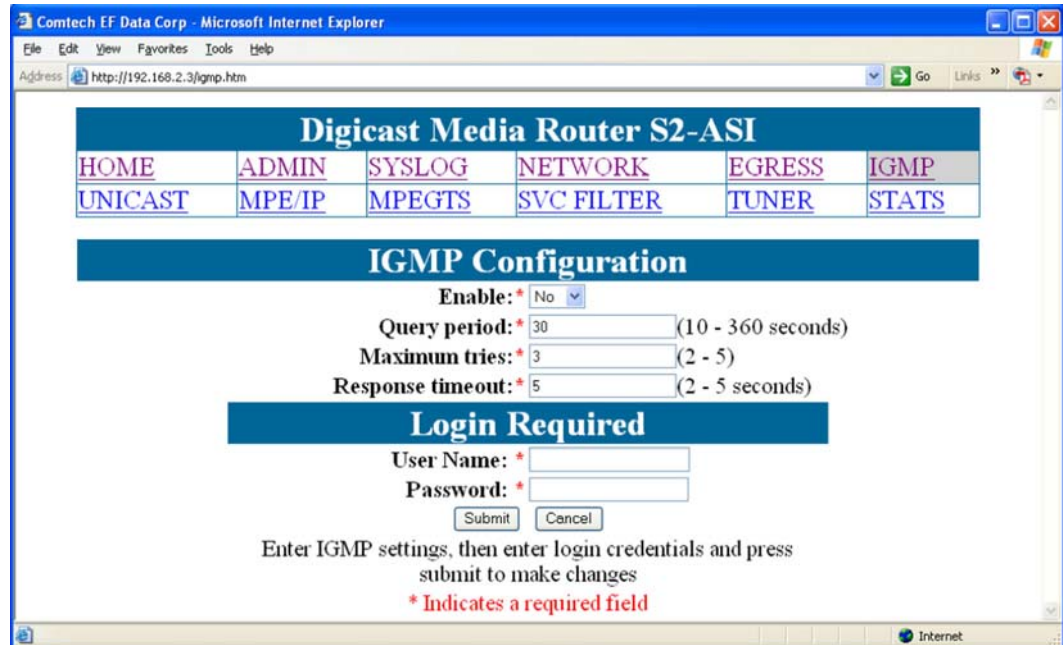


Figure 4-7. IGMP Configuration page

### 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, but 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 MR-S2 will make for soliciting for Multicast subscribers before the Multicast stream is pruned off.

### Response Timeout

The maximum amount of time the MR-S2 will wait for a Multicast Subscribers before the Multicast stream is pruned off.

## 4.2.6 Unicast Routing Configuration

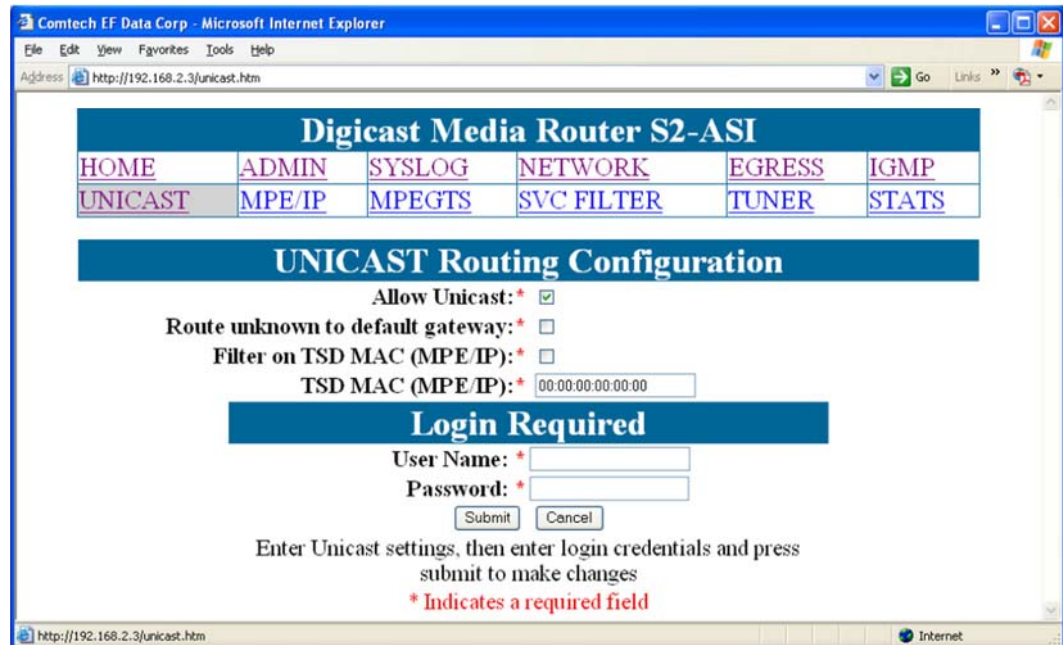


Figure 4-8. Unicast Routing Configuration page

The Unicast Routing Configuration page addresses the PID Filter's configuration for handling Unicast traffic over the transport stream. This feature is only used in the MPE/IP configuration.

### Allow Unicast

Selects whether the PID Filter will support the routing of Unicast traffic.

### Route unknown to default gateway

If an Address Resolution Protocol (ARP) can not be achieved, then incoming Unicast is directed to the configured default gateway.

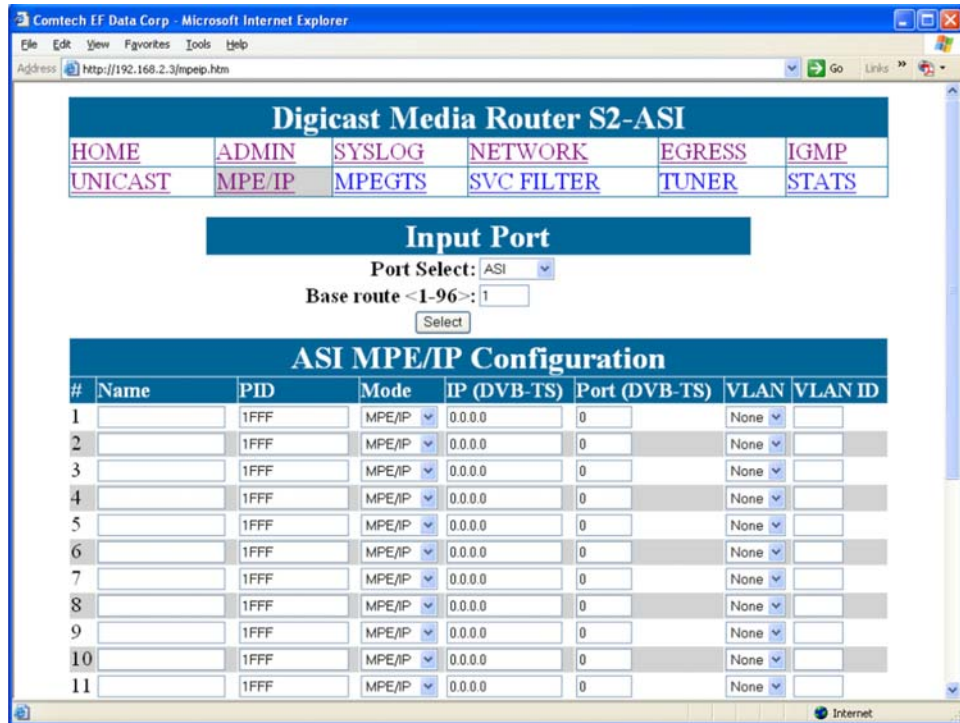
### Filter on TSD MAC (MPE/IP)

Allows the PID Filter to route only Unicast that is specifically destined to this unit. The MAC address in the MPE header must exactly match the configured TSD MAC field.

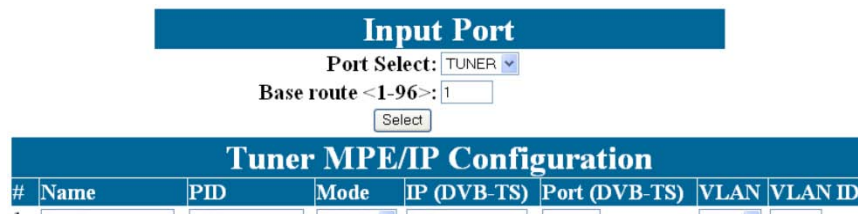
### TSD MAC (MPE/IP)

The hardware Media Access Control (MAC) address assigned for Unicast operation.

## 4.2.7 MPE/IP Configuration (Tuner or MR-S2-ASI only)



a) Full page with **ASI** Input Port selected



b) Page headers with **TUNER** Input Port selected

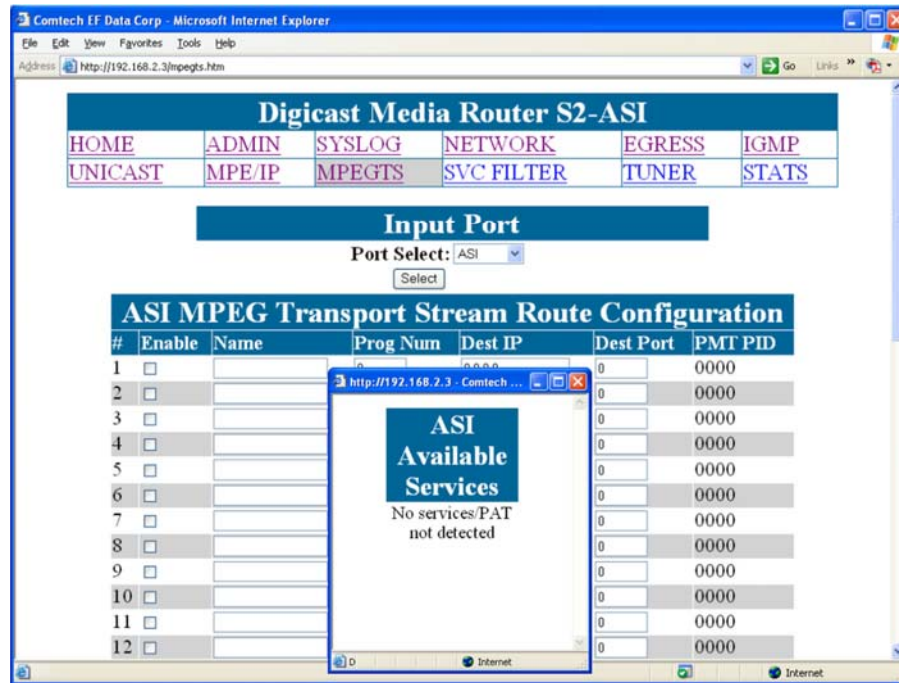
**Figure 4-9. MPE/IP Configuration page (Tuner or MR-S2-ASI only)**

On this page, from the pull down, the user must select for which input interface the PIDs will be configured for MPE/IP. For the MR-S2 there is no pull down, but for the MR-S2-ASI, the user can select which interface (Tuner or ASI) to configure.

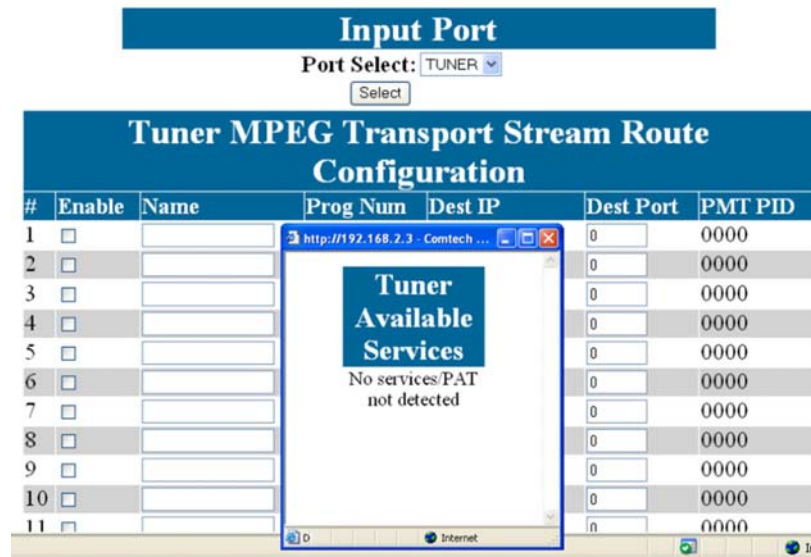
### PID Address

A configured PID value in hexadecimal, for MPE/IP data to be extracted from the transport stream and sent to the CPU. Once a valid PID value is configured, once data is found on a transport stream, the data is decapsulated and delivered to the Ethernet port. Note, the pull down menu allows the user to select which input port (ASI input or Tuner) the PIDs are being received from. A value of 0x1FFF is disabled.

## 4.2.8 Tuner MPEG TS Route Configuration



a) Full page and dialog box with **ASI** Input Port selected



b) Page headers and dialog box with **TUNER** Input Port selected

**Figure 4-10. Tuner MPEG TS Route Configuration page**

From the pull down, the user must select for which input interface the PIDs will be configured for MPE/IP. There is no pull down for the MR-S2; for the MR-S2-ASI, the user can select which interface (Tuner or ASI) to configure.

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.

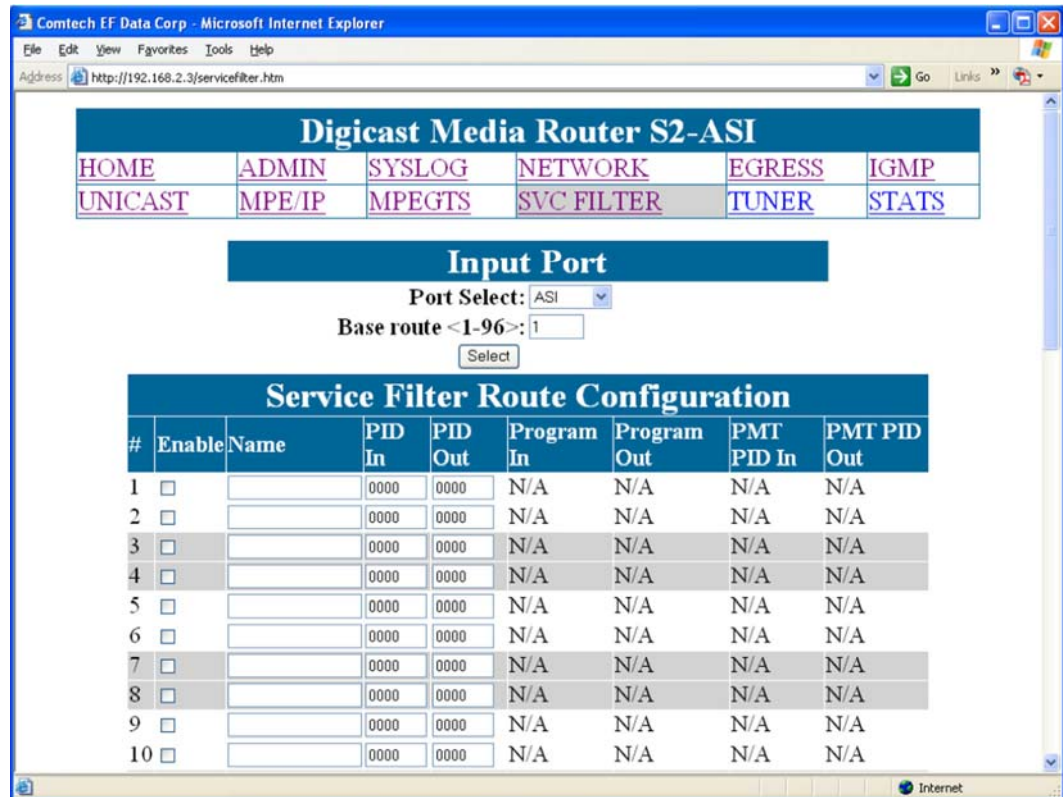
**Destination IP**

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.

## 4.2.9 Service Filter Route Configuration (MR-S2-ASI only)



**Figure 4-11. Service Filter Route Configuration page (MR-S2-ASI only)**

This menu allows the MR-S2-ASI (only) to filter incoming transport streams.

### Enable

Enables or disables a program.

### Name

Name configured for a program.

### PID In

The hexadecimal value of an input PID contained within a transport stream to the MR-S2-ASI.

### PID Out

The hexadecimal value of an output PID contained within a transport stream from the MR-S2-ASI. This feature allows the operator to set up and remap incoming and outgoing PID values for a transport stream.

### PMT PID In

The hexadecimal value of the input PMT PID to the MR-S2-ASI.

### PID Out

The hexadecimal value of the output PMT PID from the MR-S2-ASI.

## 4.2.10 Tuner Configuration

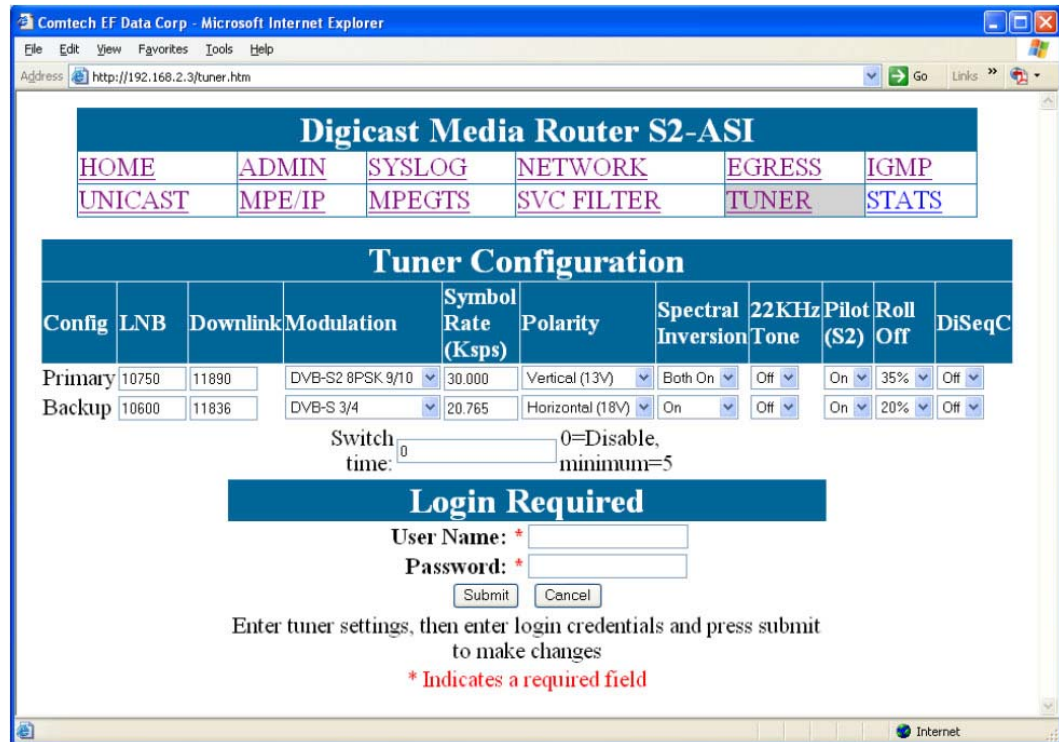


Figure 4-12. Tuner Configuration page

### Primary and Backup Tuner Configuration

The MR-S2 can be configured to have a backup (secondary) configuration. The secondary tuner configuration allows the user to configure a backup configuration in the event the main carrier is taken down. The MR-S2 will only attempt to use the secondary configuration in the event the primary carrier is not available.

### LNB Frequency

The frequency of the Local Oscillator (LO) that resides in the Low Noise Block (LNB) amplifier located at the antenna. For Ku-Band operation, the LO is typically 10,750 MHz for Ku-Band operation North America and other common frequencies are 9,750 MHz and 10,600 MHz. For C-Band operation, 5,150 MHz is a common LO frequency. Please consult your LNB manufacturer for the LO in the LNB.

### Downlink Frequency

The actual receive frequency being down linked from the satellite to the Low Noise Block (LNB) amplifier located at the antenna. For Ku-Band operation, this frequency ranges from 10,700 MHz to 12,750 MHz. For C-Band operation, this frequency ranges from 3,400 MHz to 4,200 MHz.

The combination of the LO and the downlink frequency produce the L-Band frequency expected by the MR-S2. Some examples are as follows:

**Example 1:**

LO = 10,750 MHz

Ku-Band Receive Frequency = 11,895 MHz

L-Band Frequency = 11,895 MHz – 10,750 MHz

L-Band Frequency = 1,145 MHz

**Example 2:**

LO = 10,600 MHz

Ku-Band Receive Frequency = 12,010 MHz

L-Band Frequency = 12,010 MHz – 10,600 MHz

L-Band Frequency = 1,410 MHz

**Example 3:**

LO = 5,150 MHz

C-Band Receive Frequency = 3,920 MHz

L-Band Frequency = 5,150 MHz – 3,920 MHz

L-Band Frequency = 1,230 MHz

**Modulation**

The MR-S2 supports the following modes of operation:

- DVB-S – QPSK
- DVB-S2 – QPSK
- DVB-S2 – 8PSK

Each mode of operation provides a range of FEC rates that are supported based on the mode and modulation.

**Symbol Rate**

Depending on the configured mode of operation, the following symbol rates are supported:

- DVB-S – QPSK 2 to 45 Msps
- DVB-S2 – QPSK 6 to 32 Msps
- DVB-S2 – 8PSK 6 to 32 Msps

**Polarity**

The configured polarity provides the voltage supplied to the LNB or switch. The valid selections for the MR-S2 are 13 VDC for vertical polarization and 18 VDC for horizontal polarization. The MR-S2 is capable of providing up to 500mA of current in either mode of operation. It is recommended, that if the LNB voltage is not required, then a DC block should be installed.

**Spectral Inversion**

There are four supported modes of spectral inversion:

- **On** – forces the tuner to stay with spectral inversion. The tuner will not check for spectral inversion automatically



- **Off** – forces the tuner to stay without spectral inversion. The tuner will not check for spectral inversion automatically
- **On Both** – tries spectral inversion first and then attempts to automatically check spectral inversion periodically
- **Off Both** – tries non-spectral inversion first and then attempts to automatically check spectral inversion periodically

#### **LNB 22 KHz Tone**

Enables or disables the LNB 22 KHz tone to the LNB for remote LNB and switch control.

#### **Pilot**

Enables or disables the Pilot for DVB-S2 mode of operation only.

#### **Roll Off**

The expected filter roll off of the carrier the receiver should be looking at. This parameter only works for DVB-S2 mode, since DVB-S mode uses a fixed roll off of 35%.

The valid roll offs in DVB-S2 mode are:

- 20%
- 25%
- 35%

#### **DiSEqC**

Enables sending and receiving DiSEqC commands as are supported in DiSEqC mode 1.2. The valid configuration settings for DiSEqC mode are:

- Off
- Mode A
- Mode B
- Mode C
- Mode D

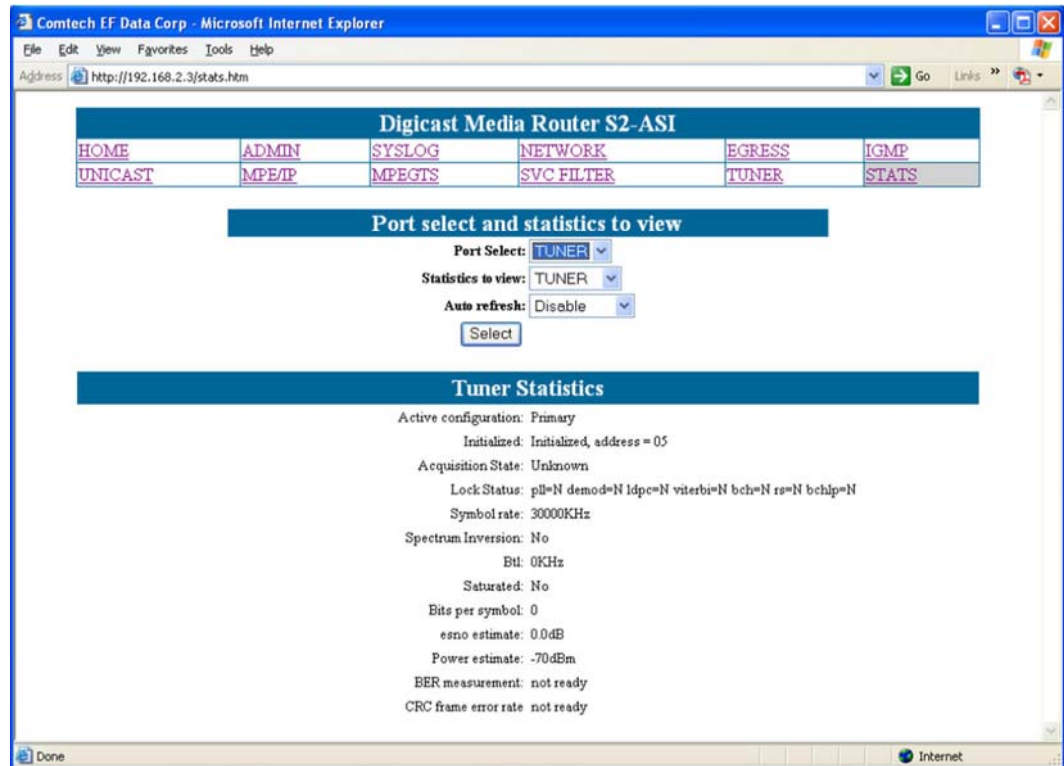
#### **Switch**

Enables or disables the ability to switch to a backup carrier. If set to disabled, the MR-S2 will not attempt to switch to a backup carrier.

#### **Switch Time**

The number of seconds the unit should wait before attempting to locate the backup carrier.

## 4.2.11 Tuner Statistics



**Figure 4-13. Tuner Statistics page**

Statistical reports are available from the MR-S2 using this menu. Here, a pull-down must be selected to allow the user to choose which view of statistics is desired: ASI or Tuner.

The available report options are :

- MPE/IP
- MPEG TS
- Tuner

When selected, the statistics displayed on screen are automatically refreshed so the user does not have to constantly refresh the screen.

These detailed tuner statistics can be used to troubleshoot problems with a satellite link. The available parameters are as follows:

### **Active Configuration**

Displays whether the tuner is running with the Primary or Backup configuration.

### **Initialized**

Displays whether the tuner is initialized or not. The I2C address where the processor found the tuner is displayed.

### **Acquisition State**

Displays whether the tuner is locked and tracking or whether the tuner is unlocked.

### **Lock Status**

Displays the lock status of various components in the tuner:

- PLL – Phase Lock Loop
- Demodulator
- LDPC Decoder
- Viterbi Decoder
- BCH Decoder
- Reed Solomon Decoder
- BCHLP Decoder

### **Symbol Rate**

Displays the configured symbol rate.

### **Spectrum Inversion**

Displays the state of the spectrum which the tuner locked to – inverted or non-inverted.

### **BTL**

Displays the status of the BTL.

### **Es/No**

Displays the Es/No (Symbol Energy over the Noise Density).

### **Power Estimate**

Displays the received port input level. This level must be between -65dBm to -25 dBm for proper operation.

### **Bits per Symbol**

Displays the number of bits per symbol.

### **Corrected Bit Error Rate**

Displays the corrected bit error rate coming from the tuner. Corrected data does not result in any lost user data.

### **Uncorrected Bit Error Rate**

Displays the uncorrected bit error rate coming from the tuner. These are bit errors that could not be corrected and result in lost user data.

### **Window Adjustment**

Displays the adjustment the tuner used to capture the incoming carrier.

### **CRC Error Rate**

Displays the Cyclic Redundancy Check (CRC) error rate received over the satellite.

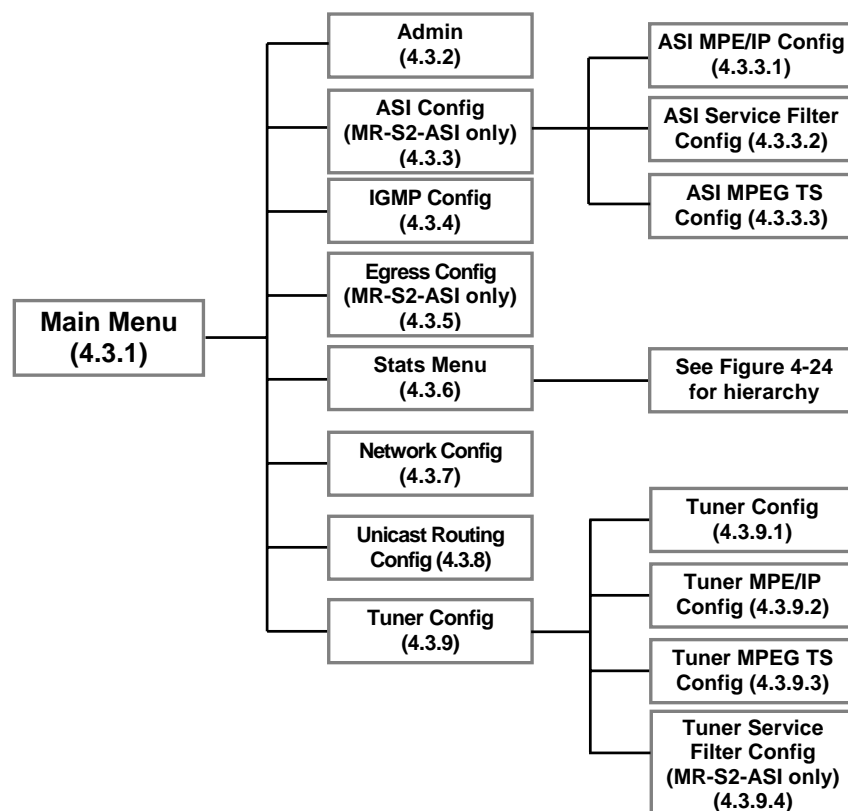
### 4.3 Terminal Interface

The Terminal Interface provides the user with a textual configuration dialog for configuring the MR-S2. 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-S2 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 4-14 shows the hierarchal structure of the Terminal Interface-based menus, and the sections in this chapter which provide figures of these submenu pages.



**Figure 4-14. 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 as shown in Figure 4-15.

### 4.3.1 Main Menu

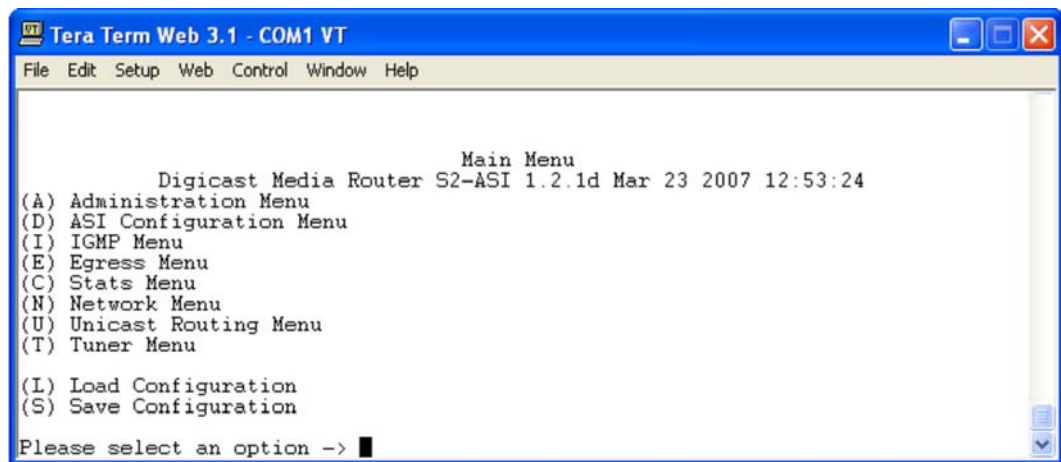


Figure 4-15. Main Menu

### 4.3.2 Administration Menu

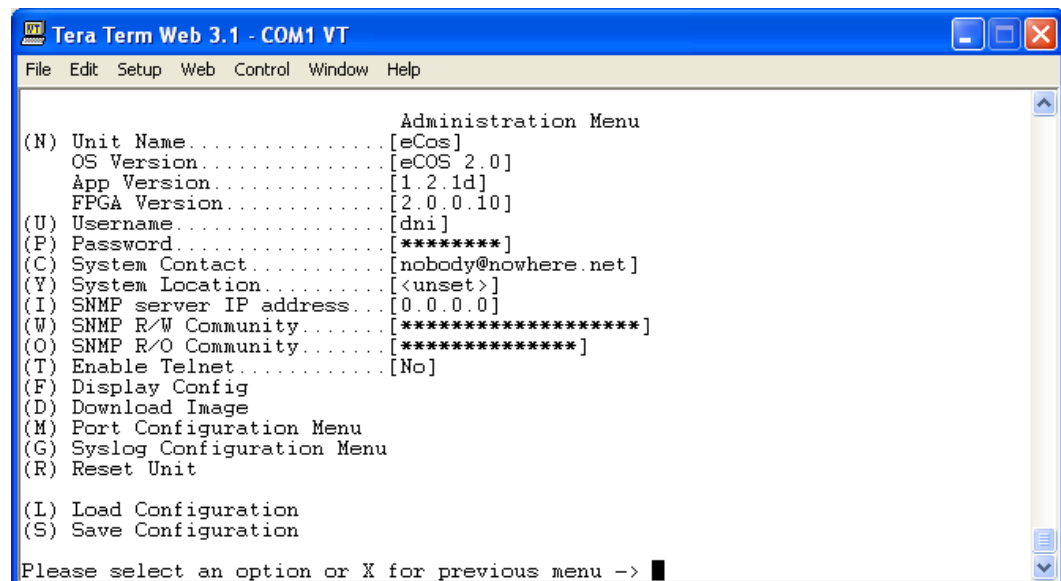


Figure 4-16. Admin Menu

---

#### 4.3.2.1 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.

### 4.3.3 ASI Configuration Menu (MR-S2-ASI only)

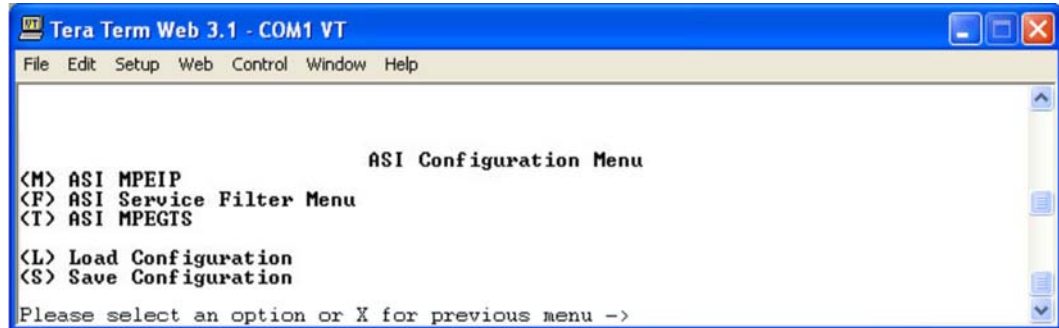


Figure 4-17. ASI Configuration Menu

#### 4.3.3.1 ASI MPE/IP Configuration Menu (MR-S2-ASI only)

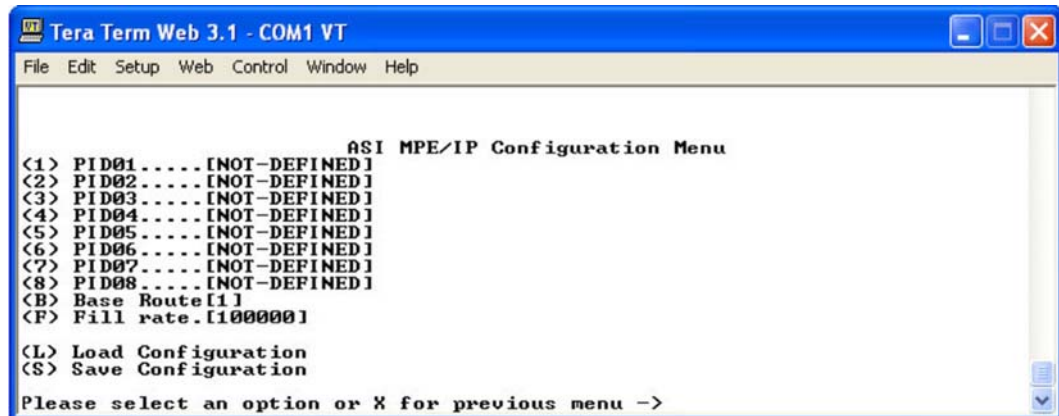


Figure 4-18. ASI MPE/IP Configuration Menu

### 4.3.3.2 ASI Service Filter Configuration Menu (MR-S2-ASI only)

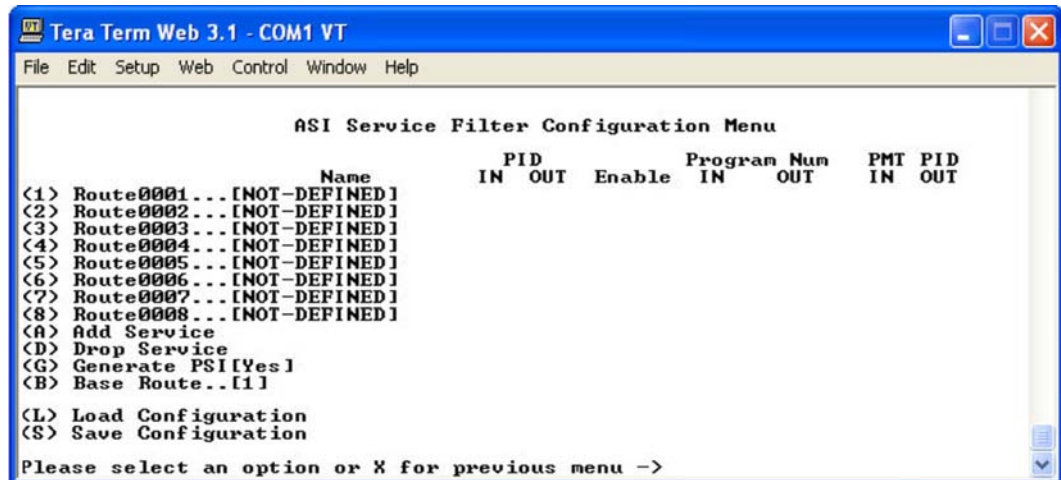


Figure 4-19. ASI Service Filter Configuration Menu

### 4.3.3.3 ASI MPEG TS Configuration Menu (MR-S2-ASI only)

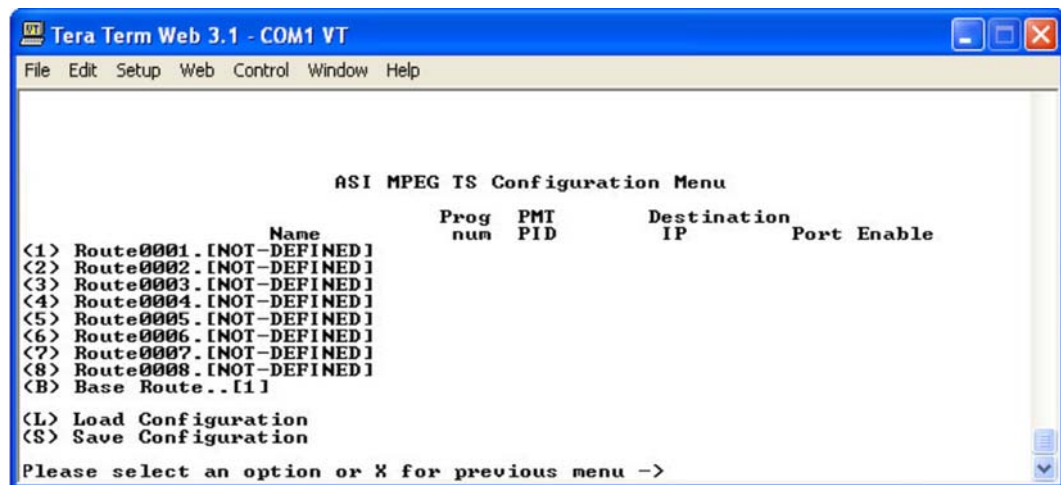


Figure 4-20. ASI MPEG TS Configuration Menu

### 4.3.4 IGMP Configuration Menu

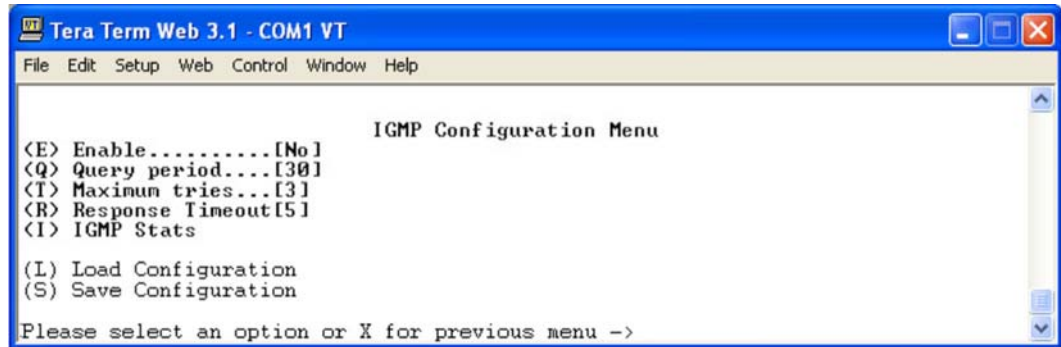


Figure 4-21. IGMP Configuration Menu

### 4.3.5 Egress Configuration Menu (MR-S2-ASI only)

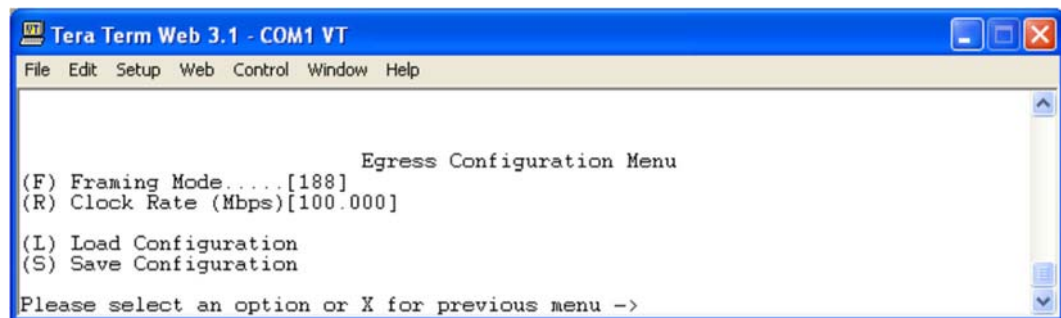


Figure 4-22. Egress Configuration Menu



### 4.3.6 Stats Menu

Figure 4-23 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.

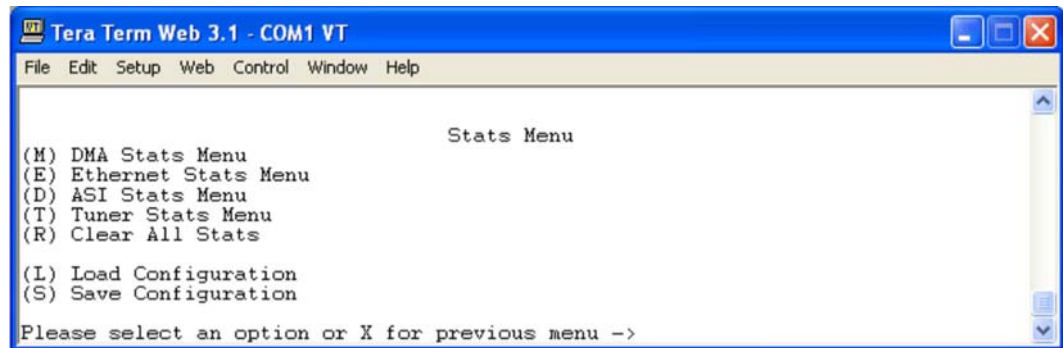


Figure 4-23. MR-S2 or MR-S2-ASI Stats Menu

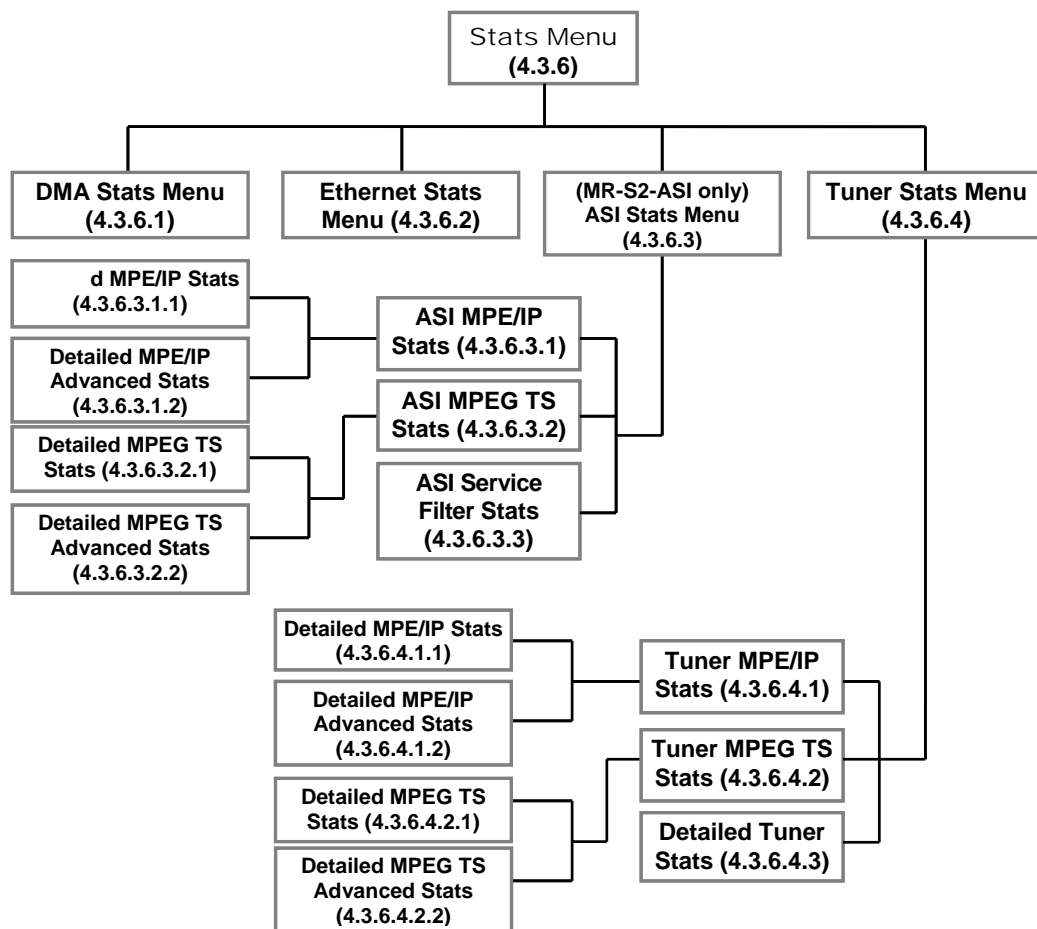


Figure 4-24. Stats Menu Hierarchy (via Terminal Interface)

### 4.3.6.1 DMA Stats Menu

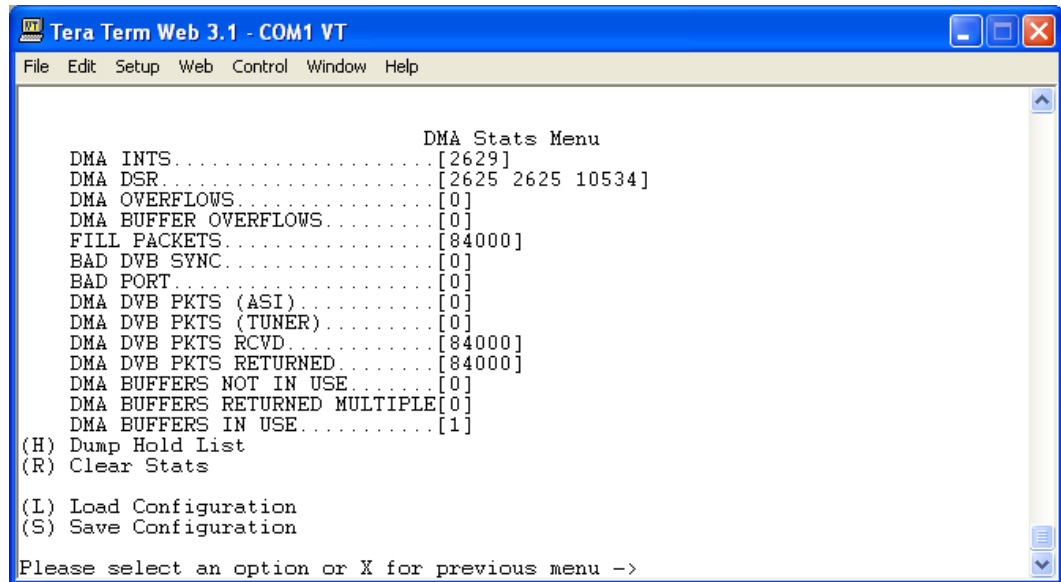


Figure 4-25. DMA Stats Menu

### 4.3.6.2 Ethernet Stats Menus

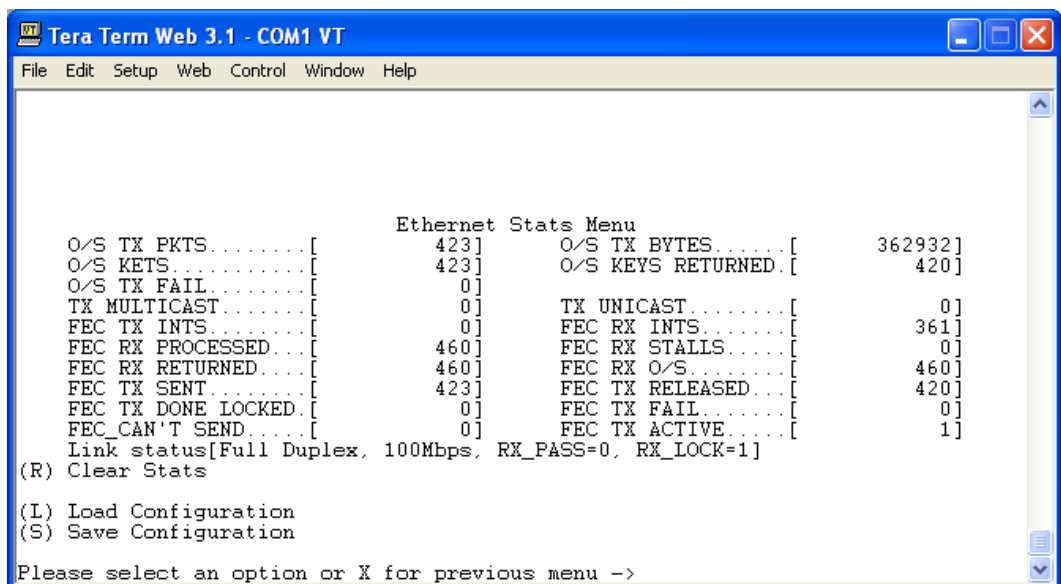


Figure 4-26. Ethernet Stats Menu

### 4.3.6.3 ASI Stats menu (MR-S2-ASI only)

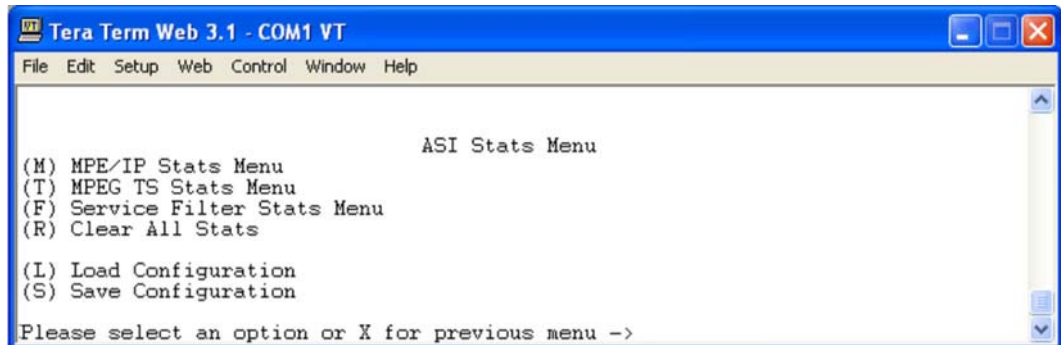


Figure 4-27. MR-S2-ASI ASI Stats Menu

### 4.3.6.3.1 ASI MPE/IP Stats Menu

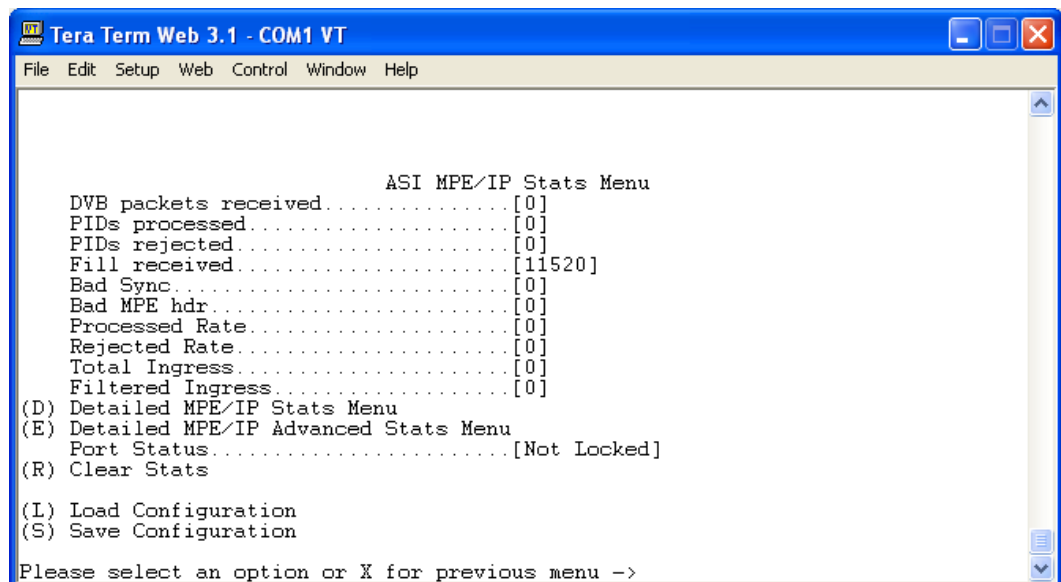


Figure 4-28. MPE/IP Stats Menu

### 4.3.6.3.1.1 ASI Detailed MPE/IP Stats Menu

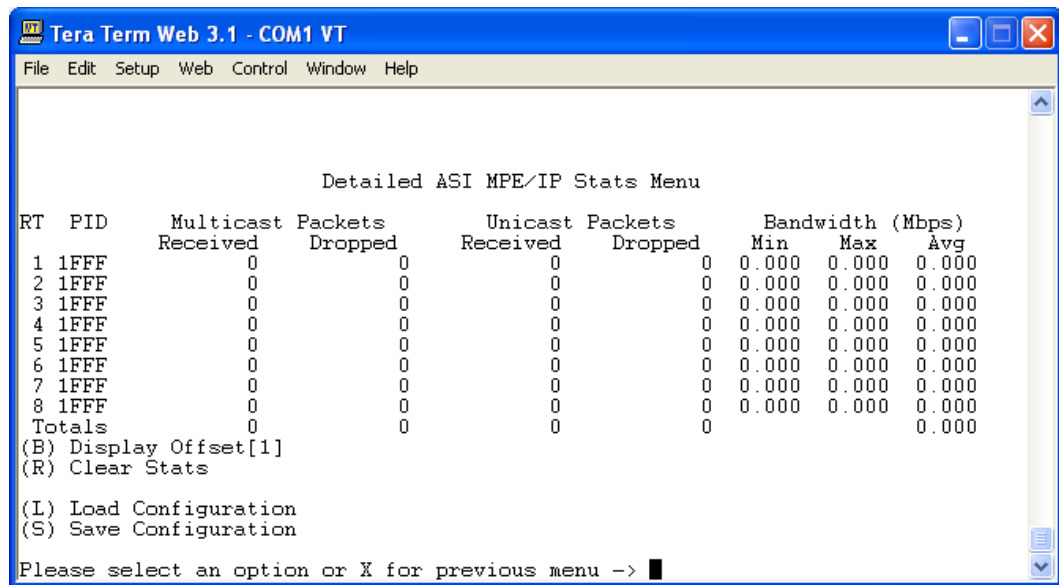


Figure 4-29. ASI Detailed MPE/IP Stats Menu

### 4.3.6.3.1.2 ASI Detailed MPE/IP Advanced Stats Menu

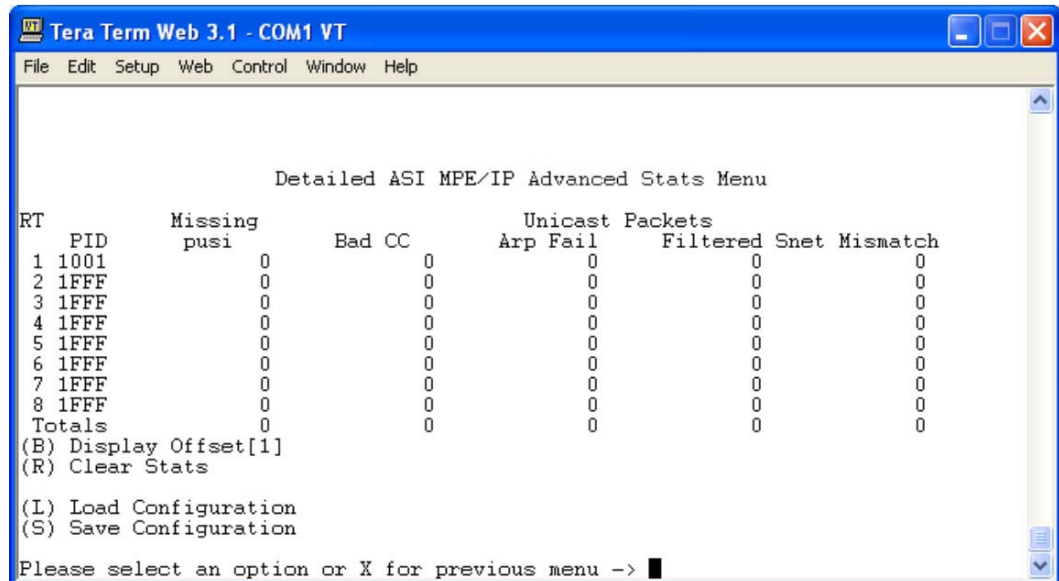


Figure 4-30. ASI Detailed MPE/IP Advanced Stats Menu

### 4.3.6.3.2 ASI MPEG TS Stats Menu

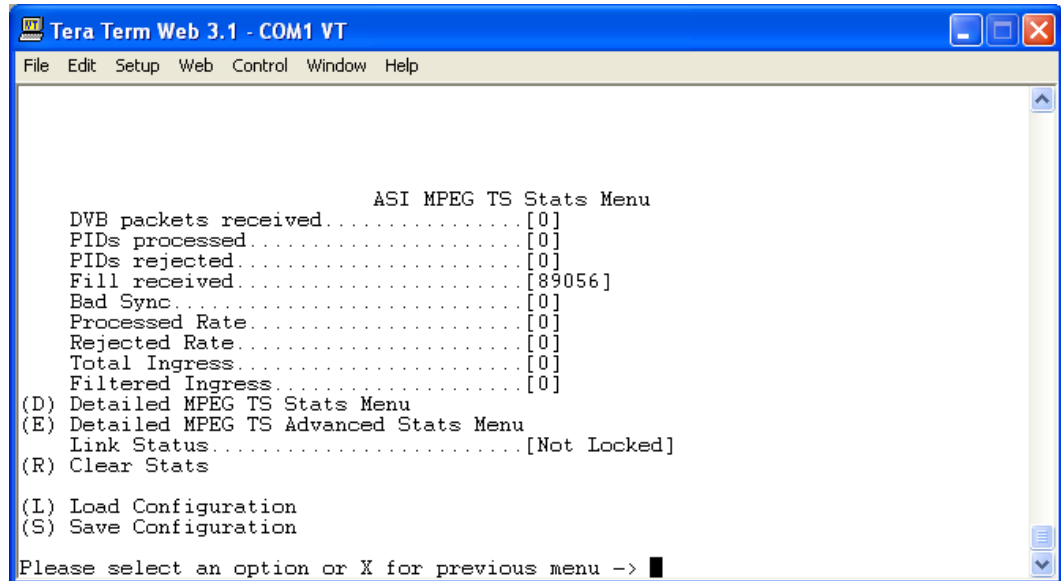


Figure 4-31. ASI MPEG TS Stats Menu

### 4.3.6.3.2.1 Detailed ASI MPEG TS Stats Menu

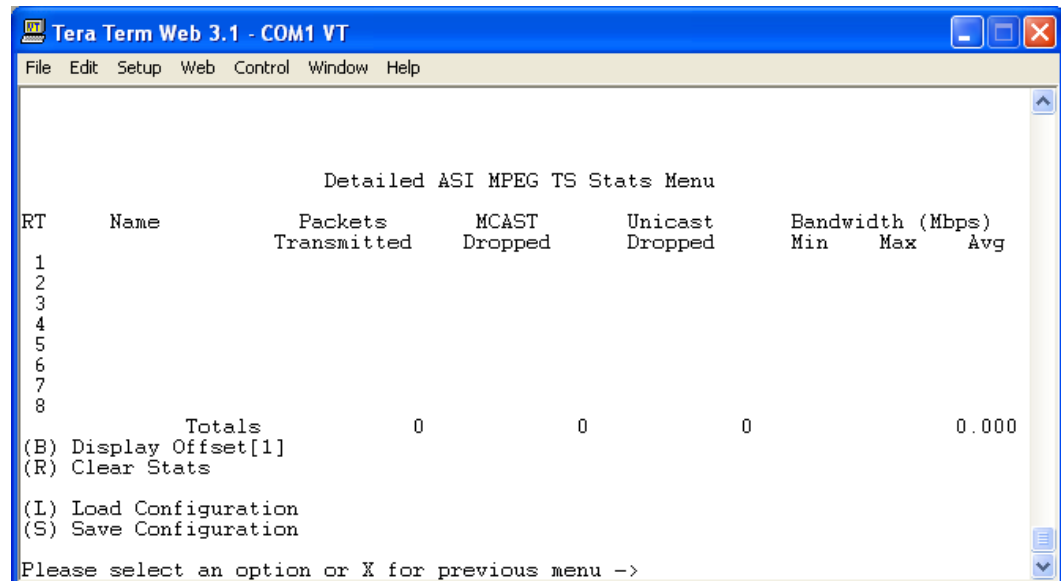


Figure 4-32. Detailed ASI MPEG TS Stats Menu

### 4.3.6.3.2 Detailed ASI MPEG TS Advanced Stats Menu

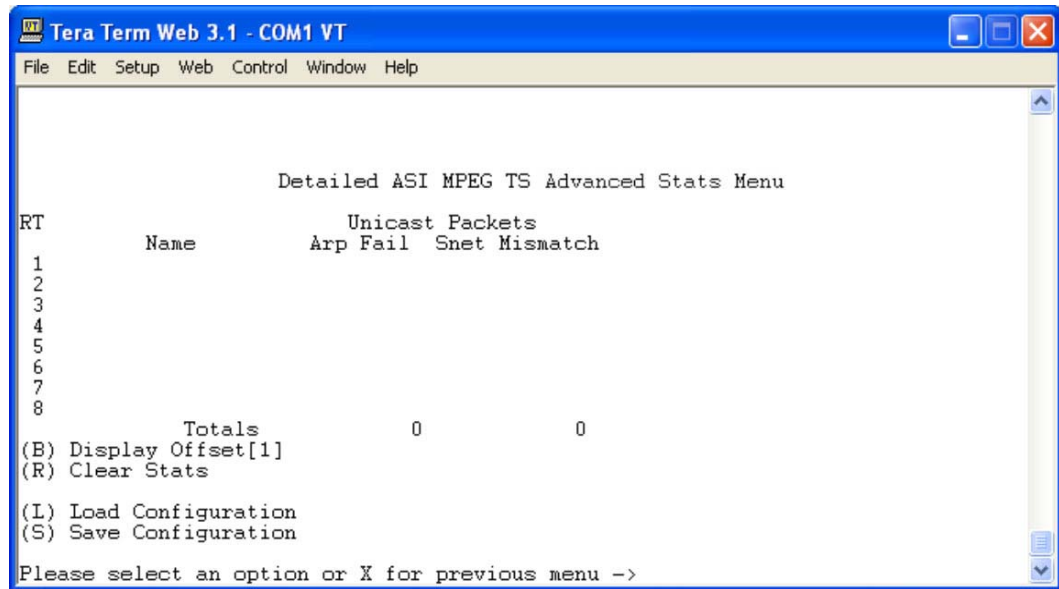


Figure 4-33. Detailed ASI MPEG TS Stats Menu

### 4.3.6.3.3 ASI Service Filter Stats Menu

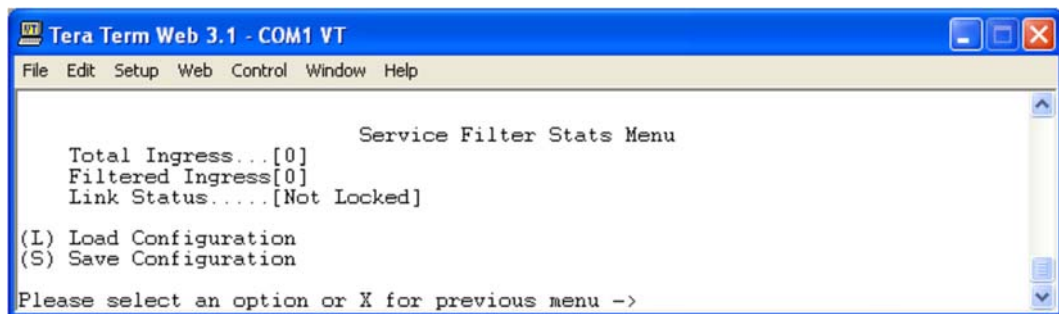


Figure 4-34. ASI Service Filter Stats Menu

### 4.3.6.4 Tuner Stats Menu

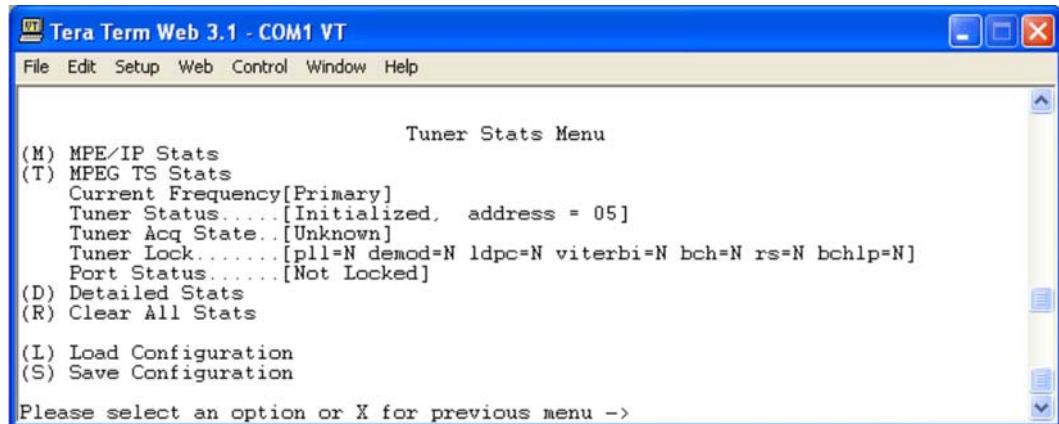


Figure 4-35. Tuner Stats Menu

#### 4.3.6.4.1 Tuner MPE/IP Stats Menu

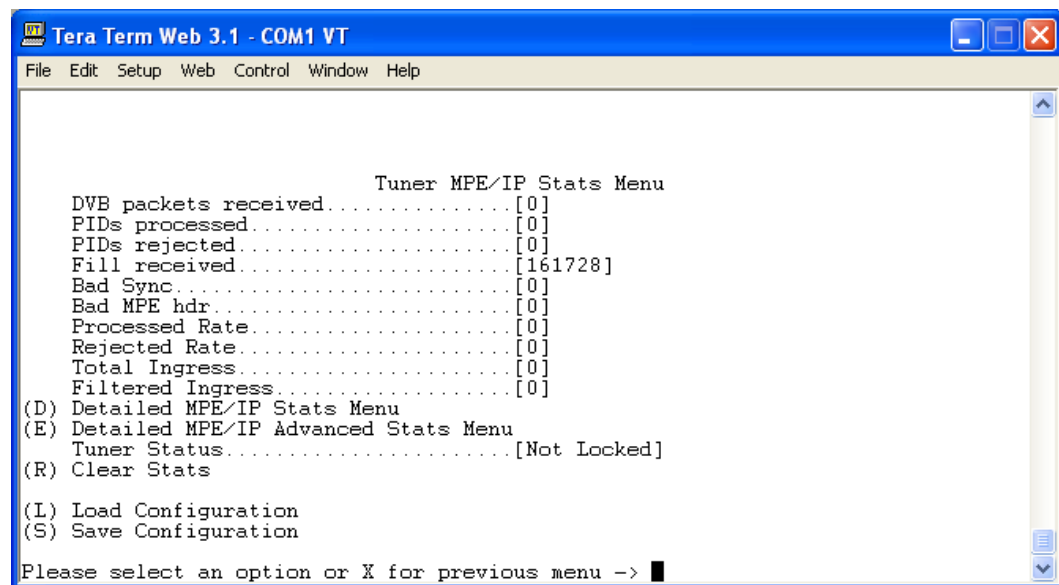


Figure 4-36. Tuner MPE/IP Stats Menu

### 4.3.6.4.1.1 Detailed Tuner MPE/IP Stats Menu

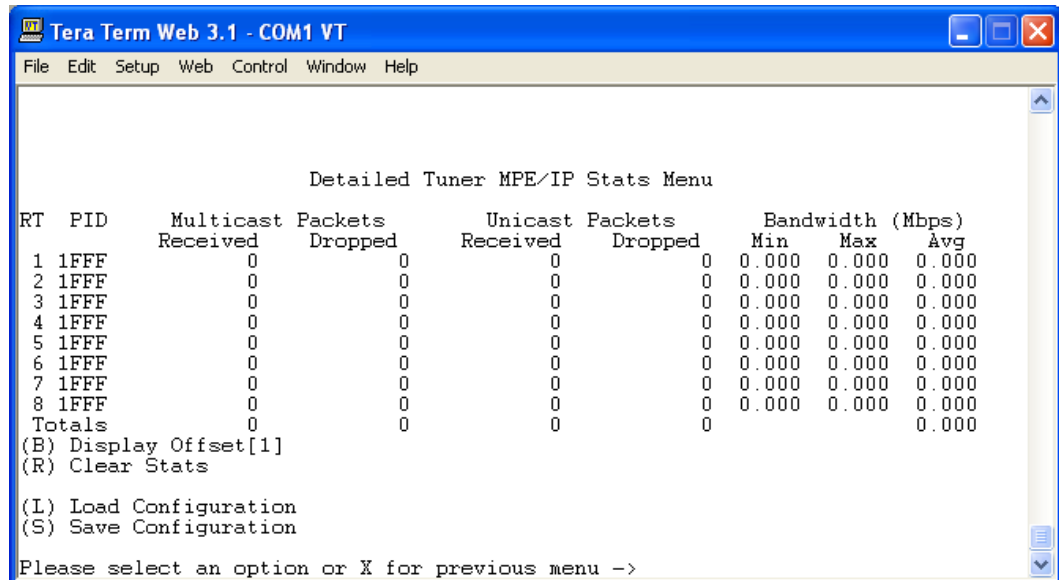


Figure 4-37. Detailed Tuner MPE/IP Stats Menu

### 4.3.6.4.1.2 Detailed Tuner MPE/IP Advanced Stats Menu

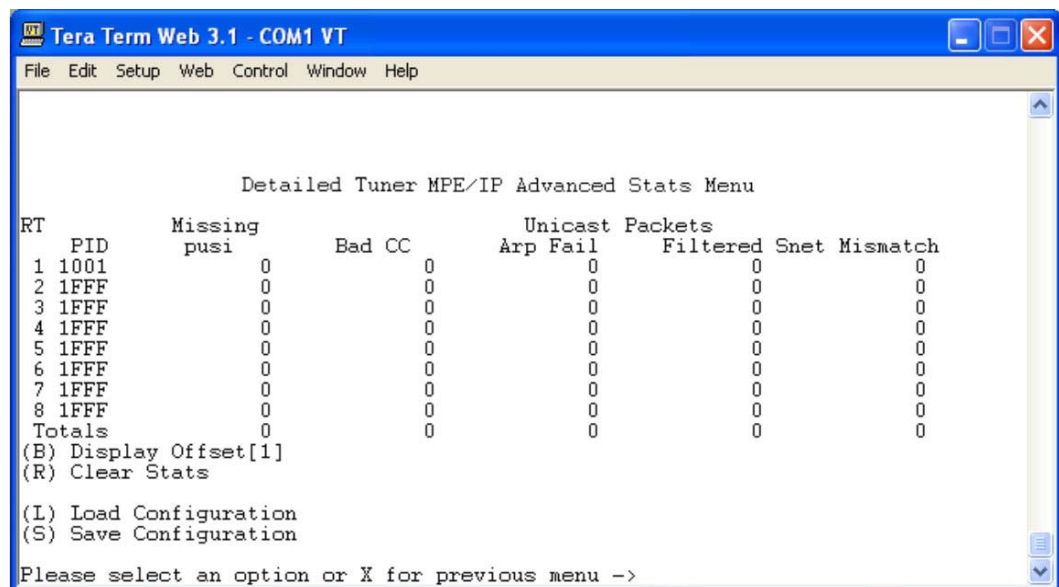


Figure 4-38. Detailed Tuner MPE/IP Advanced Stats Menu



### 4.3.6.4.2 Tuner MPEG TS Stats Menu

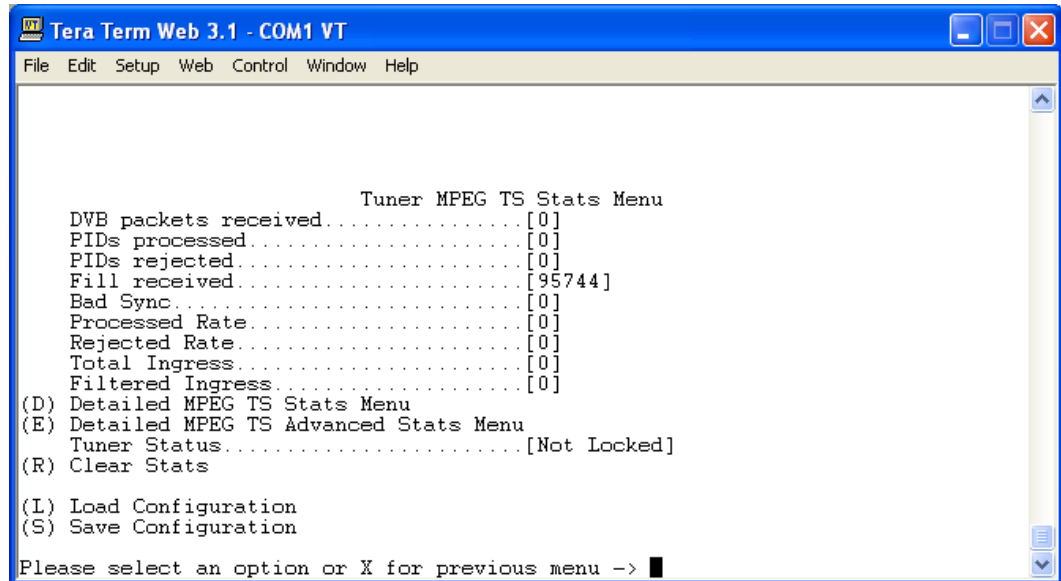


Figure 4-39. Tuner MPEG TS Stats Menu

### 4.3.6.4.2.1 Detailed Tuner MPEG TS Stats

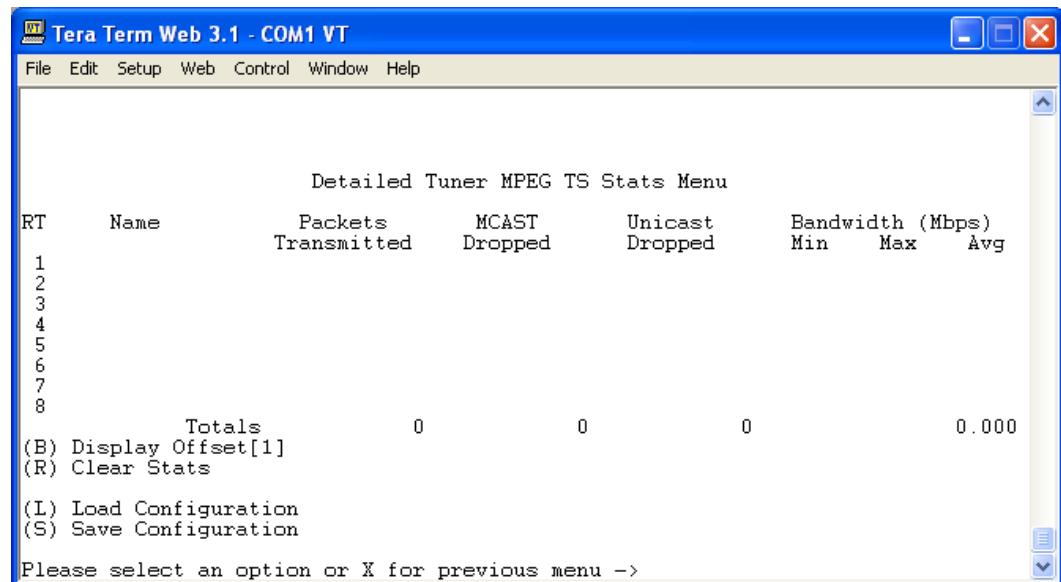


Figure 4-40. Detailed Tuner MPEG TS Stats

### 4.3.6.4.2 Detailed Tuner MPEG TS Advanced Stats Menu

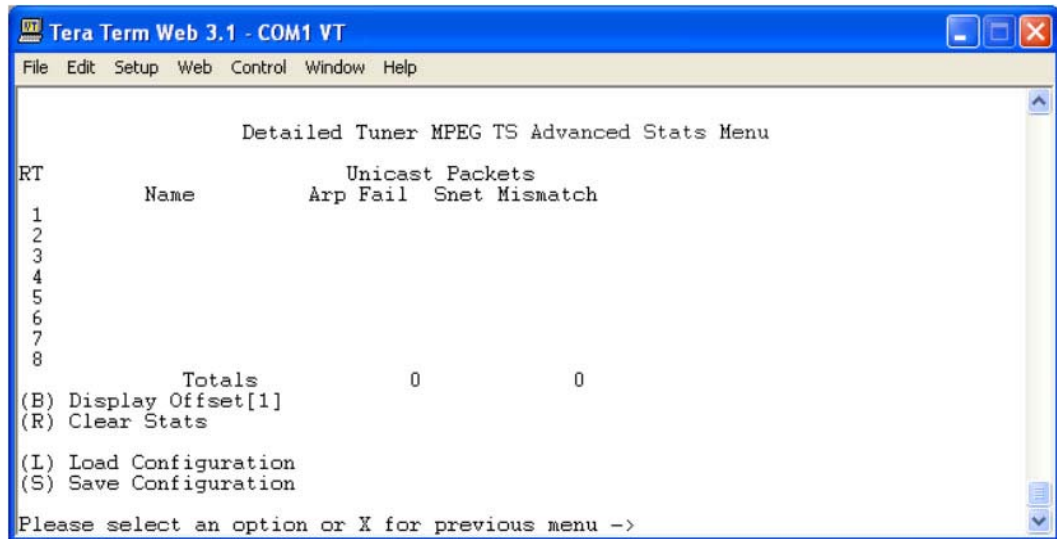


Figure 4-41. Detailed Tuner MPEG TS Advanced Stats Menu

### 4.3.6.4.3 Detailed Tuner Stats Menu

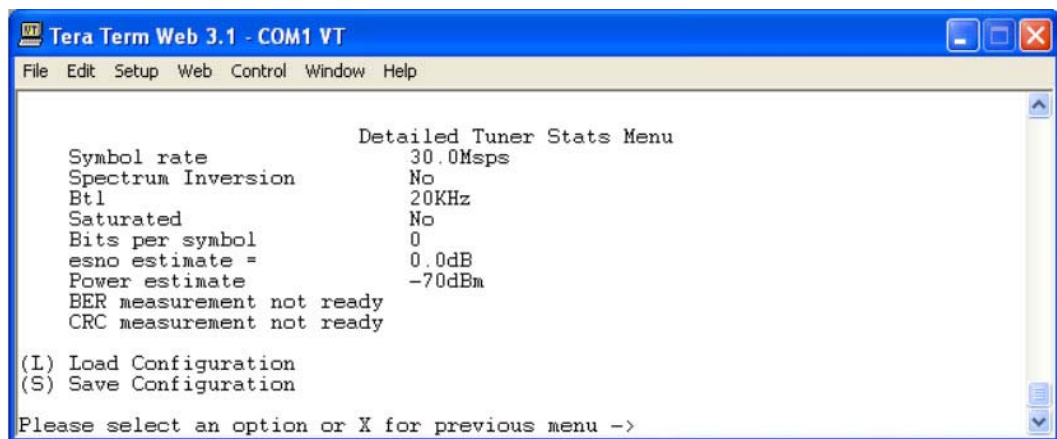


Figure 4-42. Detailed Tuner Stats Menu

### 4.3.7 Network Configuration Menu

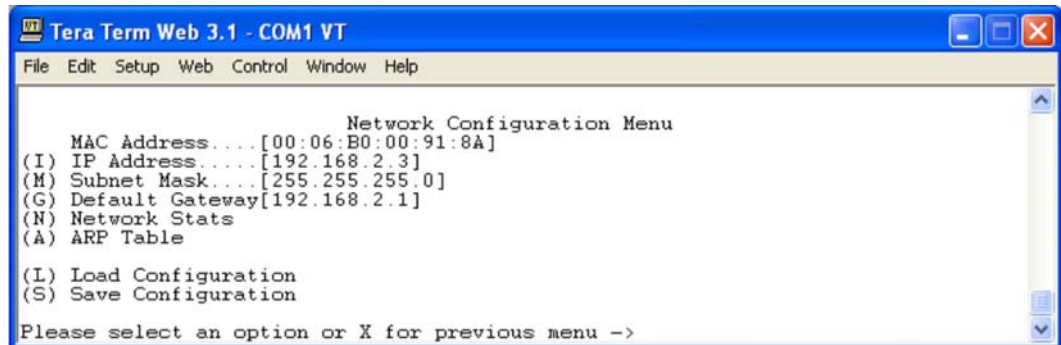


Figure 4-43. Network Configuration Menu

### 4.3.8 Unicast Routing Configuration Menu

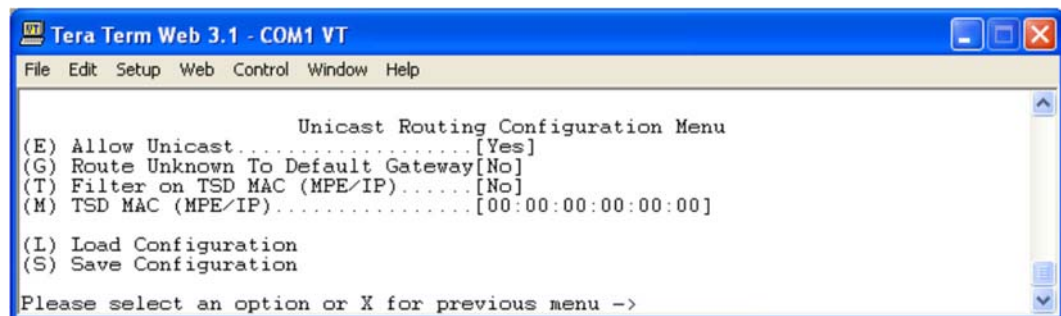


Figure 4-44. Unicast Routing Configuration Menu

### 4.3.9 Tuner Menu

This menu enables the user to configure the tuner for operation. The terminal configuration of the tuner is simple to perform and can be done at installation time.

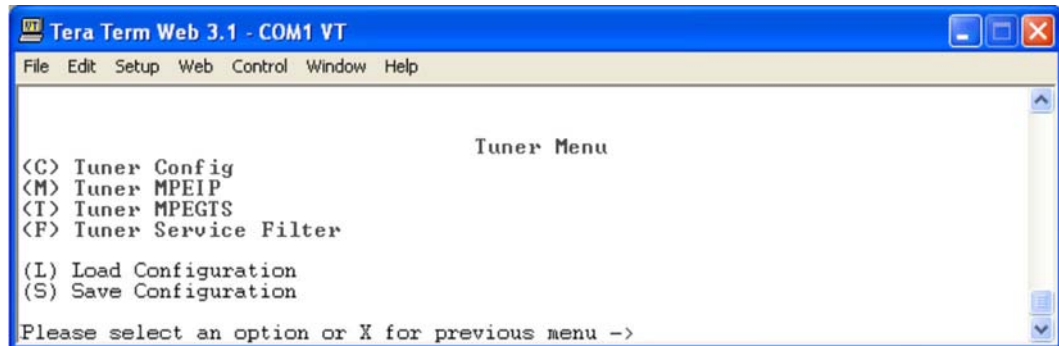


Figure 4-45. Tuner Menu

#### 4.3.9.1 Tuner Configuration Menu

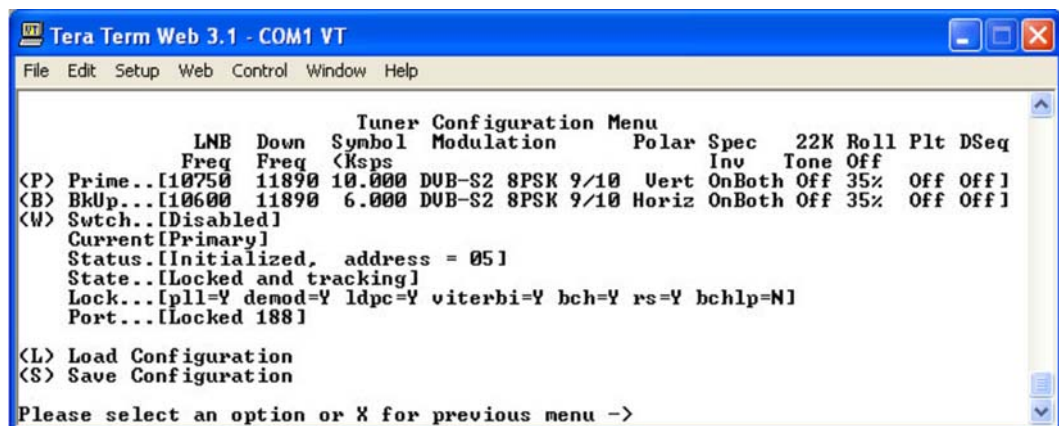


Figure 4-46. Tuner Configuration Menu

### 4.3.9.2 Tuner MPE/IP Configuration Menu

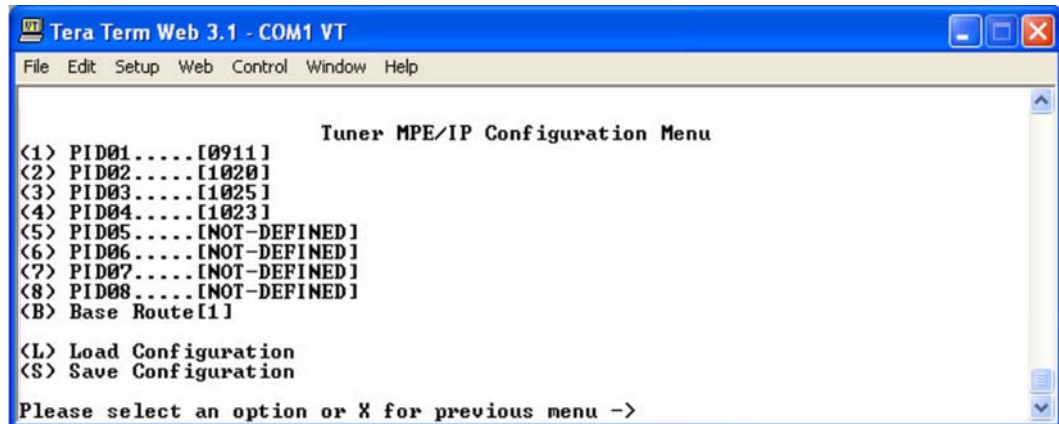


Figure 4-47. Tuner MPE/IP Configuration Menu

### 4.3.9.3 Tuner MPEG TS Configuration Menu

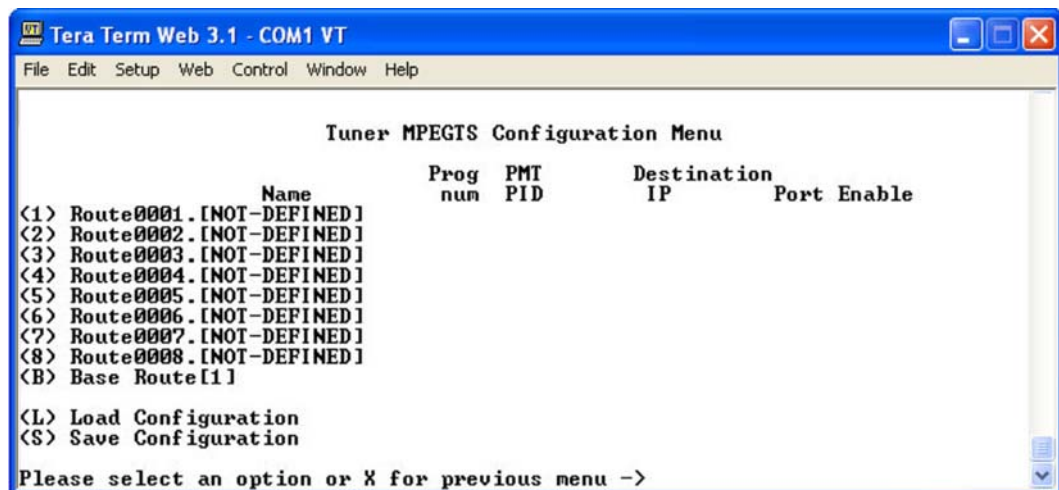


Figure 4-48. Tuner MPEG TS Configuration Menu

### 4.3.9.4 Tuner Service Filter Configuration Menu (MR-S2-ASI only)

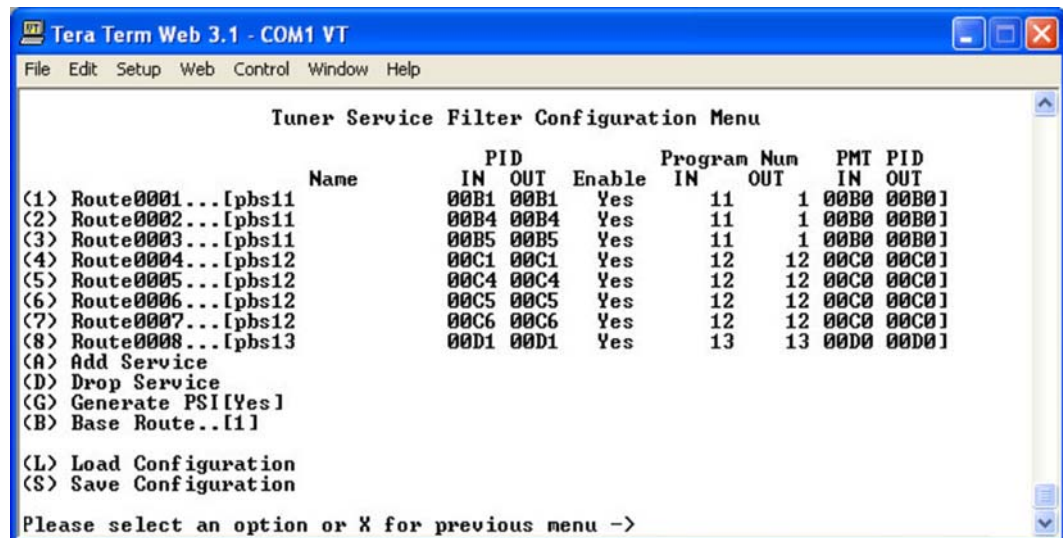


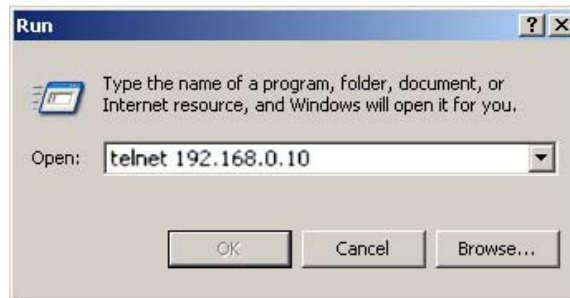


Figure 4-49. Tuner Service Filter Configuration Menu

## 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 Run dialog box is shown in Figure 4-50. In the **Open:** text window, enter “**telnet xxx.xxx.xxx.xxx,**” where **xxx.xxx.xxx.xxx** is the IP address of the MR-S2. 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.



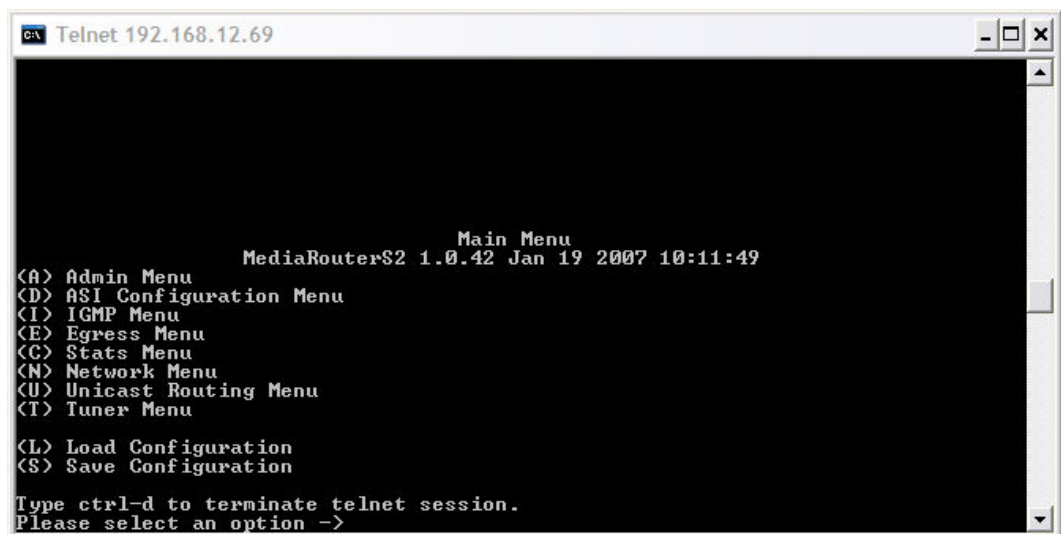
**Figure 4-50. Starting Telnet Session**

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 MR-S2 Main Menu will display as shown in Figure 4-51:



**Figure 4-51. 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 MR-S2 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 MR-S2 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 MR-S2 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-S2 as described in the Telnet Interface section
4	Select ' <b>A</b> ' for Administration
5	Select ' <b>D</b> ' for Download
6	Enter ' <b>1</b> ' for Application code or ' <b>2</b> ' 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 " <b>Upgrade complete. Press any key to continue</b> "

This code modification process can also be conducted via the Web Interface, under the Administration 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) (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-S2 in an automated fashion.

The MR-S2 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 revised version of this manual. CEFD has been assigned an SNMP designator by the IEEE, which will be found in all elements of the MR-S2’s MIB.



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

The MR-S2 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 MR-S2 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 MR-S2 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.



***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):

- In the **Update Firmware** section, enter the **Unit TFTP Server IP Address**.
- Select **Application** or **FPGA** for the **Image Type** to be upgraded.
- 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.



**Do NOT power the unit down during the upgrade process.**

- When the update is complete, the message **“Press any key to continue”** will be displayed.
- 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**.

Media Router S2 (Service Filter and ASI/LBAND Receiver)

HOME ADMIN SYSLOG NETWORK EGRESS IGMP  
UNICAST MPE/JP MPEGTS SVC FILTER TUNER STATS

**Administrative Configuration**

Unit Name: MR  
OS Version: eCOS 2.0  
App Version: 1.0.42  
FPGA Version: 2.0.0.10  
User Name: dni  
Password: \*  
Confirm Password: \*  
System Contact: nobody@nowhere.net  
System Location: kunset  
SNMP server IP address: 0.0.0.0  
Enable Telnet:

**Login Required**

User Name: \*  
Password: \*  
Submit Cancel Reset Unit

Enter new username and password, then enter login credentials and press submit to make changes  
\* Indicates a required field

**Update Firmware**

Unit TFTP Server IP Address: \*  
Image Type: Application  
**Login Required**

User Name: \*  
Password: \*  
Update

Enter server IP and select type, then enter login credentials and press submit to make changes  
\* Indicates a required field

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.

```
Direct - HyperTerminal
File Edit View Call Transfer Help
[Icons]
Admin Menu
(N) Unit Name.....[eCos]
    OS Version.....[eCOS 2.0]
    App Version.....[1.0.30]
    FPGA Version.....[0.0.0.14]
(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.....[Yes]
(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 ->
Connected 5:35:05  Auto detect  38400 B-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

**Figure A-2. TFTP Download (via Terminal)**

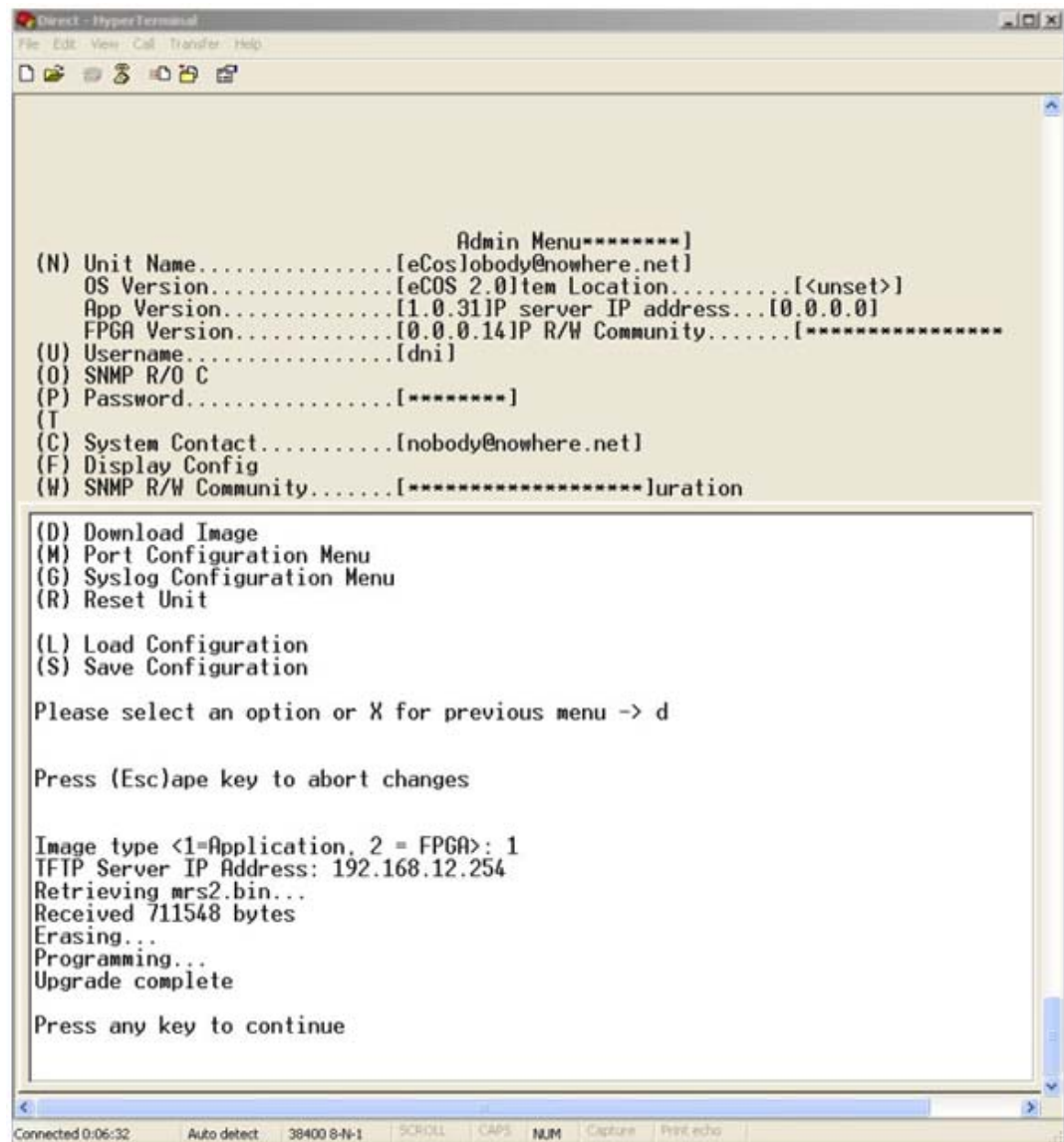


Figure A-3. TFTP Download Complete (via Terminal)

# Appendix B. IP ROUTING SUPPORT

---

## B.1 Introduction

The MR-S2 provides state-of-the-art L-Band DVB-S and DVB-S2 IP and transport stream delivery based on the ISO/IEC 13818-1, ISO/IEC 13818-6 and DVB Specification for Data Broadcasting (EN 301 192).

The MR-S2 provides the following configuration features:

- Support for DVB-S reception at rates from 2 to 45 Msps
- Support for DVB-S2 reception at rates:
  - QPSK 6 to 32 Msps
  - 8PSK 6 to 32 Msps
- IP Decapsulation per Multi-Protocol Encapsulation (EN 301 192)
- Transport stream merging and delivery (**MS-S2-ASI only**)
- 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 Multiprotocol Encapsulation specification. Routing of datagrams is accomplished by configuration of PIDs in the MR-S2, as described in the following sections.

## 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:
  - A (0.0.0.0 to 127.255.255.255)
  - B (128.0.0.0 to 191.255.255.255)
  - C (192.0.0.0 to 223.255.255.255)
- Medium Access Control (MAC) Addresses, which identifies 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 MR-S2 as it would be in any routed network. Packets received by the MR-S2 are routed to the Ethernet if they meet the subnet criteria or the MR-S2 is configured to route non-local packets to a default gateway.

The MR-S2 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 above, 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 identifies 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**.

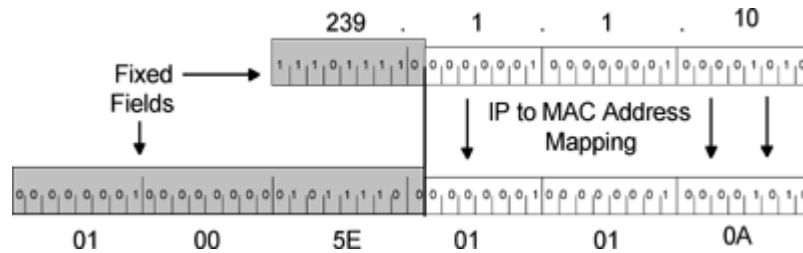
Multicast IP addresses are related to multicast MAC addresses as follows:

The lower 23 bits of the IP address are mapped into the lower 23 bits of the MAC address as shown in Figure B-1. Examples of the relationship are:

- 1) Received IP: 239.1.1.10 = MAC: 0x01 00 5E 01 01 0A
- 2) Received IP: 224.10.10.10 = MAC: 0x01 00 5E 0A 0A 0A
- 3) 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.



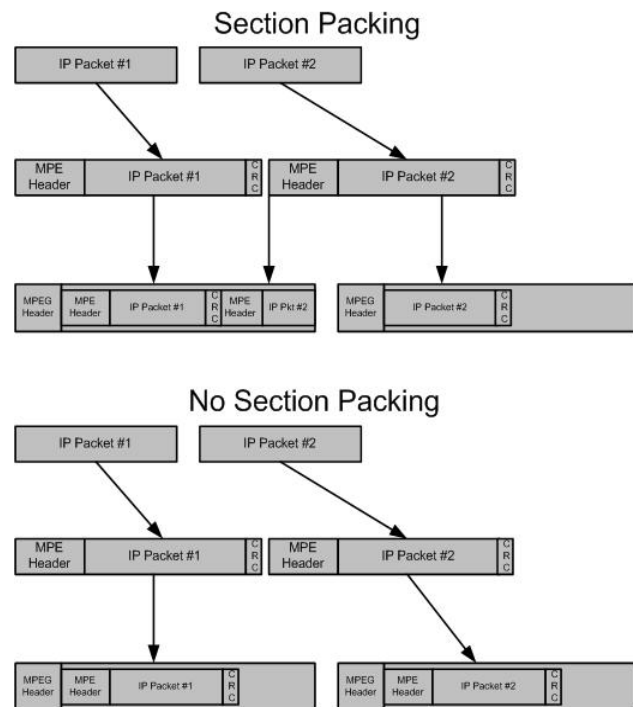
**Figure B-1. Multicast Mapping (IP to MAC)**

### B.3 Section Packing

Section packing is a technique utilized 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**



# Appendix C. SYSTEM LOG CONFIGURATION

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## C.1 Introduction

The MR-S2 supports 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 system<sup>1</sup>, allowing the MR-S2 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

---

<sup>1</sup> 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.



***After making the changes you must restart `syslogd`.***

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

---

<sup>2</sup> This file may be in a different location.

## METRIC CONVERSIONS

### Units of Length

Unit	Centimeter	Inch	Foot	Yard	Mile	Meter	Kilometer	Millimeter
1 centimeter	—	0.3937	0.03281	0.01094	$6.214 \times 10^{-6}$	0.01	—	—
1 inch	2.540	—	0.08333	0.2778	$1.578 \times 10^{-5}$	0.254	—	25.4
1 foot	30.480	12.0	—	0.3333	$1.893 \times 10^{-4}$	0.3048	—	—
1 yard	91.44	36.0	3.0	—	$5.679 \times 10^{-4}$	0.9144	—	—
1 meter	100.0	39.37	3.281	1.094	$6.214 \times 10^{-4}$	—	—	—
1 mile	$1.609 \times 10^5$	$6.336 \times 10^4$	$5.280 \times 10^3$	$1.760 \times 10^3$	—	$1.609 \times 10^3$	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	$1.0 \times 10^3$	35.27	32.15	2.205	2.679	—



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2114 WEST 7TH STREET TEMPE ARIZONA 85281 USA

480 • 333 • 2200 PHONE

480 • 333 • 2161 FAX