



SMS-7000

Modem Protection Switch
Installation and Operation Manual



Errata A

Comtech EF Data Documentation Update

Subject: Changes to Table 3-4 (Interface Configuration Jumper Settings)

Date: October 5, 2001
Document: SMS-7000 Modem Protection Switch
Installation and Operation Manual,
Revision 3, September 30, 1999
Part Number: MN/SMS7000.EA3
Collating Instructions: Attach this page to page 2-11

Comments:

The following changes provide updated information for Figure2-2. This information will be incorporated into the next revision.

Change Specifics:

See following page.....

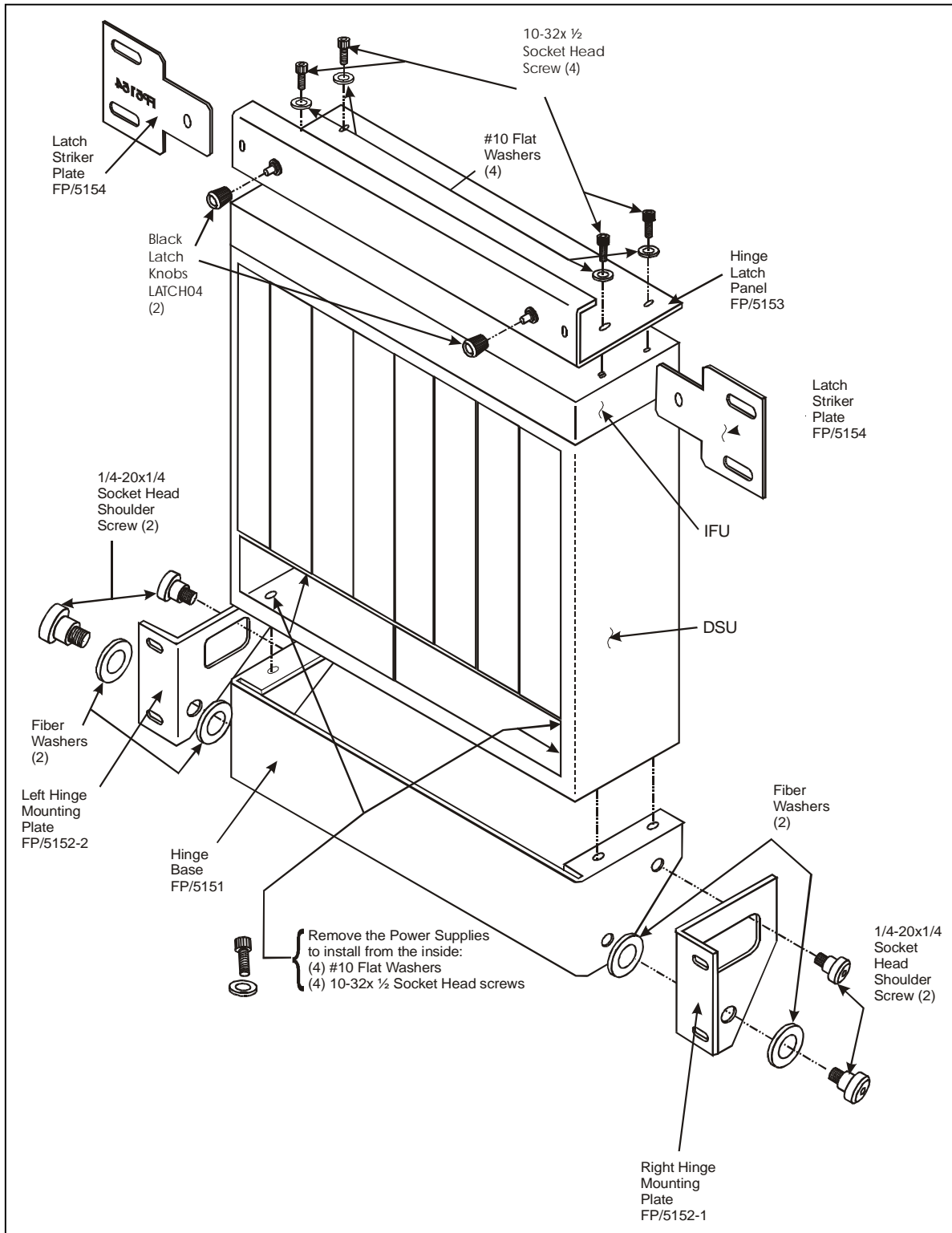


Figure 0-1. Back Mount (Hinge) Installation

Errata B

Comtech EFDATA Documentation Update

Subject: Changes to Table 3-4 (Initial Defaults)

Date: October 5, 2001

Document: SMS-7000 Modem protection Switch Installation and Operation Manual, Rev. 3, dated September 30, 1999

Part Number: MN/SMS7000.EB3

Collating Instructions: Attach this page to page 3-33

Comments: The following changes provide updated information to Table 3-4.

Table 3-4. Initial Defaults

Configuration Backup #n (n = 1 or 2)			
Backup Mod #n	Off	Backup #1 Multiplexer	No
Backup Demod #n	Off	Backup #2 Multiplexer	No
Backup #n Switching Mode	Independent		
Configuration Independent Prime #n (n = 1 through 8)			
Prime Mod #n	Off	Prime Demod #6, 7 Delay	None
Prime Mod #1, 2, 3, 4 Priority	Low	Prime Demod #8 Delay	None
Prime Mod #5, 6 Priority	Low	Prime #1, 2, 3, 4 Multiplexer	No
Prime Mod #7, 8 Priority	Low	Prime #5, 6, 7, 8 Multiplexer	No
Prime Mod #1 through 7 Delay	None	D&I #1, 2, 3, 4	Unbalanced
Prime Mod # 8 Delay	None	External Clock #1, 2, 3, 4	Unbalanced
Prime Demod #n	Off	Insert Data Input #1, 2, 3, 4	Normal
Prime Demod #1, 2, 3, 4 Priority	Low	D&I #5, 6, 7, 8	Unbalanced
Prime Demod #5, 6 Priority	Low	External Clock #5, 6, 7, 8	Unbalanced
Prime Demod #7, 8 Priority	Low	Insert Data Input #5, 6, 7, 8	Normal
Prime Demod # 1 through 5 Delay	None		
Configuration Dependent Prime #n (n = 1 through 8)			
Prime Mod #n	Off	Prime #1, 2, 3, 4 Multiplexer	No
Prime Demod #n	Off	Prime #5, 6, 7, 8 Multiplexer	No
Prime Mod #1, 2, 3, 4 Priority	Low	D&I #1, 2, 3, 4	Unbalanced
Prime Mod #5, 6 Priority	Low	External Clock #1, 2, 3, 4	Unbalanced
Prime Mod #7, 8 Priority	Low	Insert Data Input #1, 2, 3, 4	Normal
Prime Mod #1 through 5 Delay	None	D&I #5, 6, 7, 8	Unbalanced
Prime Mod #6, 7 Delay	None	External Clock #5, 6, 7, 8	Unbalanced
Prime Mod # 8 Delay	None	Insert Data Input #5, 6, 7, 8	Normal
Configuration Operation Mode			
Operation Mode	Manual		
Utility System			
Time	Current	Parity	Even
Date	Current	Remote Type	EIA-485 (2-Wire)
Remote Baud Rate	9600 bit/s	Mode Control Baud Rate	9600 bit/s



Errata C

Comtech EFData Documentation Update

Subject: Changes to Related Documents

Date: October 13, 2003

Document: SMS-7000 Modem protection Switch Installation and Operation Manual, Rev. 3, dated September 30, 1999

Part Number: MN/SMS7000.EC3

Collating Instructions: Attach this page to page viii

Related Documents

The following documents are referenced in this manual:

- Department of Defense (DOD) MIL-STD-188-114A, "Electrical Characteristics of Digital Interface Circuits"
- M-2000 Multiplexer Installation and Operation Manual
- Comtech EF Data CRS-280L 1:N Redundancy Switch Installation and Operation Manual



SMS-7000

Modem Protection Switch Installation and Operation Manual

Comtech EFData is an ISO 9001
Registered Company.



Part Number MN/SMS7000.IOM
Revision 3
September 30, 1999

Customer Support

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

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2114 West 7th Street
Tempe, Arizona 85281 USA

(480) 333-2200 (Main Comtech EFData Number)
(480) 333-4357 (Customer Support Desk)
(480) 333-2161 FAX

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5. Ship the product back to Comtech EFData. (Shipping charges should be prepaid.)

For more information regarding the warranty policies, see Warranty Policy, p. xii.

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Overview of Changes to Previous Edition

This revision supersedes part number MN/SMS7000 Rev. 2 dated October 3, 1997.

A summary of the changes made for Rev. 2 includes:

Chapter 1	Updated Compatibility and Data Formats paragraph and specified that the SDM-300 modem must be the 50-pin configuration. Added Options paragraph. Revised Figure 1-2 to include cable part numbers. Updated specifications paragraph to the current specification. Relocated mounting information to Chapter 2.
Chapter 2	Added Equipment Inspection paragraphs to reflect mounting kits and required tooling. Added cable information. Revised mounting instructions by including description and installation information. Added trouble shooting information for installation procedures.
Chapter 3	Updated software menu from version 2.1.7 to 2.1.8. Added revision emulation and initial default paragraphs.
Appendix A	Updated to software version 2.1.8.
General	Deleted Mounting appendix. Reidentified Multiplexer section as Appendix B.

About this Manual

This manual provides installation and operation information for the Comtech EFData SMS-7000 Modem Protection Switch. This is a technical document intended for earth station engineers, technicians, and operators responsible for the operation and maintenance of the SMS-7000.

Related Documents

The following documents are referenced in this manual:

- *Department of Defense (DOD) MIL-STD-188-114A, "Electrical Characteristics of Digital Interface Circuits"*
- *M-2000 Multiplexer Installation and Operation Manual*

Conventions and References

Cautions and Warnings



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.

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 English to Metric conversions.

Recommended Standard Designations

Recommended Standard (RS) Designations have been superseded by the new designation of the Electronic Industries Association (EIA). References to the old designations are shown only when depicting actual text displayed on the screen of the unit (RS-232, RS-485, etc.). All other references in the manual will be shown with the EIA designations (EIA-232, EIA-485, etc.) only.

Military Standards

References to “MIL-STD-188” apply to the 114A series (i.e., MIL-STD-188-114A), which provides electrical and functional characteristics of the unbalanced and balanced voltage digital interface circuits applicable to both long haul and tactical communications. Specifically, these references apply to the MIL-STD-188-114A electrical characteristics for a balanced voltage digital interface circuit, Type 1 generator, for the full range of data rates. For more information, refer to the Department of Defense (DOD) MIL-STD-188-114A, “*Electrical Characteristics of Digital Interface Circuits.*”

Trademarks

Other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

Reporting Comments or Suggestions Concerning this Manual

Comments and suggestions regarding the content and design of this manual will be appreciated. To submit comments, please contact the Comtech EFData Customer Support Department.

EMC Compliance

EN55022 Compliance

This equipment meets EN55022.

This is a Class A product. In a domestic environment it may cause radio interference in which the user may be required to take adequate measures.

Federal Communications Commission (FCC)


Note: All cables shall be shielded.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.



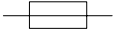

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Low Voltage Directive (LVD)

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

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

International Symbols:

Symbol	Definition	Symbol	Definition
	Alternating Current.		Protective Earth
	Fuse.		Chassis Ground.

Notes:

1. For additional symbols, refer to “Cautions” listed earlier in this preface.
2. Applicable testing is routinely performed as a condition of manufacturing on all units to ensure compliance with requirements of EN60950 for Safety.

Warranty Policy

This Comtech EFData product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Comtech EFData will, at its option, repair or replace products that prove to be defective.

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

Limitations of Warranty

The foregoing warranty shall not apply to defects resulting from improper installation or maintenance, abuse, unauthorized modification, or operation outside of environmental specifications for the product, or, for damages that occur due to improper repackaging of equipment for return to Comtech EFData.

No other warranty is expressed or implied. Comtech EFData specifically disclaims the implied warranties of merchantability and fitness for particular purpose.

Exclusive Remedies

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

Disclaimer

Comtech EFData has reviewed this manual thoroughly in order that it will be an easy-to-use guide to your equipment. All statements, technical information, and recommendations in this manual and in any guides or related documents are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted, and they are not intended to be, nor should they be understood to be, representations or warranties concerning the products described. Further, Comtech EFData reserves the right to make changes in the specifications of the products described in this manual at any time without notice and without obligation to notify any person of such changes.

If you have any questions regarding your equipment or the information in this manual, please contact the Comtech EFData Customer Support Department.

1 Chapter 1. INTRODUCTION

This chapter provides an overview, description, and specifications for the SMS-7000 satellite modem protection switch. The SMS-7000 is hereinafter referred to in this manual as “the switch”, and includes the following components (refer to Figure 1-1):

- IFU Intermediate Frequency Switch Unit
- DSU Data Switch Unit
- SCU Switch Control Unit

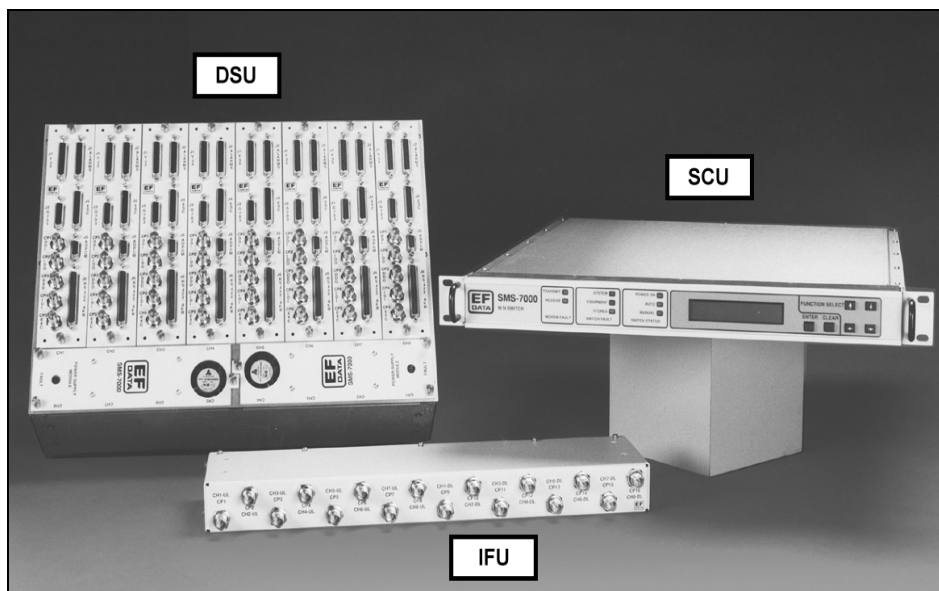


Figure 1-1. SMS-7000

1.1 Overview

The switch is specifically designed to perform automatic redundancy switching for any combination of up to two backup and eight prime Comtech EFData satellite modems. Up to eight separate uplinks and downlinks can be accessed by the user at any time.

Each switch channel has a built-in breakout panel that is automatically configured to support overhead, non-overhead, and programmable data-type modems. Configuration and control of the switch and attached modems may be performed from a terminal or PC connected to the switch remote port (refer to Appendix A); or directly from the switch front panel (refer to Chapter 3).

The switch is compatible with the M-2000 multiplexer (refer to Appendix C for more information).

The switch is tested and certified to CE-Mark requirements.

1.1.1 Compatibility

The switch is designed to operate with the following Comtech EFData modems:

- SDM-100
- SDM-308-4
- SDM-308-5
- SDM-309B
- SDM-650B
- SDM-300 (*see Note*)
- SDM-300A (*see Note*)
- SDM-6000
- SDM-8000
- SLM-3650 (*see Note*)
- SLM-6650
- SLM-8650

Note: Use the 50-pin D connector configuration with the switch.

For modem compatibility, refer to Table 1-1.

Table 1-1. SMS-7000 Modem Hardware Compatibility

Rack Setup	Backup	Comments
SDM-308-4 SDM-6000	Either	SDM-6000 must be configured as Modem Type 1 to be compatible with SDM-308-4 (M1200P). Note: SDM-6000 must be configured as Modem Type 4 to be compatible with SDM-308-4 (old IDR interface). <i>(See Note 1)</i>
SDM-308-5 SDM-6000	Either	SDM-6000 must be configured as Modem Type 3 to be compatible with SDM-308-5. <i>(See Note 1)</i>
SDM-309B SDM-6000	Either	SDM-6000 must be configured as Modem Type 2 to be compatible with SDM-309 (M1200P). <i>(See Note 1)</i>
SDM-308-4 SDM-8000	Either	SDM-8000 must be configured as Modem Type 1 to be compatible with SDM-308-4.(M1200P). Note: SDM-8000 must be configured as Modem Type 4 to be compatible with SDM-308-4 (old IDR interface) or Type 5 to be compatible with SDM-308-4 (M1200/RS). <i>(See Note 1)</i>
SDM-308-5 SDM-8000	Either	SDM-8000 must be configured as Modem Type 3 to be compatible with SDM-308-5. <i>(See Note 1)</i>
SDM-309B SDM-8000	Either	SDM-8000 must be configured as Modem Type 2 to be compatible with SDM-309 (M1200P). <i>(See Note 1)</i>
SDM-650B SDM-100A	Either	SDM-100A must have sequential decoder option, and be configured as Modem Type 1 to be compatible with SDM-650B. <i>(See Note 1)</i>
SDM-100A SDM-300/-300A	Either	SDM-300/300A, incorporating the 50-pin Data Interface connector must be configured to emulate an SDM-100A (Ver: 15.7.1).
SDM-308-4 SDM-300/-300A	Either	SDM-300/300A, incorporating the 50-pin Data Interface connector must be configured to emulate an SDM-308-4 (Ver: 4.03, 6.05, or 7.03).
SDM-308-5 SDM-300/-300A	Either	SDM-300/300A, incorporating the 50-pin Data Interface connector must be configured to emulate an SDM-308-5 (Ver: 6.08).
SDM-309 SDM-300/-300A	Either	SDM-300/300A, incorporating the 50-pin Data Interface connector must be configured to emulate an SDM-309 (Ver: 6.04).
SDM-650B SDM-300/-300A	Either	SDM-300/300A, incorporating the 50-pin Data Interface connector must be configured to emulate an SDM-650B (Ver: 4.12A or 4.16)
SDM-6000 SDM-300/-300A	Either	SDM-300/300A, incorporating the 50-pin Data Interface connector must be configured to emulate an SDM-6000 (Ver: 5.1.1)
SLM-3650	None	Only compatible with SLM-3650, incorporating the 50-pin Data Interface connector.
SLM-6650	None	Only compatible with SLM-6650.
SLM-8650	None	Only compatible with SLM-8650.

Notes:

1. Modem control feature supported by latest code release for SDM-100, SDM-6000, and SDM-8000.
2. Backup modems are always compatible with primes of like models when they are comparably equipped.
3. Consult Comtech EFData Customer Support for combinations not shown in Table 1-1.
4. Compatibility differences between modems exist due to the fact that the specific capabilities of modems vary. For example, the SDM-8000 has a larger set of framing structure parameters than the SDM-300, etc.

1.1.2 Data Formats

Table 1-2 lists the data formats that the switch will support.

Table 1-2. Data Formats

Data Type	Connector
V.35 Data	25-pin D
EIA-422/MIL-STD-188 Data IDR 8K Data Channel	37-pin D
G.703 Balanced	15-pin D
G.703 Unbalanced	Coax BNC
EIA-232 Data	25-pin D
ADPCM Audio Data or 64K Data Overhead	9-pin D
Engineering Data Channel ASYNC Overhead	25-pin D
Alarms	25-pin D

Under the following conditions, the switch is designed to operate with prime modems configured with different overhead data types, such as, IDR, IBS, D&I, ASYNC, or NONE; and/or with different terrestrial data types, such as, EIA-422, V.35, or G.703:

- Modems must be one of the following models:
 - ◆ SDM-6000
 - ◆ SDM-8000
 - ◆ SLM-6650
 - ◆ SLM-8650
- Backup modems must have an AS/2876 interface relay board option installed, in order for the backup modem to switch between IDR, IBS, and Custom mode.
- Backup modems' switching mode must be dependent when there is a mixture of prime modem types. Example: Prime 1 is IDR, and Prime 2 is IBS, EIA-422.

Backup modems must be comparably equipped to the prime modems assigned. (Example: Backup #1 is an SDM-8000 configured with a relay card and a sequential decoder. It can backup prime modems (SDM-8000) that are configured as prime #1 IDR and prime #2 configured for Custom sequential. Backup # 2 can also be an SDM-300 backing up a set of prime SDM-300 modems. The backup modems can be directed to a specific set of modems.)

1.1.3 Options

Table 1-3 lists the options that are applicable to the switch.

Table 1-3. Options

Input Power	Mounting Kit	IF Switch	Switch Type	Switch Quantity	Option
AC	Top KT/5275	No IF Switch	Universal	1	None
DC	Back KT/5274	75Ω Attached		2	
		50Ω Attached		3	
		75Ω Unattached		4	
		50Ω Unattached		5	
				6	
				7	
				8	

1.1.4 Protection Switch

Refer to Table 1-4 for part numbers of various switch component.

Table 1-4. Protection Switch

Part Number	Description
PL/4800	Chassis Controller
PL/4801-1	IF Switch, 75Ω
PL/4801-2	IF Switch, 50Ω
PL/4802	Switch, Data
PL/4803	Power Supply, AC
PL/4831	Power Supply, DC
CA/5343	Cable Assembly, 15-Pin, EMI
CA/5361-1	Cable Assembly, Switch to Controller, 6 ft. (182.88 cm)

1.2 Description

The switch (Figure 1-1) is composed of three units:

- **Switch Control Unit (SCU)** — User interface for switch and modem control and configuration.
- **Data Switch Unit (DSU)** — As commanded by the SCU, performs terrestrial data configuration and backup modem data switching.
- **IF Switch (IFU)** — As commanded by the SCU, performs backup modem IF switching.

This 3-chassis arrangement gives the user control of the switch from the one unit (1U) rack mounted SCU front panel. The DSU and IFU, which contain all terrestrial and link interfaces, are mounted inside the rack to minimize rack and external interface cabling. These units will accommodate the particulars of external interface requirements. They can be separated or joined together and mounted either in the rear or on the top of the rack.

The switch functional block diagram (Figure 1-2) displays the functional partitioning and interconnection between the three chassis.

Two cables interconnect the three units. The SCU and DSU are connected via a cable that transfers power, faults, and switch control between the two chassis. Power, modem faults, and switch faults originate from the DSU, while switch control commands are initiated by the SCU. The IFU is connected to the DSU in the same manner.

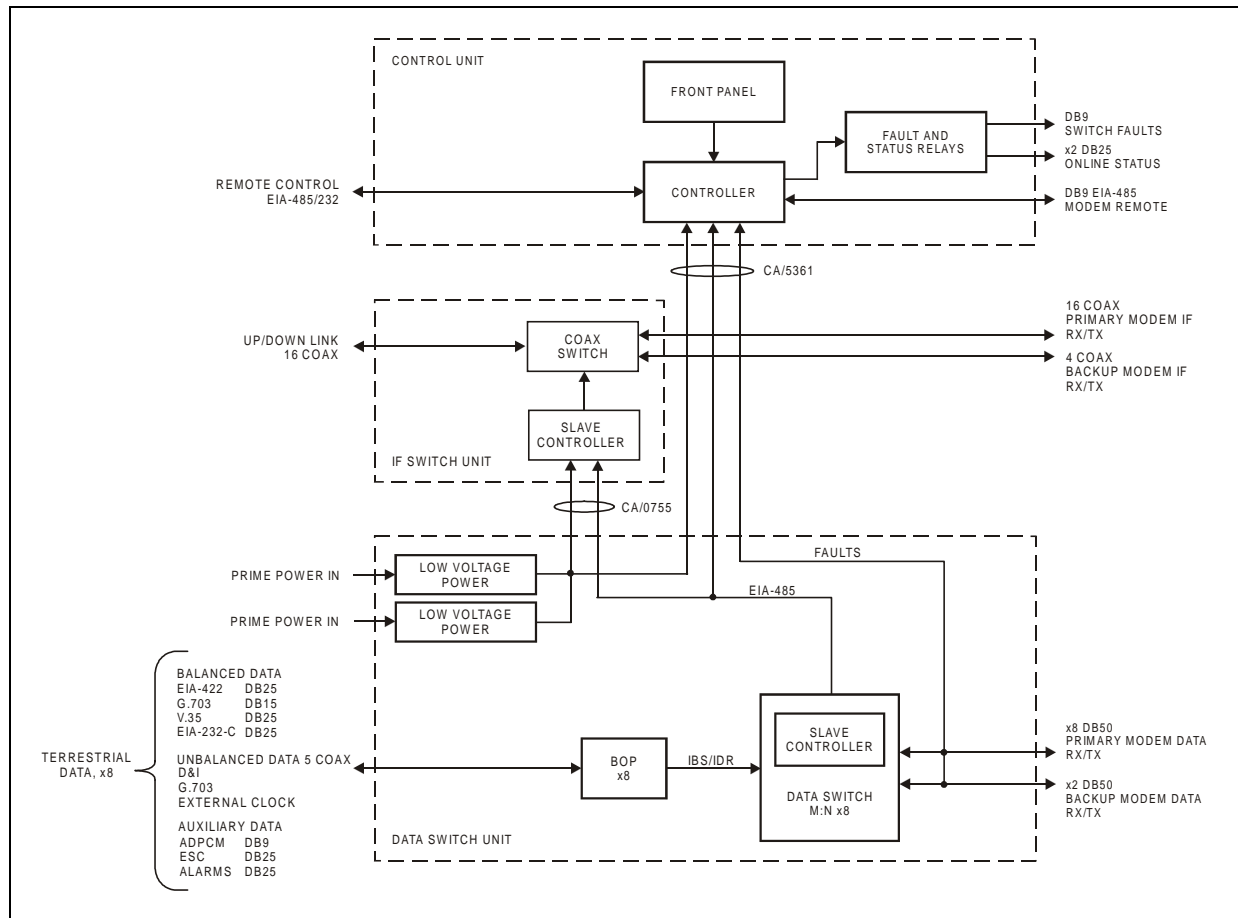


Figure 1-2. Block Diagram

1.2.1 Switch Controller Unit (SCU)

The SCU is a one unit (1U), 19-inch (48.26 cm) rack-mounted chassis that provides the configuration and automatic switching control functions. Rear panel connectors on this chassis provide all user remote control and status interfaces and rack internal control interfaces. The front panel provides local control of the switch.

The SCU front panel (Figure 1-3) provides the user with visual fault and status indicators. The back-lit display and keypad provide the local user control interface. The front panel is a typical Comtech EFDATA modem front panel status and control interface. The switch front panel supports all functions of the remote port. The user may configure both the switch and associated modems as well as query status and faults.

Note: The modem control feature is only available with certain modems. Refer to the compatibility chart (Table 1-3) for specific applications.

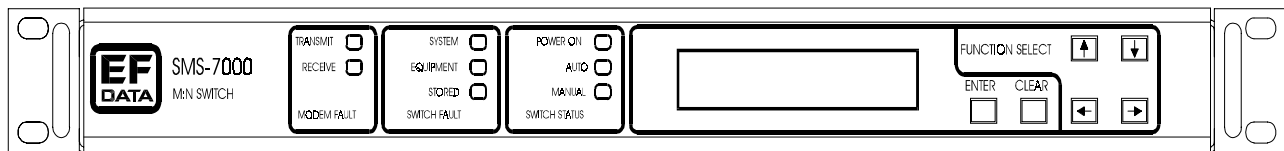


Figure 1-3. SCU Front Panel

The SCU rear panel (Figure 1-4) accommodates the user serial command interface for remote configuration and status. These interfaces are also shown in the block diagram (Figure 1-2).

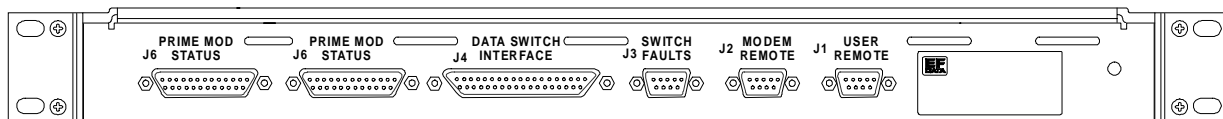


Figure 1-4. SCU Rear Panel

Prime modulator and demodulator status and switch faults are provided on dedicated I/O connectors. Status and fault conditions are indicated at these connectors by opening and closing relay contacts, which may be used to directly trigger external alarms and indicators. The modem remote port is the control interface to all modems attached to the switch. The Data Switch Interface, which carries control and fault information between the switch chassis and SCU, is also provided.

1.2.2 Data Switch Unit (DSU)

The DSU performs terrestrial data switch and breakout panel functions. Enclosed in a shallow 4.5-inch (11.4 cm) deep chassis, the DSU is designed to mount within the rack in several ways. This will accommodate particular rack configurations and user terrestrial cable routing.

The DSU (Figure 1-5) may be equipped with up to eight data switch modules—one per prime modem as required. The modules may be removed and replaced on site, or they can be added later for configuration expansion. In addition to performing prime and backup data switch functions, each module incorporates a configurable breakout panel that steers the desired terrestrial data interfaces to a single modem I/O data connector.

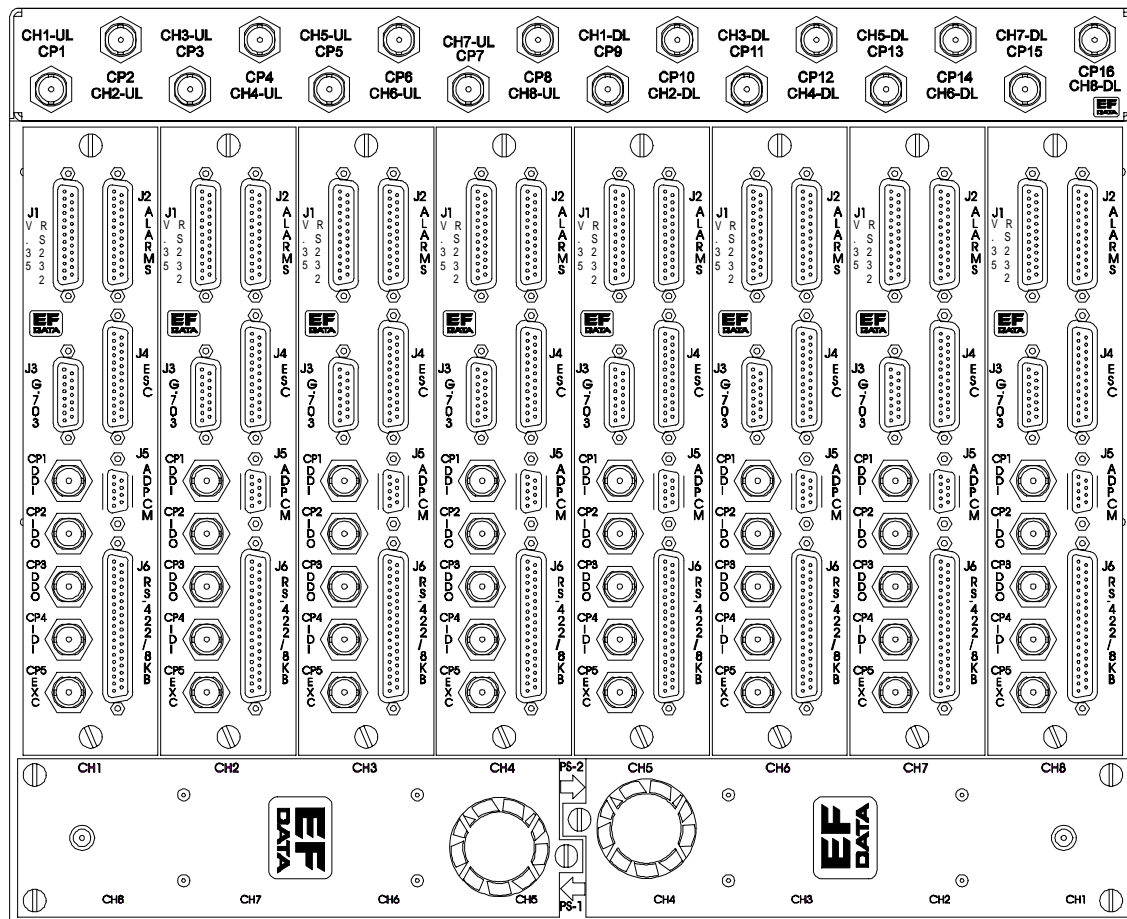


Figure 1-5. DSU/IFU Terrestrial Side

The bottom of the DSU encloses two redundant, online-replaceable, low-voltage, power supply modules. The power supply modules service all three chassis and are individually replaceable with no interruption of service.

All terrestrial data connections are located on the data switch module face of the DSU (Figure 1-5). The breakout panel on the face of each data switch module supports a variety of standard data and alarm interfaces. These interfaces support IBS, IDR, D&I, or custom formats.

Ten modem data cable interfaces are located on the opposite face of the DSU (Figure 1-6); one for each of the eight prime and two backup satellite modems. Connectors J11 and J12 provide the interfaces for the SCU and IFU. The line cord receptacles for the redundant power supply modules are located at the upper corners of the unit. The spring-loaded mechanical slide, associated with each supply, must be slid aside to insert the AC line cord. Unless the power cord is disconnected, this slide performs two functions retaining the power cord and preventing the removal of the module.

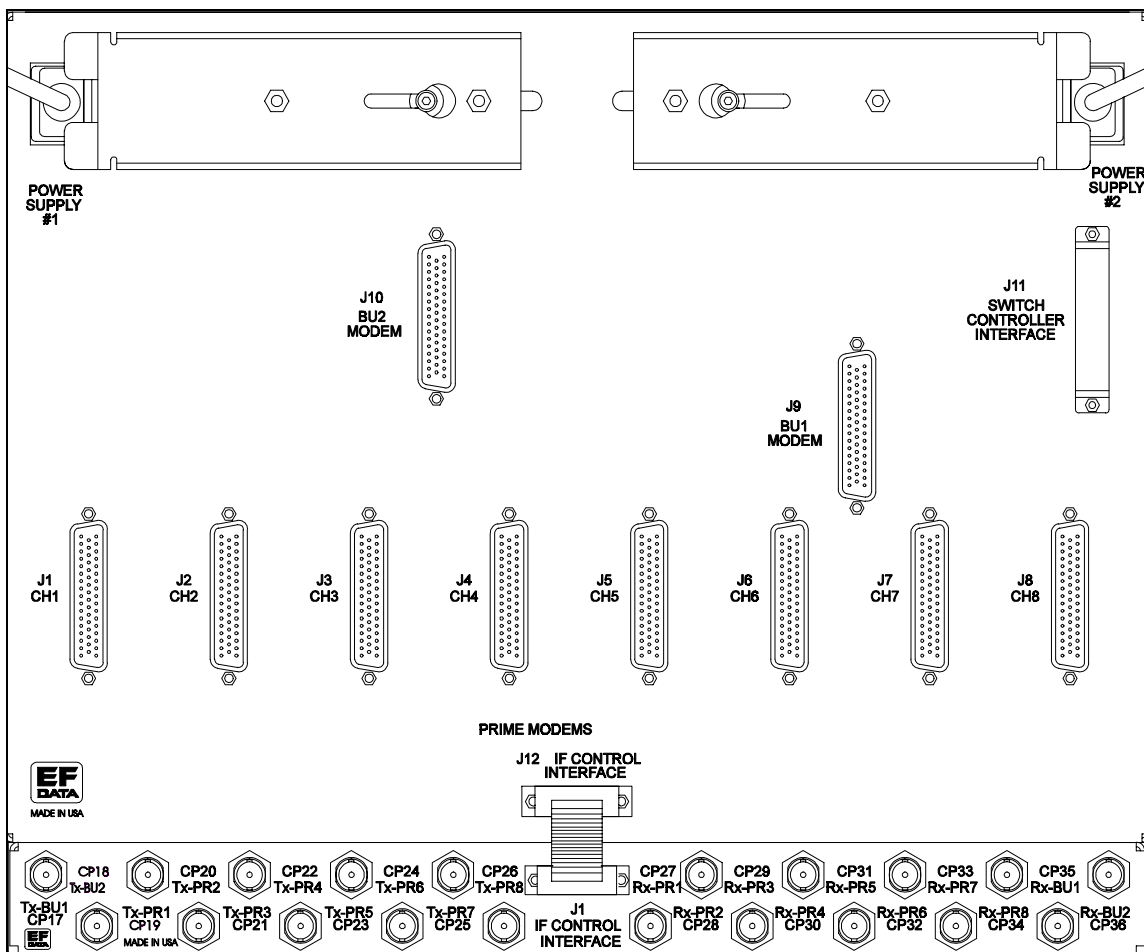


Figure 1-6. DSU/IFU Modem Side

1.2.3 IF Switch Unit (IFU)

All IF switching is performed in the IFU. In a typical application, the IFU is attached to the DSU. If necessary, the unit can be mounted separately and interconnected with an extended length interface cable. This procedure is recommended if mounting multiple switches in the top of a rack or when separate mounting facilitates IF cabling.

The user has access to one downlink and one uplink port for each of the eight channels (Figure 1-5).

Each prime and backup satellite modem in the configuration has an RX and TX coaxial connection to the modem side of the DSU chassis (Figure 1-6).

1.3 Specifications

Refer to Table 1-5 for operating specifications of the switch.

Table 1-5. SMS-7000 Specifications

Operation	
Number of Service Channels	Modular from 1 to 8. Field upgradeable; one data switch module per channel.
Number of Backups	1 or 2.
Switching Modes	Auto or Manual.
Backup Modes	Dependent. Independent (transmit/receive).
Modem Priority	Programmable: high, medium, or low.
Configuration Control: Remote (programmable): Type	EIA-485/232 with provisions for future support of standard network interfaces.
Rate	110 to 19200 baud.
Local	Menu-driven from the switch front panel, for both the switch and the modems.
I/O Interfaces	
Control: Front Panel	Back-lit LCD display and keypad.
Remote	9-pin female D.
Front Panel LEDs:	
Switch Status	Power On. Auto. Manual.
Switch Fault	System. Equipment. Stored.
Modem Fault	Transmit. Receive.
Monitors:	
Modulator Online Status	FORM-C relay outputs, 25-pin female D.
Demodulator Online Status	FORM-C relay outputs, 25-pin female D.
Switch Faults	FORM-C relay outputs, 9-pin female D.

Table 1-5. SMS-7000 Specifications (Continued)

I/O Interfaces	
Terrestrial Data (Each channel)	V.35 Data: 25-pin female D. EIA-422/MIL-STD-188 Data: 37-pin female D. G.703 Balanced Drop and Insert: 15-pin female D. G.703 Unbalanced Drop and Insert: Coax. EIA-232 Data: 25-pin female D. ADPCM Audio Data: 9-pin female D. Engineering Data Channel: 25-pin female D. Alarms: 25-pin female D. External Reference Clock: BNC.
IF Ports	10 each IF Modulation: BNC. 10 each IF Demodulation: BNC. 8 each Uplinks: BNC. 8 each Downlinks: BNC.
IF	Downlinks: up to 8. Uplinks: up to 8. Frequency response: 50 to 180 MHz. Return loss: 18 dB. Impedance: 75Ω or 50Ω (optional). Isolation: 60 dB. Transmit loss: < 1.5 dB. Receive loss: < 5.0 dB.
General	
Prime Power	90 to 264 VAC; 47 to 63 Hz, 40W max. -48 VDC; 40W max. optional.
Size and Weight: Control Unit	1U 19-inch (48.3 cm) rack mount by 20-inch (51 cm) deep, < 10 lbs. (4.5 kg).
Switch Unit with IF Switch	8U 19-inch (48.3 cm) rack mount by approx. 4.5-inch deep (11 cm), < 20 lbs. (9.1 kg).
Mounting	Top Mount. Back Mount (Hinged).
Temperature: Operating	0° to +40°C (32° to 100°F).
Storage	-50° to +100°C (-58° to 212°F).
Humidity	95% at +40°C (100°F), non-condensing.
EMI	CE-Mark certified.

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Chapter 2. INSTALLATION

This chapter provides instructions for unpacking and installation, as well as external connection information for the switch.

2.1 Unpacking

The switch (which consists of three sections) and the manual are packaged in pre-formed, reusable, cardboard cartons that contain foam spacing for maximum shipping protection.



Do not use any cutting tool that will extend more than 1 inch (2.5 cm) into the container and cause damage to the switch.

To remove the switch:

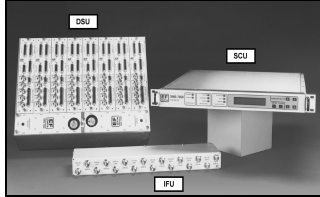
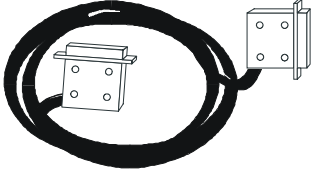
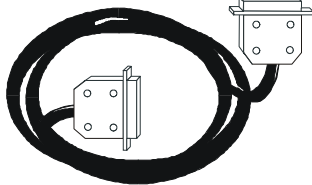
1. Cut the tape at the top of the carton (indicated by OPEN THIS END).
2. Remove the cardboard/foam packing covering the switch.
3. Remove the switch components, product manual, and power cords from the carton.
4. Save the packing material for storage or reshipment purposes.
5. Inspect the equipment for any possible damage incurred during shipment.
6. Check the equipment against the packing list to ensure the shipment is correct.

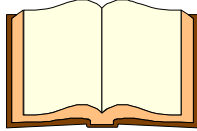
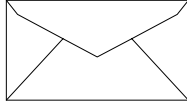
2.2 Equipment Inspection

2.2.1 Included Parts

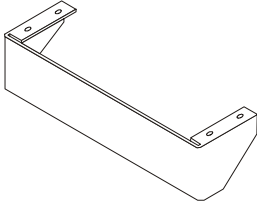

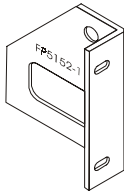

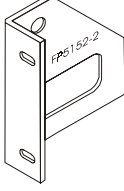
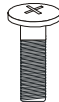
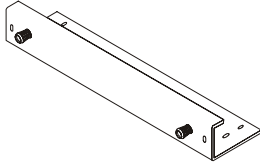
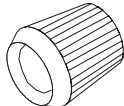
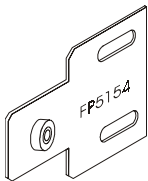


A typical switch contains the following components:

Note: Parts are not drawn to scale.

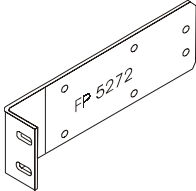
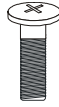


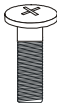

Qty	Description
1	SMS-7000 Switch 
1	Cable Assembly, 37-Pin  <i>Comtech EFData Part # PL/5361-X</i>
1	Cable Assembly, 15-pin M-15 pin  <i>Comtech EFData Part No. CA/5343-X</i>

Qty	Description
1	Installation and Operation Manual 
1	Envelope containing the test data 

2.2.2 Back Mount (Hinged) Hardware Kit

1		Back Mount (Hinged) Hardware Kit (Comtech EFData Part # KT/5274), which includes:	
Qty	Description	Qty	Description
1	Base Hinge  Comtech EFData Part # FP/5151	8	10-32 x 1/2 Socket Head Cap Screws  Comtech EFData Part # HW/10-32X1/2SH
1	Plate, Hinge Mounting  Comtech EFData Part # FP/5152-1	8	#10 Flat Washer  Comtech EFData HW/10-FLT
1	Plate, Hinge Mounting  Comtech EFData Part # FP/5152-2	4	10-32 x 3/8 Phillips™ Screw  Comtech EFData Part # HW/10-32X3/8 P.H.
1	Panel, Hinge Latch  Comtech EFData Part # FP/5153	2	Latch, Slam, 1/4 Turn, Black Knob  Comtech EFData Part # LATCH04
2	Plate, Latch Striker  Comtech EFData Part # 5154	4	Spacer, 0.380 ID x 0.062 Thick, Fiber  Comtech EFData Part # SPC380F062
1		Back Mount (Hinged) Hardware Kit (Comtech EFData Part # KT/5274), which includes:	
Qty	Description	Qty	Description
4	1/4-20 x 1/4 Socket Head Shoulder Screw  Comtech EFData Part #HW/1/4-20X1/4SHSS		

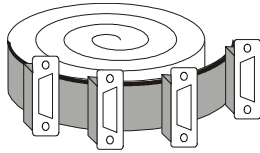
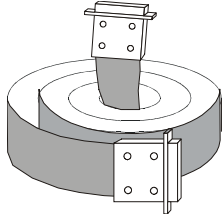
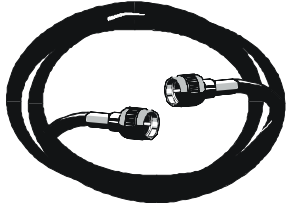
2.2.3 Top Mount Hardware Kit

1 Top Mounting Hardware Kit (Comtech EFData Part # KT/5275), which includes:			
Qty	Description	Qty	Description
2	Bracket, Rack Mounted IF Chassis  Comtech EFData Part # FP/5272	6	4-40 x 3/8 Phillips™ Head Screw  Comtech EFData Part # HW/4-40X3/8P.H.
2	Bracket, Rack Mounted Switch Chassis  Comtech EFData Part # FP/5273	4	#10 Flat Washers  Comtech EFData Part # HW/10-FLT
4	10-32 x 3/8 Phillips™ Head Screw  Comtech EFData Part # HW/10-32X3/8P.H.	6	#4 Flat Washers  Comtech EFData Part # HW/4-FLT

2.2.4 Cables

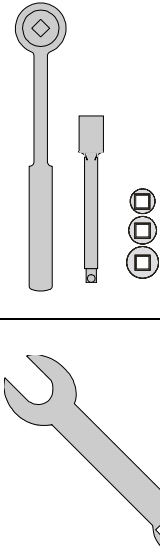
Notes:

1. The following QTY represents the minimum number of cables. Addition prime and backup modems will require additional cables.
2. Contact Comtech EFData Sales department for information regarding the price and availability of the cables.

1		Required cables for rack installation, include:	
Qty	Description	Qty	Description
1	Cable Assembly, Control, w/Termination  <i>Comtech EFData Part # CA/0755</i>	2	Cable Assembly, 50-pin DSB (M to M)  <i>Comtech EFData Part # CA/0737-X</i>
4	Cable Assembly, IF BNC  <i>Comtech EFData Part # CA/0813-X</i>		

2.2.5 Tools Required

Qty	Description
1	3/8 inch (9 mm) drive ratchet.
1	3 x 3/8 inch (76 x 9 mm) drive extension.
1	1/2 x 3/8 inch drive socket. <i>(Metric equivalent: 13mm, 6 pt.)</i>
1	3/8 x 3/8 inch drive socket. <i>(Metric equivalent: 9mm, 6 pt.)</i>
1	1/4 x 3/8 inch drive socket. <i>(Metric equivalent: 6mm, 6 pt.)</i>
1	1/2 inch combination wrench. <i>(Metric equivalent: 13mm combination wrench with a 6 pt. box end.)</i>



2.3 Mounting

Prior to installing the switch in the customer equipment rack, an appropriate mounting configuration must be defined. The switch components are designed for a variety of mounting options to accommodate different user requirements.

The Switch Control Unit (SCU) chassis is a one unit (1U), 19-inch (48.3 cm) rack-mountable unit intended for mounting at eye level in the front of the rack. The keypad and display on the front panel of the SCU provide single-point control for all modems associated with the switch, as well as for the switch.

The Data Switch Unit (DSU) and IF Unit (IFU) chassis may be mounted in various ways. User application requirements determine which rack mounting option is used. The two basic mounting locations are:

- Top mount
- Back mount

2.3.1 Description

2.3.1.1 Top Mount

This installation is intended for ceiling-routed cables, where terrestrial data harnesses conveniently enter from the top of the rack. Installed on standard 19-inch (48.3 cm) rails through an opening in the top of the rack, with the terrestrial interfaces facing up, this configuration provides direct access to terrestrial data and IF ports at the top of the rack, minimizing cabling within the rack.

2.3.1.2 Back Mount

This installation is intended for configurations where terrestrial data cables enter the top and/or bottom of the rack. A back mount (hinge) kit is used to facilitate installation and service access. The DSU and IFU are mounted directly inside the rear door of the rack. The hinged switch chassis, when pitched out at the rear of the rack, provides access to both the rear of the front panel-mounted equipment and the inside face of the switch.

2.3.2 Installation

2.3.2.1 Switch Control Unit

The Switch Control Unit (SCU) arrives fully assembled from the factory. After unpacking the switch, install the switch control unit into the equipment rack and secure with customer-furnished hardware.

2.3.2.2 Top Mount Installation

The Top Mount Hardware Kit (KT/5275) is for fixed-mounting the Data Switch Unit (DSU) and Intermediate Frequency Switch Unit (IFU) to a standard equipment rack rails. Kit components are listed in Section 2.2.

Although top mounting can be employed wherever there is clearance within the rack, it provides a convenient external rack interface for both terrestrial data and IF signals that are routed from the ceiling.

Assemble the DSU and IFU as shown in Figure 2-1 and as follows:

1. Install Bracket (FP/5272) on the IFU and secure with 6 screws and flat washers.
2. Install Bracket (FP/5273) onto the DSU and secure with 8 screws and flat washers.
3. Position unit into the rack and secure with customer-furnished hardware.

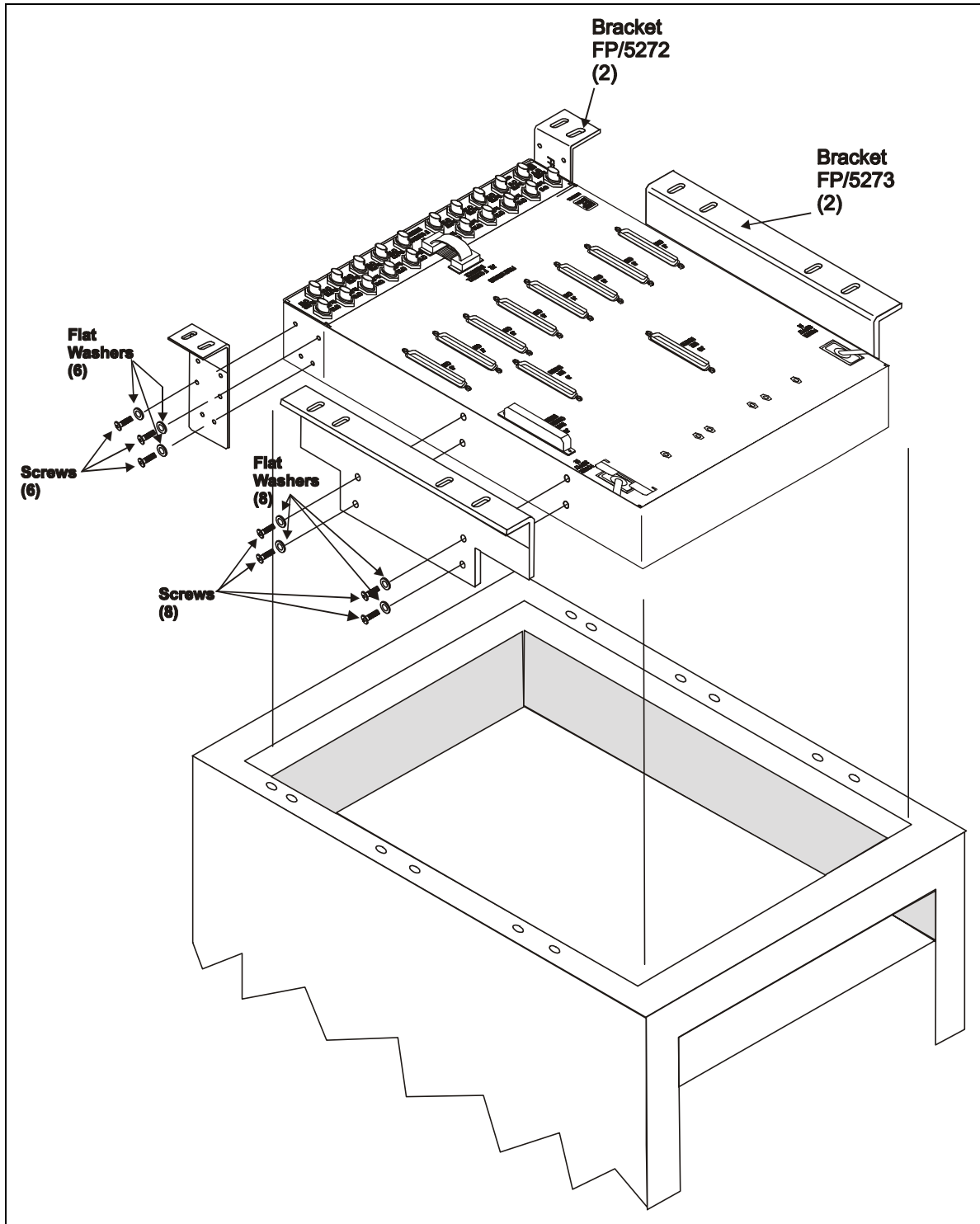


Figure 2-1. Top Mount Installation

2.3.2.3 Back Mount Installation

The back mount (hinge) feature provides ready access for installation and service, while making efficient use of rack volume. The Back-Mount Hardware Kit (KT/5274) is intended for (but not restricted to) use in rear-mount applications where clearance and access might create difficulty. Kit components are listed in Section 2.2.

The DSU and IFU must be secured prior to installation into the equipment rack. The hinge is mounted to the attached base plate of the DSU). The latch plates are mounted to the attached base plate. The DSU can be directly mounted behind the SCU and the prime, and backup modems that it services.

Note: This mounting requires the use of right-angle backshells for both the modem and terrestrial data cables.

Assemble the DSU and IFU as shown in and as follows:

1. Position IFU on DSU and secure with four Phillips™ screws.
2. Install the Top Plate (FP/5153) to the IFU and secure with four 1/2-inch socket screws and flat washers.
3. Install plates (FP/5154) to the equipment rack at the level to connect to the top plate and secure with customer-furnished hardware.
4. Install base plate to the DSU and secure with four 1/2-inch socket screws and flat washers.
5. Install right Plate (FP/5152-1) to the base plate and secure with two socket screws and spacers.
6. Install left Plate (FP/5152-2) to the base plate and secure with two socket screws and spacers.
7. Install the assembled DSU and IFU to the equipment rack and secure with customer-furnished hardware.

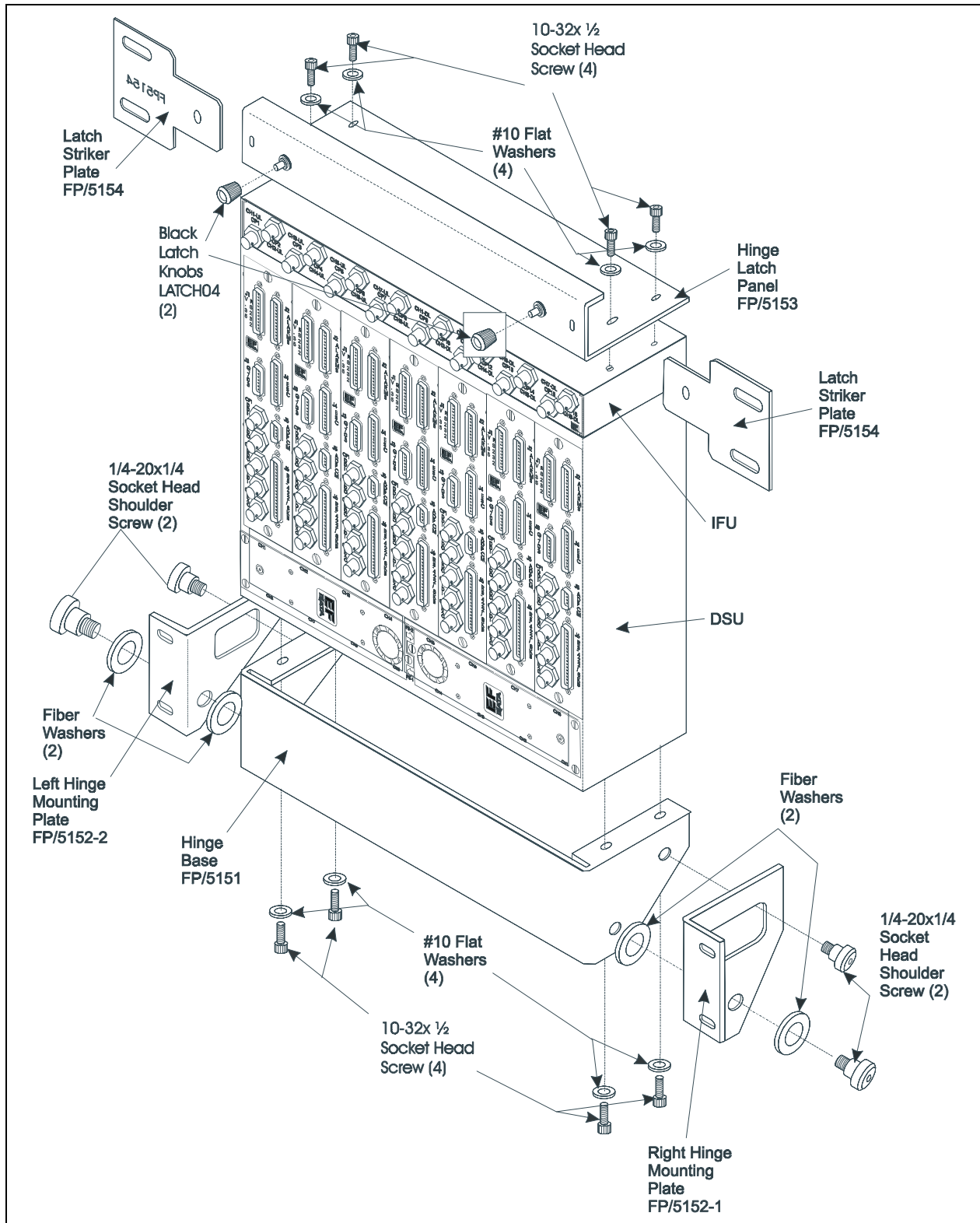


Figure 2-2. Back Mount (Hinge) Installation



Figure 2-3. Hinge Mount, Side View

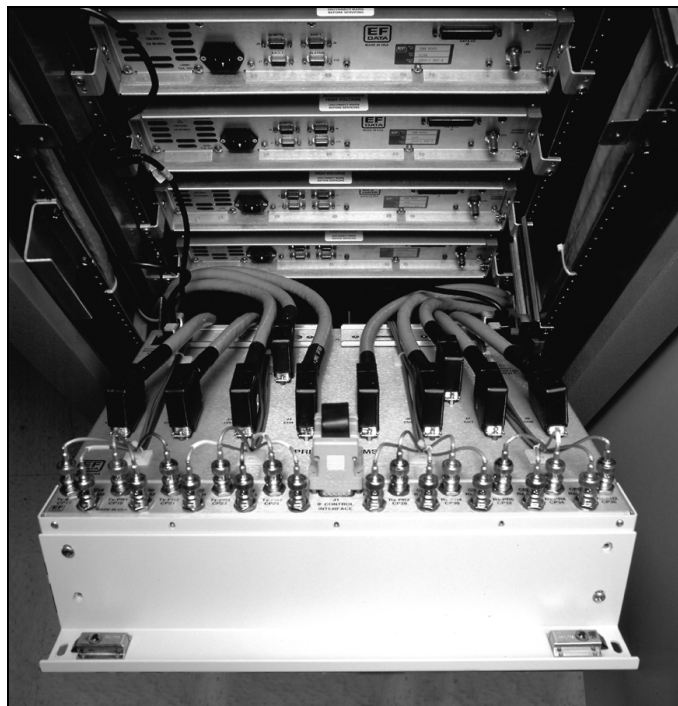


Figure 2-4. Hinge Mount, Top View

2.4 Cable Installation

2.4.1 Interconnecting the Switch Components

Refer to **Error! Reference source not found.** for typical cable installation.

The equipment rack is a mixed rack consisting of a SDM-6000 Satellite Modem serving as the prime and a SDM-300 Satellite Modem incorporating the 50-pin data interface, serving as the backup modem.

The SMS-7000 Switch is provided with two cables. All other cables are optional and the customer should contact Comtech EFData Customer Support for price and availability.

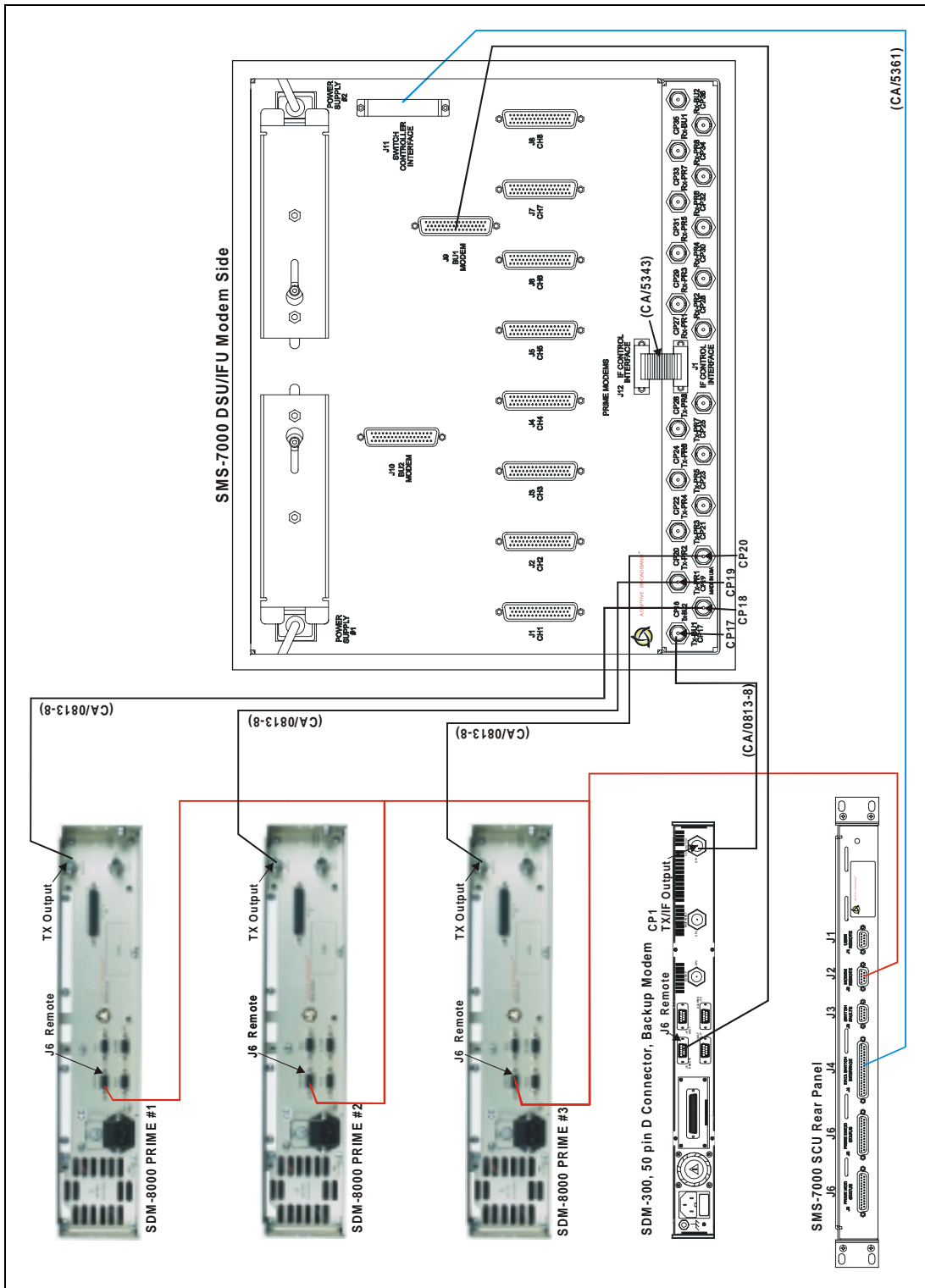


Figure 2-5. Typical Switch Installation

2.4.1.1 SCU (J4) to DSU (J11) Interface

Refer to Figure 2-5.

Cable Assembly Part No. CA/5361 is provide with the switch. This is a single cable interface between SCU Data Switch Interface J4 connector to the DSU Switch Controller Interface J11 connector. The cable carries modem alarms, power supply faults, the serial command link, and SCU power.

2.4.1.2 Remote Connection

Refer to Figure 2-5.

Option - Cable Assembly Part No. CA/0755 is offered by Comtech EFData. The remote serial interface J6 connector of each modem in the configuration is bussed to the SCU Modem Remote J2 connector.

This cable is a 9-pin D EIA-485 2-wire ribbon cable and must be connected before programming the switch configuration. The cable assembly is configured for:

- Baud Rate: 9.6 to 19.2K
- 7 Information bits
- Parity: Even
- 2 Stop bits

Note: Ensure the modems are all set to EIA-485 2-wire and that the baud rates match.

The ribbon cable assembly is used to query the configuration of modems, to set the configuration of the backup modem, and to verify the saved configuration of the modems. This data is used by the switch controller to set the position of the relays in the data modules.

2.4.1.3 DSU (J12) to IFU (J1)

Refer to Figure 2-5.

Cable Assembly Part No. CA/5343 is provided with the switch. This is a single cable interface between the two switching sections, J12 IF Control Interface on the DSU and J1 IF Control Interface on the IFU. The cable carries EIA-485 at 9600 baud, control signals, and power.

2.4.1.4 DSU J9 (BU1) Modem Connector to Backup Modem

Refer to Figure 2-5.

Option – Cable Part No. CA/0737 is offered by Comtech EFData. This 50-pin cable is available in either straight hoods or right angle hoods. Refer to Table 2-1. This cable includes two faults, Mod and Demod, pins 49 and 33. The modems will ground the two pins when a No Fault condition exists. When either a Mod or Demod fault occurs, a line will either Open, with the 50-pin cable pulled Off, or +5 VDC that is allowed from the open collector fault circuit on the modem.

Table 2-1. 50-Pin Cable

Part No.	Length, ft	Type
CA/0737-2	2	Straight
CA/0737-4	4	Straight
CA/0737-4R	4	Right Angle
CA/0737-6	6	Straight
CA/0737-6R	6	Right Angle
CA/0737-8	8	Straight
CA/0737-8R	8	Right Angle
CA/0737-10	10	Straight

2.4.1.5 DSU JI CH to Prime Modem

Refer to Figure 2-5.

Option – Cable Part No. CA/0737 is offered by Comtech EFData.

2.4.1.6 IFU Connections (CP17 through CP36)

Refer to Figure 2-5.

Option – Cable CA/0813-8 is offered by Comtech EFData. Each prime and backup modem in the configuration has an RX and TX coaxial connection to the modem face of the IFU chassis. The switch and modems should have compatible characteristic IF impedances of either 75Ω or 50Ω. Miniature coax is recommended to facilitate harnessing.

2.5 Configuration Setup

This procedure will apply to the SDM-300, and current versions of the SDM-6000 and SDM-8000 modems.

Note: Communications shall be established between the switch controller and the modems. No visual activity will occur, however, relays may click and fault lamps may come on. Use UTILITY/MODEM CONTROL to take command of the operation.

2.5.1 Configure Rack Setup

Note: The EIA-485 bus on the ribbon cable will be frozen if any communications are set to EIA-232.

1. Check each modem for the following:
 - a. Remote Baud Rate: 9.6 or 19.2 kbit/s
 - b. Ribbon Cable: EIA-485 (2- or 4-wire)
 - c. Remote Address: Note
2. Check IF switch for the following:
 - a. Modem Remote Baud Rate: 9.6 or 19.2 kbit/s
 - b. Remote Address: Config the prime and backup modem to match.

3. Configure the switch controller, prime, and backup modems as follows:

- a. Go to CONFIG/BACKUP #1 and insert all parameters.

Notes:

- DEPENDENT switching is preferred and it is the only function to operate in the Drop and Insert application.
- The screen showing underlines will have to be filled in for the specific modems that are to be backed up.
- If a modem in the switch is required, but not to be backed up, then leave field blank.
- Turn MOD and DEMOD off on each prime modem, if the back up modem is not to emulate the prime modem. The switch controller will ignore the faults from the modem.

- b. Configure the prime modems.

- c. If Drop and Insert is the applications, then use Insert Clock as the RX Buffer. Select LOOP that states; INSERT DATA INPUT LOOP or NORMAL. Balance is for G.703 data cables that have different pairs.

- d. Set LOAD ALL MODEMS. Fault lamps should go off.

4. Set switch mode from OPERATION to AUTO.

5. Backup modem should go into REMOTE.

6. Set switch screen to SYSTEM STATUS/SWITCHING.

7. Test the configured protection system as follows:

- a. Crisscross the IF inputs on two prime modems.

- b. Ensure the two modems transfer data to each other in the protection system.

- c. Turn off the SDM-7000 switch to change data modules. If not, re-initialization of the switch controller may result.

2.5.2 Trouble Shoot Configuration

Refer to Table 2-2 for trouble shooting information.

Table 2-2. Trouble Shooting

Problem	Possible Cause	Remedy
Load comes up with a MOD or DEMOD configuration error.	<ol style="list-style-type: none"> 1. Switch controller not communicating to the modems. 2. Backup modem cannot match all the commands as the prime mode. 	<p>Switch controller will query the modems with a MCP and DCP command. Data will be stored and compared with backup modem. If no match, perform the following:</p> <ol style="list-style-type: none"> 1. Rack contains mixed modems. One modem is high power and one is normal power out. Set modems to ≤ -5 dBm . 2. Software version numbers are not compatible. Upgrade the firmware as necessary. 3. SDM-8000 is emulating an SDM-6000 and SDM-300 emulating an SDM-6000. Reconfigure rack with specific modems. (SDM-8000 will backup an SDM-6000, and the SDM-300 will backup SDM-300 modem.) 4. Ensure communications to the modem are operational.
A flashing number and the letter 'F' appears.	Reporting an open cable and is reporting a fault.	<p>Backup modem will indicate a 'B' and either a -, *, or ↑.</p> <p>The - indicates; Backup modem is ready to take command for a specific modem.</p> <p>The * indicates; Backup modem is undergoing remote configuration.</p> <p>The ↑ indicates; Backup modem has taken command for a specific prime mode.</p>

2.6 DSU Data Connections (J1 through J10)

There are 10 data cables between the modem face of the DSU and 10 possible modems associated with the switch. Each of the eight prime modems has an associated data cable connector, CH1 through CH8 (J1 through J8). The two backup modems are connected with data cables to BU1 and BU2 (J9 and J10). The cable terminations are 50-pin male D connectors. The signal/pin assignments, as they occur for each data configuration, are listed in Table 2-3.

Table 2-3. DSU Data Connections (J1 through J10)

Signal Name						
Pin #	Overhead Type			SDM-100 and No Overhead		
	IBS	IDR	D&I	EIA-422	V.35	EIA-232
1	GND	GND	GND	GND	GND	GND
2	GND	GND	GND			
3	AGC-OUT	AGC-OUT	AGC-OUT			
4	TXD-B	8K-TXO-A				
5	TXD-A	8K-TXO-B				
6	RXD-B	8K-RXO-A				
7	RXD-A	8K-RXO-B				
8	RS422RXO-A	BWO1-C				
9	RS422RXO-B	BWO2-C				
10	PRI-COM	BWO3-C				
11	SEC-COM	BWO4-C				
12	SCTE/TT-A	BWI-1		TT-A	SCTE-A	TT
13	SCTE/TT-B	BWI-2		TT-B	SCTE-B	
14	RS422TXO-A	BWI-3				
15	RS422TXO-B	BWI-4				
16		DF-COM				
17		DMA				
18	G703_SDB	SD-B	DDI-B			
19	EXC-B	EXC-B	EXC_B	EXC-B	EXC-B	
20	G703_RDB	RD-B	IDO-B			
21	SCT/ST-A	8K-TXC-A		ST-A	SCT A	ST
22	SCT/ST-B	8K-TXC-B		ST-B	SCT B	

Table 2-3. DSU Data Connections (J1 through J10) (Continued)

Signal Name						
Pin #	Overhead Type			SDM-100 and No Overhead		
	IBS	IDR	D&I	EIA-422	V.35	EIA-232
23	SCR/RT-A	8K-RXC-A		RT-A	SCRA	RT
24	SCR/RT-B	8K-RXC-B		RT-B	SCRB	
25	TXCK	BWO1-NC				
26	RXCK	BWO2-NC				
27	PRI-NC	BWO3-NC				
28	SEC-NC	BWO4-NC				
29	RTS-B	A1I-B		RTS-B		
30	RR-B	A1O-B		RR-B		
31	CTS-B	A2I-B		CTS-B		
32	DM-B	A2O-B		DM-B		
33	DMD-FLT	DMD-FLT	DMD-FLT			
34	G703_SDA	SD-A	DDI-A			
35	EXC-A	EXC-A	EXC_A	EXC-A	EXC-A	EXT CLK
36	G703_RDA	RD-A	IDO-A			
37	SD-A	8K-TXD-A	DDO-A	SDA	SD-A	SD
38	SD-B	8K-TXD-B	DDO-B	SDB	SD-B	
39	RD-A	8K-RXD-A	IDI-A	RDA	RD-A	RD
40	RD-B	8K-RXD-B	IDI-B	RD-B	RD-B	
41	DSR/DM-A	BWO1-NO				
42		BWO2-NO				
43	PRI-NO	BWO3-NO				
44	SEC-NO	BWO4-NO				
45	RTS-A	A1I-A		RTS-A	RTS	RTS
46	RLSD/RR-A	A1O-A		RR-A	RLSD	RR
47	CTS-A	A2I-A		CTS-A	CTS	CTS
48	DSR/DM-A	A2O-A		DM-A	DSR	DM
49	MOD-FLT	MOD-FLT	MOD-FLT			
50		DF-NO				

2.6.1 SCU Rear Panel

Refer to **Error! Reference source not found.**

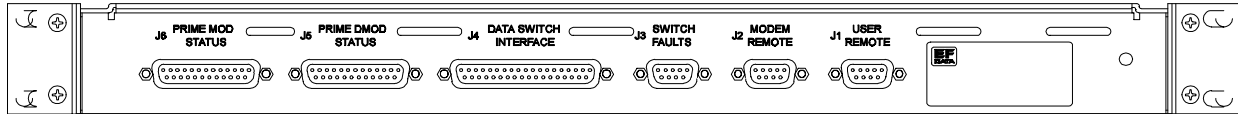


Figure 2-6. SCU Rear Panel

2.6.1.1 User Remote (J1)

This port is connected to a control device, such as a terminal or personal computer. The control device then communicates with the switch and associated modems using the protocol defined in Appendix A. The user remote interface can be an EIA-485 or EIA-232, 110 to 19200 baud. The connector is a 9-pin female D with the pinouts as shown in Table 2-4.

Table 2-4. User Remote EIA-485/EIA-232 Connector (J1)

Pin #	EIA-485		EIA-232
	4-Wire	2-Wire	
1	GND	GND	GND
2			RD
3			TD
4	+TX	+RX/TX	
5	-TX	-RX/TX	GND
6			DSR
7			RTS
8	+RX	+RX/TX	CTS
9	-RX	-RX/TX	

2.6.1.2 Modem Remote (J2)

The modem remote interface is a 2-wire EIA-485, 9600, or 19200 baud. The connector is a 9-pin female D, with the pinouts as shown in Table 2-5.

Table 2-5. Modem Remote EIA-485 Connector (J2)

Pin #	Signal Name
1	GND
2	Unused
3	Unused
4	+RX/TX
5	-RX/TX
6	Unused
7	Unused
8	+RX/TX
9	-RX/TX

2.6.1.3 Switch Faults (J3)

Switch fault outputs on this connector are provided by Form C relay contacts for status monitoring.

- Controller Fault is indicated by a Common-to-Normally Closed contact closure, activated if the controller loses power.
- M:N faults are indicated by a Common-to-Normally Open contact closure, activated in the event of any fault registered in the Fault Alarm Menus.

Maximum relay contact current is 1A at 30 VDC.

The connector is a 9-pin female D with the pinouts as shown in Table 2-6.

Table 2-6. Switch Faults Connector (J3)

Pin #	Signal Name
1	Controller Fault NO
2	Controller Fault COM
3	Controller Fault NC
4	M:N Fault NO
5	M:N Fault COM
6	M:N Fault NC
7	Spare 2 NO
8	Spare 2 COM
9	Spare 2 NC

2.6.1.4 Prime Mod (Online) Status (J6)

The prime mod (online) status to user connector provides Form C relay contact outputs for status monitoring. Online is indicated by a Common-to-Normally-Closed contact closure.

Maximum current is 1A at 30 VDC.

The connector is a 25-pin female D with the pinouts as shown in Table 2-7.

Table 2-7. Prime Mod Online Connector (J6)

Pin #	Signal Name
1	MOD 1 COM
2	MOD 1 NC
3	MOD 1 NO
4	MOD 2 COM
5	MOD 2 NC
6	MOD 2 NO
7	MOD 3 COM
8	MOD 3 NC
9	MOD 3 NO
10	MOD 4 COM
11	MOD 4 NC
12	MOD 4 NO
13	MOD 5 COM
14	MOD 5 NC
15	MOD 5 NO
16	MOD 6 COM
17	MOD 6 NC
18	MOD 6 NO
19	MOD 7 COM
20	MOD 7 NC
21	MOD 7 NO
22	MOD 8 COM
23	MOD 8 NC
24	MOD 8 NO
25	SIGNAL GND

2.6.1.5 Prime Mod (Online) Status (J5)

The prime mod (online) status to user connector provides Form C relay contact outputs for status monitoring. Online is indicated by a Common-to-Normally Closed contact closure. Maximum current is 1A at 30 VDC.

The connector is a 25-pin female D with the pinouts as shown in Table 2-8.

Table 2-8. Prime Demod Online Connector (J5)

Pin #	Signal Name
1	DMD 1 COM
2	DMD 1 NC
3	DMD 1 NO
4	DMD 2 COM
5	DMD 2 NC
6	DMD 2 NO
7	DMD 3 COM
8	DMD 3 NC
9	DMD 3 NO
10	DMD 4 COM
11	DMD 4 NC
12	DMD 4 NO
13	DMD 5 COM
14	DMD 5 NC
15	DMD 5 NO
16	DMD 6 COM
17	DMD 6 NC
18	DMD 6 NO
19	DMD 7 COM
20	DMD 7 COM
21	DMD 7 NO
22	DMD 8 COM
23	DMD 8 NC
24	DMD 8 NO
25	SIGNAL GND

2.6.2 DSU Terrestrial Data Interfaces

Refer to Figure 2-7.

Up to eight switch modules support the following terrestrial data interfaces.

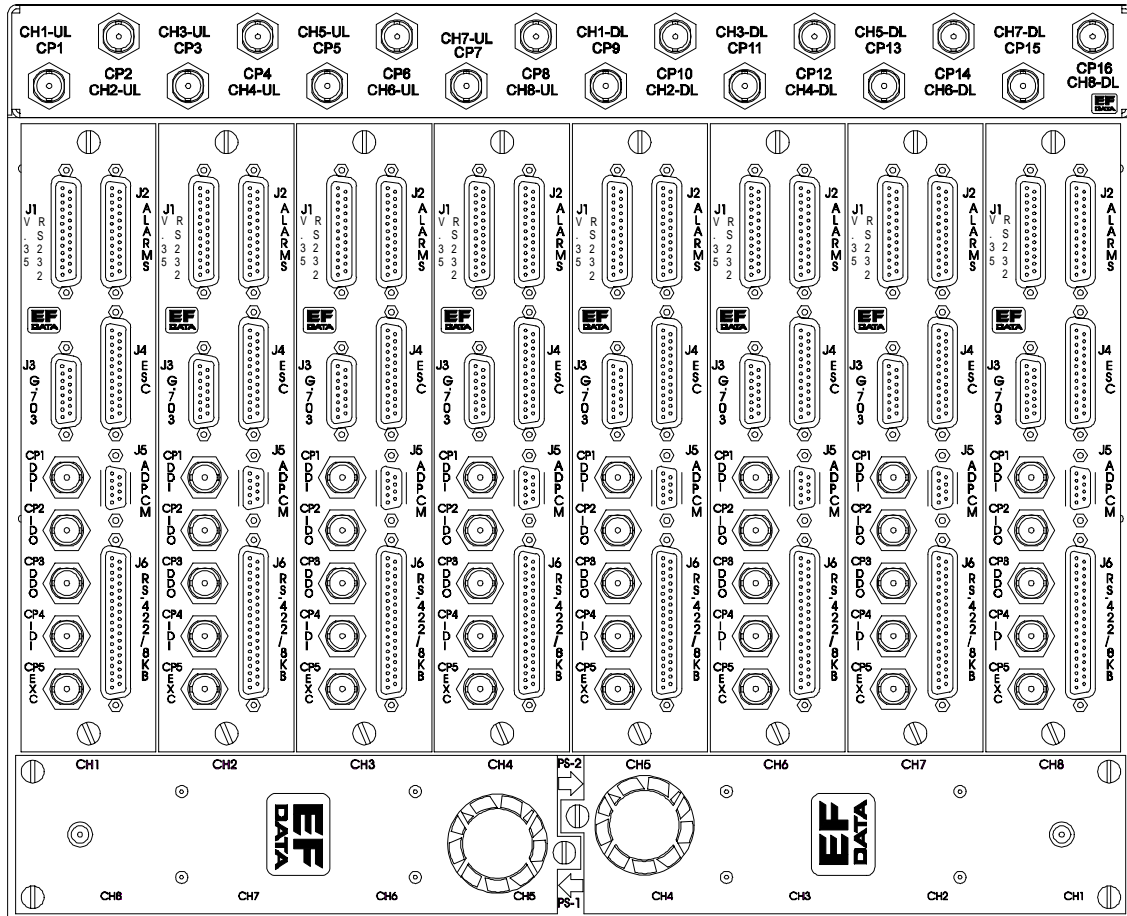


Figure 2-7. DSU/IFU Terrestrial Side

2.6.2.1 EIA-422/8 kbit/s Terrestrial Data (J6)

This data port is used for IBS-422 terrestrial data or IDR 8 kbit/s terrestrial overhead data. The connector is a 37-pin female D, with one connector per channel (Table 2-9).



When using this port for IBS or no overhead data, be certain there is no connection to the J1 (V.35) or J3 (G.703) ports. When using EIA-422 data, all data switch modules must have jumper JP1 in EIA-422 position (with jumpers connecting the middle pin and the pin closest to the front of the switch module).

Table 2-9. EIA-422 Terrestrial Data Connectors (J6)

Pin #	Signal Name		
	IBS	IDR	D&I
1	SHIELD	SHIELD	
2			
3	RS422 TXO-A	8K TXO A	
4	SD A	8K TXD A	
5	ST A	8K TXC A	
6	RD A	8K RXD A	C
7	RTS A	RTS A	A
8	RT A	8K RXC A	B
9	CTS A	CTS A	L
10			E
11	DM A	N/C	
12			R
13	RR A	N/C	E
14			M
15	EXC A	8K RXO A	O
16	RS422 RXO A	N/C	V
17	TT A	N/C	E
18			D
19	GND	GND	
20	GND	GND	
21	RS422 TXO-B	8K TXO B	

Table 2–9. EIA-422 Terrestrial Data Connectors (J6) (Continued)

Pin #	Signal Name		
	IBS	IDR	D&I
22	SD B	8K TXD B	
23	ST B	8K TXC B	
24	RD B	8K RXD B	
25	RTS B	RTS B	A
26	RT B	8K RXC B	L
27	CTS B	CTS B	
28			
29	DM B	N/C	
30			
31	RR B	N/C	
32			
33	EXC B	8K RXO B	
34	RS422 RXO B	N/C	
35	TT B	N/C	
36			
37	GND	GND	

2.6.2.2 V.35/EIA-232-C Terrestrial Data (J1)

The V.35 terrestrial data connector (one of three IBS data options) is a 25-pin female D, with one connector per channel (refer to Table 2-10).



When using this port, be certain there is no connection to the J6 (EIA-422) or J3 (G.703) ports. When using EIA-232 data, all data switch modules must have jumper JP1 in EIA-232 position (with jumpers connecting the middle pin and the pin furthest from the front of the switch module). For V.35, all jumpers must be in EIA-422 position.

Table 2-10. V.35/EIA-232 Terrestrial Data Connectors (J1)

Pin #	Signal Name			
	IBS V.35	IDR	D&I	EIA-232-C
1	SHIELD			SHIELD
2	SD A			SD
3	RD A			RD
4	RTS	C	C	RTS
5	CTS	A	A	CTS
6	DSR	B	B	DM
7	SIG GND	L	L	SIG GND
8	RLSD	E	E	RR
9	SCR B			EXT CLK
10				
11	SCTE B			
12	SCT B	R	R	
13		E	E	
14	SD B	M	M	
15	SCT A	O	O	ST
16	RD B	V	V	
17	SCR A	E	E	RT
18		D	D	
19				
20	EXC A			
21				
22				
23	EXC B			
24	SCTE A			(TT)
25			A	

Note: For all eight switch modules, JP1 must be either set all EIA-232 or all EIA-422/V.35/G.703 (JP1 set in the EIA-422/V.35/G.703 position works for most applications).

2.6.2.3 Engineering Service Channel Data (J4)

The engineering service channel data connector is a 25-pin female D for IBS and D&I data service. There is one connector per channel. The pinouts are shown in Table 2-11.

Table 2-11. Engineering Service Channel Data Connectors (J4)

Pin #	Signal Name		
	IBS	IDR	D&I
1	SHIELD		SHIELD
2	TXD A		TXD A
3	RXD A		RXD A
4	RTS/CTS	C	RTS/CTS
5	RTS/CTS	A	RTS/CTS
6	DSR	B	DSR
7	GND	L	GND
8		E	
9			
10			
11		R	
12		E	
13		M	
14	TXD B	O	TXD B
15	TXCK	V	TXCK
16	RXD B	E	RXD B
17	RXCK	D	RXCK
18			
19			
20	EXC A		
21			
22			
23	EXC B		
24	SCTE A		(TT)

2.6.2.4 Alarms (J2)

The Alarms (J2) interface accommodates alarms as defined by IBS, IDR, and D&I data formats. A relative demodulator signal strength (AGC_OUT) is also provided on this connector. The alarms connector is a 25-pin female D with one connector per channel. The pinouts are shown in Table 2-12.

Table 2-12. Alarms (J2) Connectors

Pin #	Signal Name		
	IBS	IDR	D&I
1	N/C	N/C	N/C
2	N/C	BWO1 C	N/C
3	N/C	BWO1 NC	N/C
4	N/C	BWO2 NO	N/C
5	PROMPT COM	BWO3 C	PROMPT COM
6	PROMPT NC	BWO3 NC	PROMPT NC
7	SERVICE NO	BWO4 NO	SERVICE NO
8	N/C	DF COM	N/C
9	N/C	DMA	N/C
10	N/C	BWI 2	N/C
11	N/C	BWI 4	N/C
12	N/C	N/C	N/C
13	AGC_OUT	AGC_OUT	AGC_OUT
14	GND	GND	GND
15	N/C	BWO1 NO	N/C
16	N/C	BWO2 C	N/C
17	N/C	BWO2 NC	N/C
18	PROMPT NO	BWO3 NO	PROMPT NO
19	SERVICE COM	BWO4 C	SERVICE COM
20	SERVICE NC	BWO4 NC	SERVICE NC
21	N/C	DF NO	N/C
22	N/C	BWI 1	N/C
23	N/C	BWI 3	N/C
24	N/C	N/C	N/C
25	GND	GND	GND
26	RT B	8K RXC B	L
27	CTS B	CTS B	

2.6.2.5 ADPCM Audio Data (J5)

The Adaptive Differential Pulse Code Modulation (ADPCM) audio data connector (as defined for the IDR data format) is a 9-pin female D with one connector per channel. The pinouts are shown in Table 2-13.

Table 2-13. ADPCM Audio Data (J5) Connectors

Pin #	Signal Name					
	IBS		IDR	D&I		64K
1	C		A1I A	C		SDA
2	O	R	A1O A	O	R	RTA
3	N	E	GND	N	E	GND
4	N	M	A2I B	N	M	STB
5	E	O	A2O_B	E	O	RDB
6	C	V	A1I B	C	V	SDB
7	T	E	A1O B	T	E	RTB
8	O	D	A2I A	O	D	STA
9	R		A2O A	R		RDA

2.6.2.6 Balanced G.703/Drop & Insert Data (J3)

Primary data for IDR and D&I as well as one of three IBS data options (balanced G.703/D&I data connector) is facilitated by using a 15-pin female D with one connector per channel. The pinouts are shown in Table 2-14.



When using this port for other than IDR data, be certain there is no connection to the J6 (EIA-422) or J1 (V.35) ports. When using G.703 data, all data switch modules must have jumper JP1 in EIA-422 position (with jumpers connecting the middle pin and the pin closest to the front of the switch module).

Table 2-14. Balanced G.703/Drop & Insert Data Connectors (J3)

Pin #	Signal Name		
	IBS	IDR	D&I
1	SD A	SD A	DDI-A
2	GND	GND	GND
3	RD A	RD A	IDO-A
4	GND	GND	GND
5	Open	Open	DDO-B
6	Open	Open	IDI-B
7	EXC_A	EXC_A	EXC_A
8	EXC_B	EXC_B	EXC_B
9	SD B	SD B	DDI-B
10	Open	Open	Open
11	RD B	RD B	IDO-B
12	Open	Open	DDO-A
13	Open	Open	IDI-A
14	Open	Open	Open
15	Open	Open	Open

2.6.2.7 Unbalanced Data Ports

Unbalanced data ports on 75Ω BNC coax connectors contain G.703, D&I, and external clock signals. These data ports also facilitate IBS, D&I, or IDR data. When selected from the control panel, the Unbalanced External Clock replaces the external clock signals on J1, J3, and J6. The pinouts are shown in Table 2-15.



When using the G.703 unbalanced data ports for other than IDR data, be certain there is no connection to the J6 (EIA-422) or J1 (V.35) ports. When using G.703 data, all data switch modules must have jumper JP1 in EIA-422 position (with jumpers connecting the middle pin and the pin closest to the front of the switch module).

Table 2-15. Unbalanced Data Connectors

Pin #	Signal Name		
	IBS	IDR	D&I
CP1	G.703 SD	G.703 SD	DDI
CP2	G.703 RD	G.703 RD	IDO
CP3	Open	Open	DDO
CP4	Open	Open	IDI
CP5	EXC	EXC	EXC

2.6.3 IFU Uplink and Downlink IF (CP1 through CP16)

Each of eight channels has dedicated uplink and downlink ports located on the IFU, as shown in Table 2-16. These ports are BNC female, either 50Ω, or 75Ω, as required.

Table 2-16. IFU Uplink/IF Downlink Data Connectors

Connector Reference	Signal
CP1	CH1 Uplink
CP2	CH2 Uplink
CP3	CH3 Uplink
CP4	CH4 Uplink
CP5	CH5 Uplink
CP6	CH6 Uplink
CP7	CH7 Uplink
CP8	CH8 Uplink
CP9	CH1 Downlink
CP10	CH2 Downlink
CP11	CH3 Downlink
CP12	CH4 Downlink
CP13	CH5 Downlink
CP14	CH6 Downlink
CP15	CH7 Downlink
CP16	CH8 Downlink

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3 Chapter 3. OPERATION

This chapter defines the controls and procedures for configuration and operation of the protection switch.

Note: Familiarization with the front panel controls (Figure 3-1) and/or the related remote commands described in Appendix A is recommended.

3.1 Configuration

The configuration of the protection switch may be performed from the front panel, or from a terminal or personal computer connected to the protection switch remote port (J1).

Each front panel menu screen has corresponding remote commands. The front panel display menus are designed to guide the operator through the configuration process.

Note: Refer to the menu tables presented in this chapter for specific configuration information.

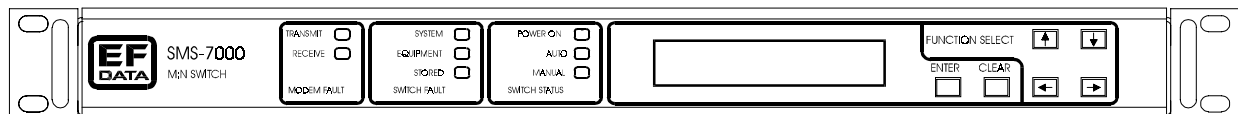


Figure 3-1. SMS-7000 Front Panel View

3.1.1 Backup Modems

The configuration of the backup modems (1 or 2) is usually performed first. Each backup is defined to switch either independently or dependently, as a function of RX or TX faults in the assigned prime modems.

A set of prime modems can be assigned using the backup configuration menu (refer to Figure 3-3). Individual prime MOD and DEMOD priority and delay options are available when the backup modem is intended to backup the MOD and DEMOD independently. The independent backup will only backup the modems that are selected in the set under the 'Backup #n Prime Modems' menu.

3.1.2 Prime Modems

When progressing into the prime modem (1 through 8) configuration menus, two possible menu sets are available: independent or dependent.

- If assigned to a backup designated as independent, the modem configuration menu set provides for setting the TX and RX parameters independently.
- If assigned to a dependent backup, no distinction is made between RX and TX in the menu.

3.2 Front Panel

The protection switch front panel (Figure 3-1) provides a local interface to configure, operate, and monitor the switch. For remote control operation information, refer to Appendix A.

The front panel features:

- 48-character, 2-line, back-lit Liquid Crystal Display (LCD).
- 6-key, user friendly keypad that provides a wide variety of functions.
- 8 Light-Emitting Diodes (LEDs) on the front panel to provide overall status at a glance.

3.2.1 LED Indicators

The eight LEDs on the front panel indicate the following (see Table 3-1):

Table 3-1. LED Indicators

Name	LED	Description
Status		
Power On	Green	Indicates that power is applied to the switch.
Auto	Green	Indicates the switch is automatically assigning backup modems.
Manual	Green	Indicates the backup modems are being assigned as directed by the user from the manual menu.
Switch Fault		
System	Red	Indicates a communications failure or a configuration anomaly between the switch and the attached modems. Specifics are displayed in the Fault/Alarm menu. For example, mixing modems (without paying attention to Table 1-1) in a rack will cause this fault, due to differences in the remote communications commands.
Equipment	Red	Indicates a communications failure between the switch modules or a detected fault within the switch hardware. Specifics are displayed in the Fault/Alarm menu. For example, a power supply not plugged in will indicate this fault.
Stored	Yellow	Indicates that a fault occurrence has been logged and stored. Specifics are displayed in the Stored Fault/Alarms menu. The fault may or may not be active.
Transmit	Yellow	Indicates a faulted prime modulator which has not been backed up. The identity of the faulted modem(s) is displayed in the switch Fault/Alarm menu. Specifics are displayed in the Fault/Alarm menu of the individual modems. This fault clears when the faulted prime is backed up or when the fault is removed.
Receive	Yellow	Indicates a faulted prime demodulator which has not been backed up. The identity of the faulted modem(s) is displayed in the switch Fault/Alarm menu. Specifics are displayed in the Fault/Alarm menu of the individual modems. This fault clears when the faulted prime is backed up, or when the fault is removed.

3.2.2 Front Panel Controls

The switch is locally operated by using the front panel keypad, which consists of the following keys (see Table 3-2):

Table 3-2. Front Panel Keypad

Key	Description
[ENTER]	This key is used to select a displayed function, or to execute a change to the configuration.
[CLEAR]	This key is used to back out of a selection, or to cancel a configuration change which has not been executed by pressing [ENTER]. Pressing [CLEAR] generally returns the display to the previous selection.
[←] and [→]	These keys are used to move to the next selection, or to move the cursor for certain functions.
[↑] and [↓]	These keys are used primarily to change configuration data (numbers), but are also used at times to move from one section to another.

Whenever a key is pressed, the switch responds with a beep:

- A single beep indicates a valid entry (the appropriate action was taken).
- A double beep indicates an invalid entry.

3.3 Menu System

Refer to Figure 3-2 through Figure 3-12 to access and execute all functions. Use the main menu in Figure 3-2 as a quick reference for accessing the protection switch functions. Refer to Section 3.2 for further configuration details.

When the protection switch power is turned ON, the base level of the menu system displays the sign-on message:

- Line 1 of the sign-on message is the protection switch model number and type.
- Line 2 is the version number of the firmware.

The main level of the menu system is Function Select. To access this level from the sign-on message, press the [←] or [→] keys. From the Function Select menu, select one of the functional categories:

- Configuration
- System Status
- Faults/Alarms
- Stored Faults/Alarms
- Utility

Press [←] or [→] to move from one selection to another. When line 2 displays the desired function, select that level by pressing [ENTER]. After entering the appropriate functional level, press [←] or [→] to move to the desired function.

To view or change the configuration of the protection switch, enter the Configuration level from the Function Select menu. While in the Configuration menu, press [←] or [→] to scroll through the Configuration menu selection.

Press [ENTER] to select the desired Configuration menu option. To view the options for the selected configuration parameters, press [←] or [→]. To change a configuration parameter, press [ENTER] to begin the change process.

Press [↑] or [↓] to change the parameters. After the correct parameters are displayed, press [ENTER] to execute the change. This action initiates the necessary programming by the protection switch. To undo a parameter change prior to execution, press [CLEAR].

Notes:

1. Figure 3-2 through Figure 3-12 show the front panel menu window selections.
2. Menus or commands that are specific to certain protection switch configurations are only accessible after selecting the appropriate protection switch configuration. This prevents incompatible parameters from accidentally being selected.

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3.4 Front Panel Menu

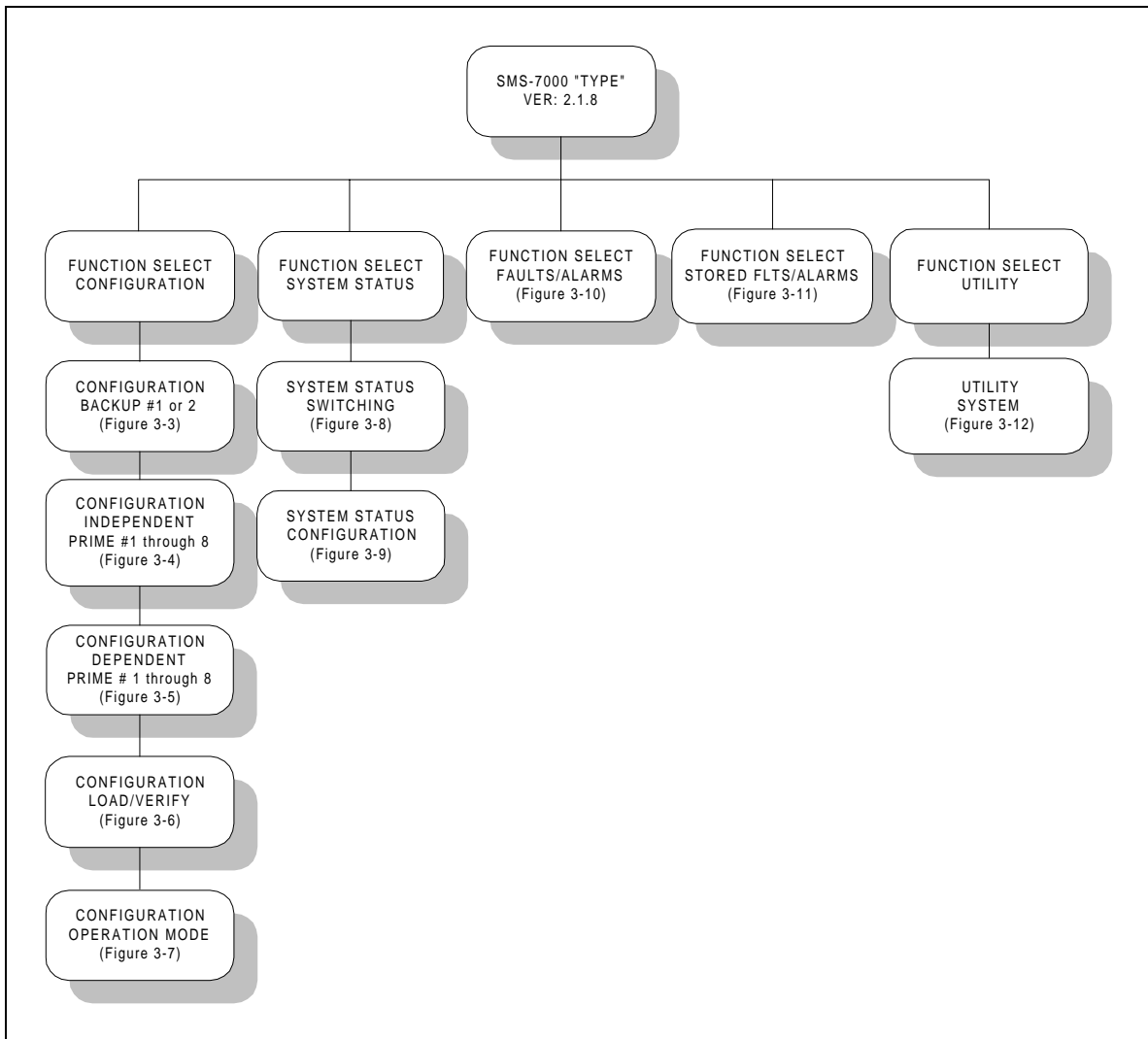


Figure 3-2. Main Menu

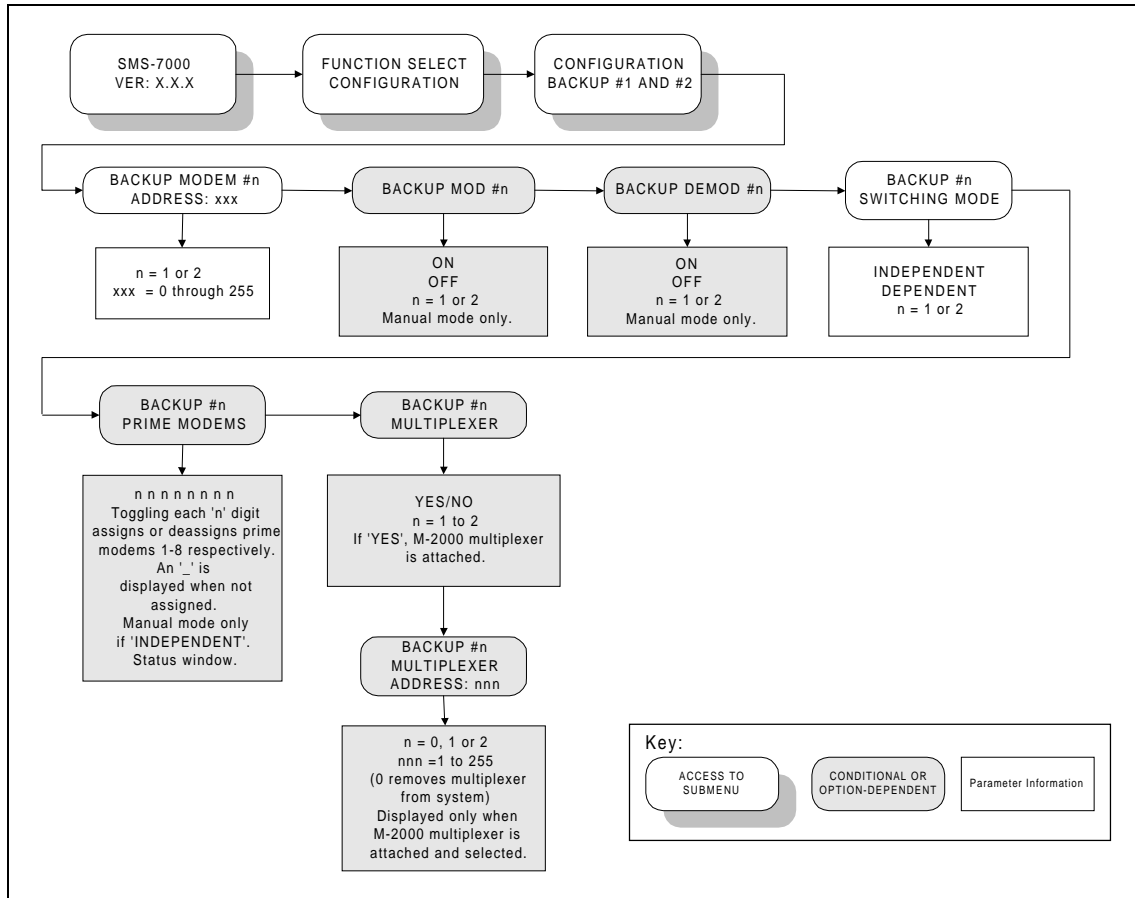


Figure 3-3. Configuration Backup 1 and 2 Menu

3.4.1 Configuration Backup 1 and 2 Menu

Refer to Figure 3-3.

BACKUP MODEM #n ADDRESS	<p>Set # other than 0. Numbers 9 or 10 are recommended when the protection system is full; two backups and eight prime modems. Address: 0 to 255.</p> <p>Note: Address 0 is reserved as a global address.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
BACKUP MOD #n	<p>Turn On or Off the switch to recognize that the Backup modulator status.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
BACKUP DEMOD #n	<p>Turn On or Off the switch to recognize that the Backup demodulator status.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
BACKUP #n SWITCHING MODE	<p>When a failure occurs, DEPENDENT mode switching will place the whole Prime modem to the Backup modem. When a failure occurs, INDEPENDENT switching will only switch half the modem; either the Modulator or the Demodulator.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
BACKUP #n PRIME MODEMS	<p>Place the Prime modem numbers in the spaces provided so that the Backup modem will only look to backup the identified prime modems. e.g., 1 _ 3 _ 5 _ _ . This example displays the Backup modem replacing modem #s 1, 3, and 5.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
BACKUP #n MULTIPLEXER	<p>Used when the Comtech EFDData M-2000 multiplexer is included in the modem set-up.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
BACKUP #n MULTIPLEXER ADDRESS	<p>Display status of multiplexer: 'YES or NO'.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>

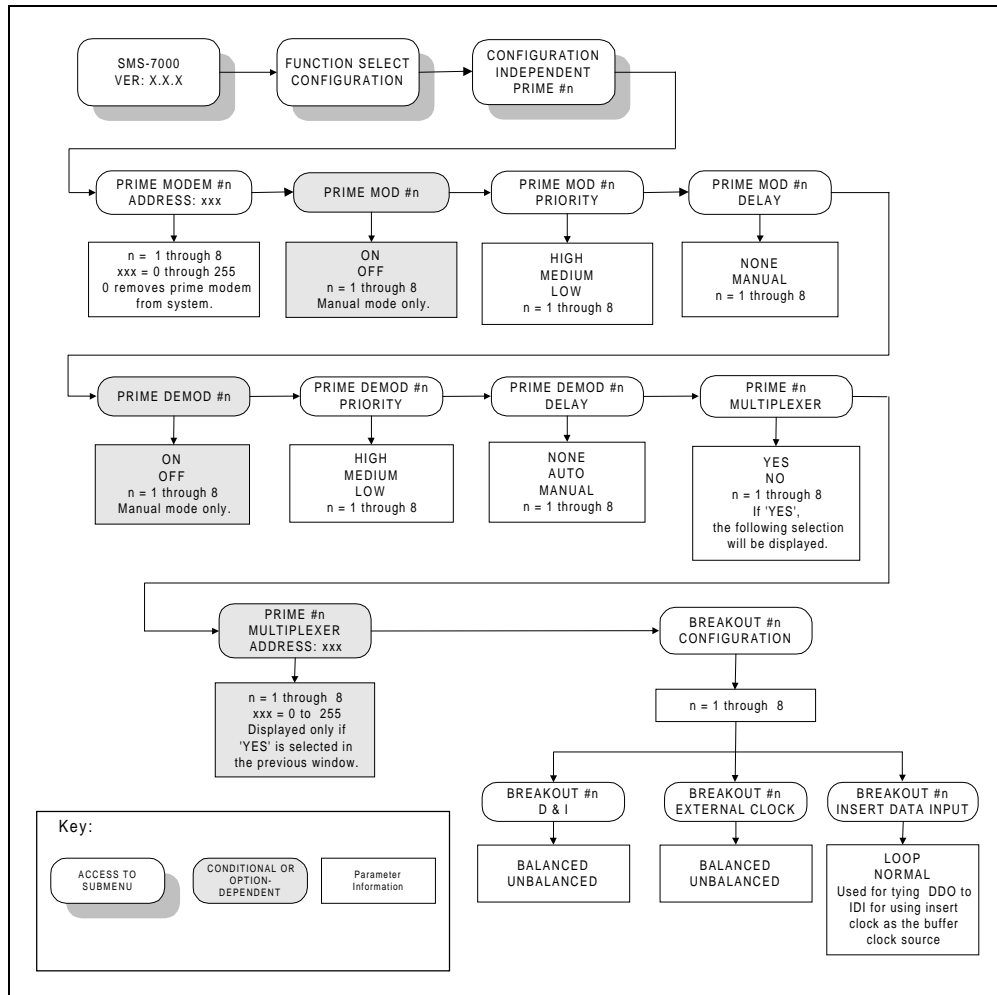


Figure 3-4. Configuration Independent Prime 1 through 8 Menu

3.4.2 Configuration Independent Prime 1 through 8 Menu

Refer to Figure 3-4.

PRIME MODEM #n ADDRESS	Set # other than 0. Address 0 is a global address which is used to communicate with all modems even though the address is set to something else. Address: 0 to 255 Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME MOD #n	Must be On for the switch to recognize it as active. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME MOD #n PRIORITY	Options: LOW, MEDIUM, and HIGH. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME MOD #n DELAY	NONE MANUAL = 0.5 to 127.0 SEC. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME DEMOD #n	Must be On for the switch to recognize it as active. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME DEMOD #n PRIORITY	Options: LOW, MEDIUM, and HIGH. Upon entry, the current status is displayed, Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME DEMOD #n DELAY	NONE AUTO MANUAL = 0.5 to 127.0 SEC. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME #n MULTIPLEXER	Displayed if multiplexer is; 'YES or NO.' Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME DEMOD #n MULTIPLEXER ADDRESS	Set # other than 0. Address 0 removes the multiplexer from the system. Address: 0 to 255 Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
<i>(Menu applies, only if multiplexer is attached.)</i>	

BREAKOUT #n CONFIGURATION	Press [ENTER] to access submenus.
D & I	Use the BNC connectors for Unbalanced. Use the DB15 connector for Balanced.
EXTERNAL CLOCK	Use the BNC connectors for Unbalanced. Use the DB15 connector for Balanced
INSERT DATA INPUT	Options: NORMAL or LOOP Loop will connect DDO to IDI for D & I operation. This allows operator to select "insert clock" as the buffer clock source.

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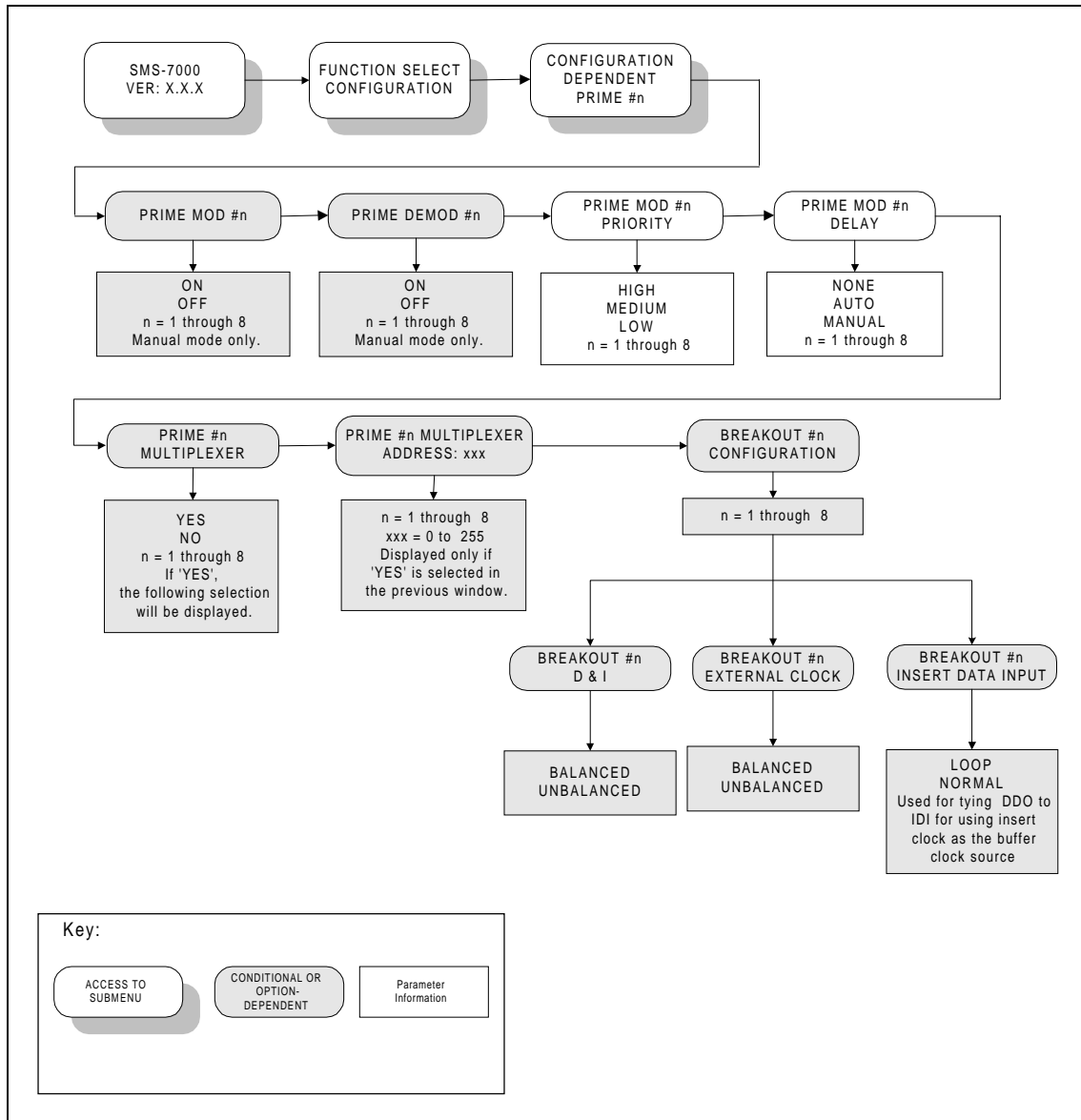


Figure 3-5. Configuration Dependent Prime 1 through 8 Menu

3.4.3 Configuration Dependent Prime 1 through 8 Menu

Refer to Figure 3-5.

PRIME MODEM #n ADDRESS	Set # other than 0. Address 0 is a global address. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME MOD #n	Must be On for the switch to recognize as active. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME DEMOD #n	Must be On for the switch to recognize as active. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME MODEM #n PRIORITY	Options: LOW, MEDIUM, and HIGH. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME MODEM #n DELAY	AUTO = 2 times sweep period MANUAL = 0.5 to 127.0 SEC. To switch properly in DEPENDENT mode, the Prime modem demods must have input from a source modem other than their own. Otherwise, when the delay is set to NONE, the switch will oscillate between prime and backup modems. This occurs because the output of the modulator has been interrupted while the whole modem attempts to switch. Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME #n MULTIPLEXER	Displayed if multiplexer is; 'YES or NO.' Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
PRIME DEMOD #n MULTIPLEXER ADDRESS <i>(Menu applies, only if multiplexer is attached.)</i>	Set # other than 0. Address 0 removes the multiplexer from the system. Address: 0 to 255 Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.
BREAKOUT #n CONFIGURATION	Press [ENTER] to access submenus.
D & I	Use the BNC connectors for Unbalanced. Use the DB15 connector for Balanced.
EXTERNAL CLOCK	Use the BNC connectors for Unbalanced. Use the DB15 connector for Balanced.
INSERT DATA INPUT	Options: NORMAL/LOOP Select LOOP if insert clock is selected as receive buffer clock source at the modem. This connects DDO to IDI. (Drop Data Out to Insert Data In).

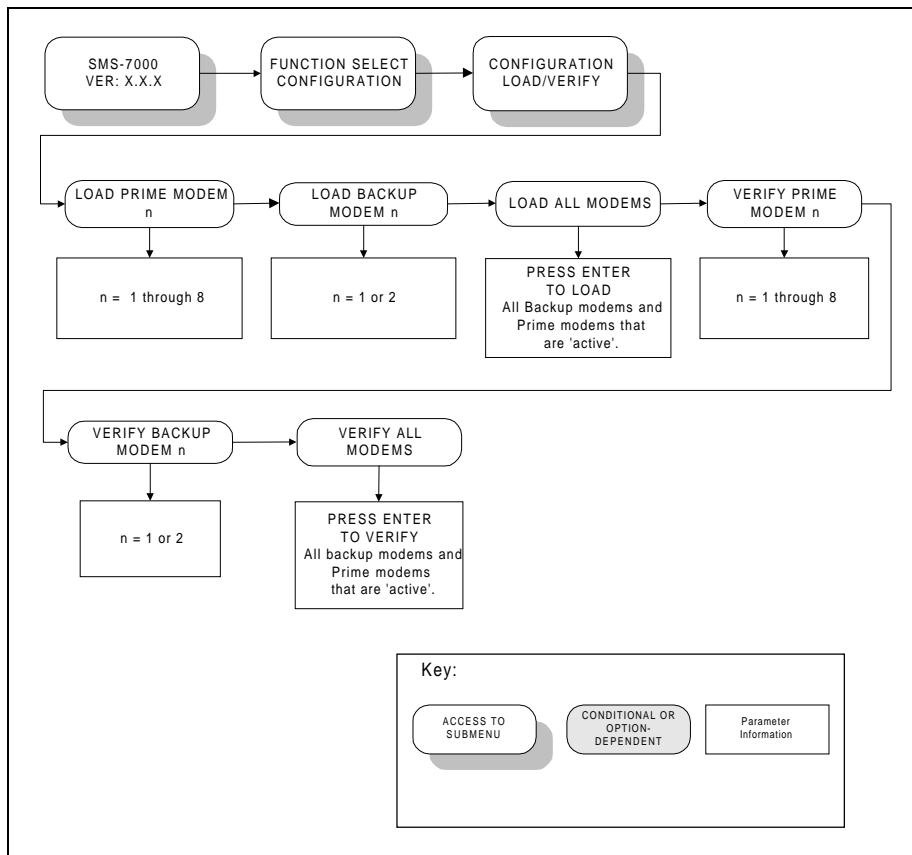


Figure 3-6. Configuration Load/Verify Menu

3.4.4 Configuration Load/Verify Menu

Refer to Figure 3-6.

LOAD PRIME MODEM n	Active modems only (use if configuration changes have been made for any one prime modem).
LOAD BACKUP MODEM n	Active modems only (use if configuration changes have been made to all prime modems).
LOAD ALL MODEMS	Active modems only. Press [ENTER] twice to load.
VERIFY PRIME MODEM n	Active modems only (used to verify that the modem configuration has not changed).
VERIFY BACKUP MODEM n	Active modems only.
VERIFY ALL MODEMS	Active modems only. Press [ENTER] twice to verify.

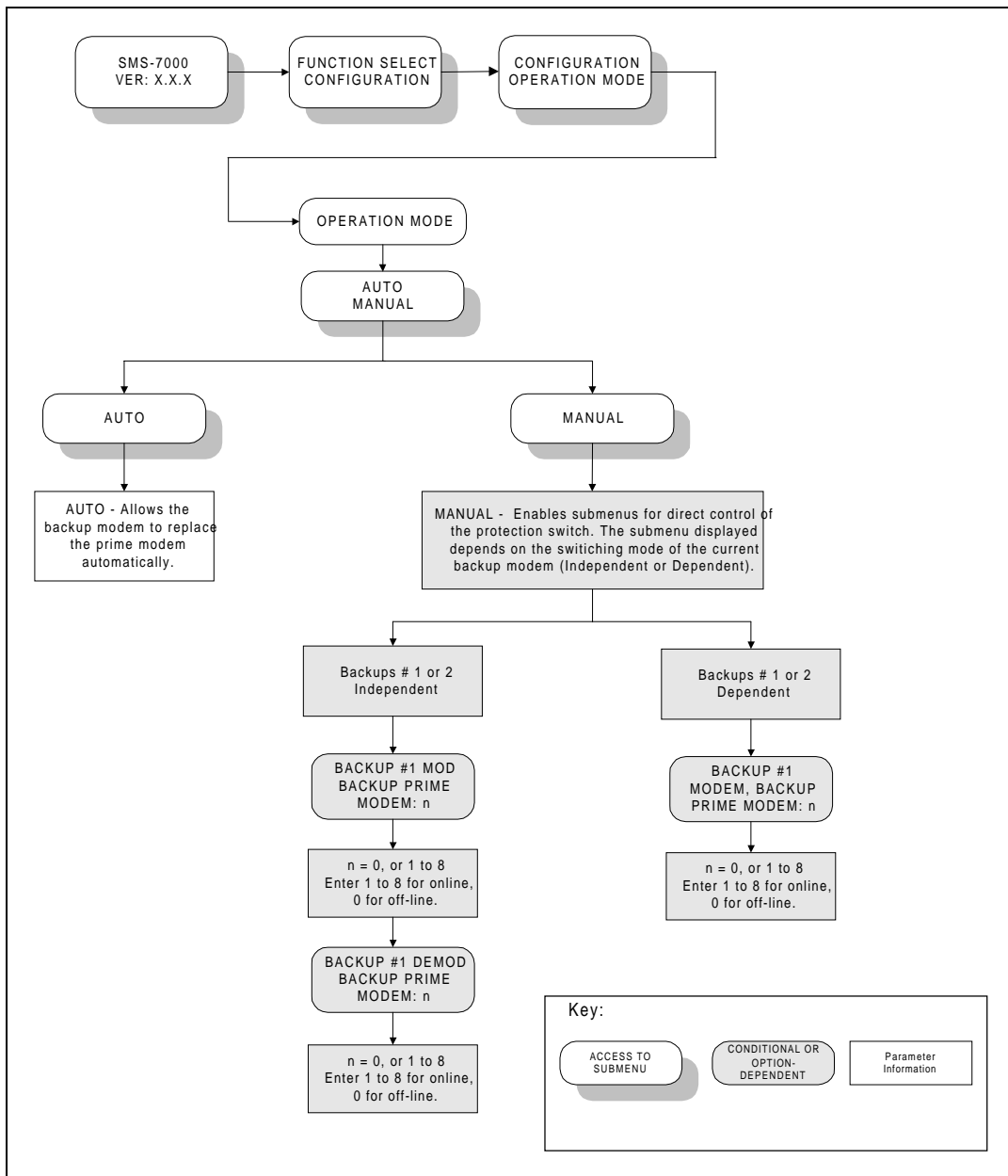


Figure 3-7. Configuration Operation Mode Menu

3.4.5 Configuration Operation Mode Menu

Refer to Figure 3-7.

Operation Mode	<p>AUTO or MANUAL</p> <p>If 'AUTO', the Backup modem automatically replaces the failed Prime modems.</p> <p>If 'MANUAL', a submenu is enabled for direct control of the protection switch. The submenu displayed depends on the switching mode of the current backup modem; i.e., INDEPENDENT or DEPENDENT.</p> <p>Upon entry, the current status is displayed. Press [↑] or [↓] to make the selection. Press [ENTER] to execute the change.</p>
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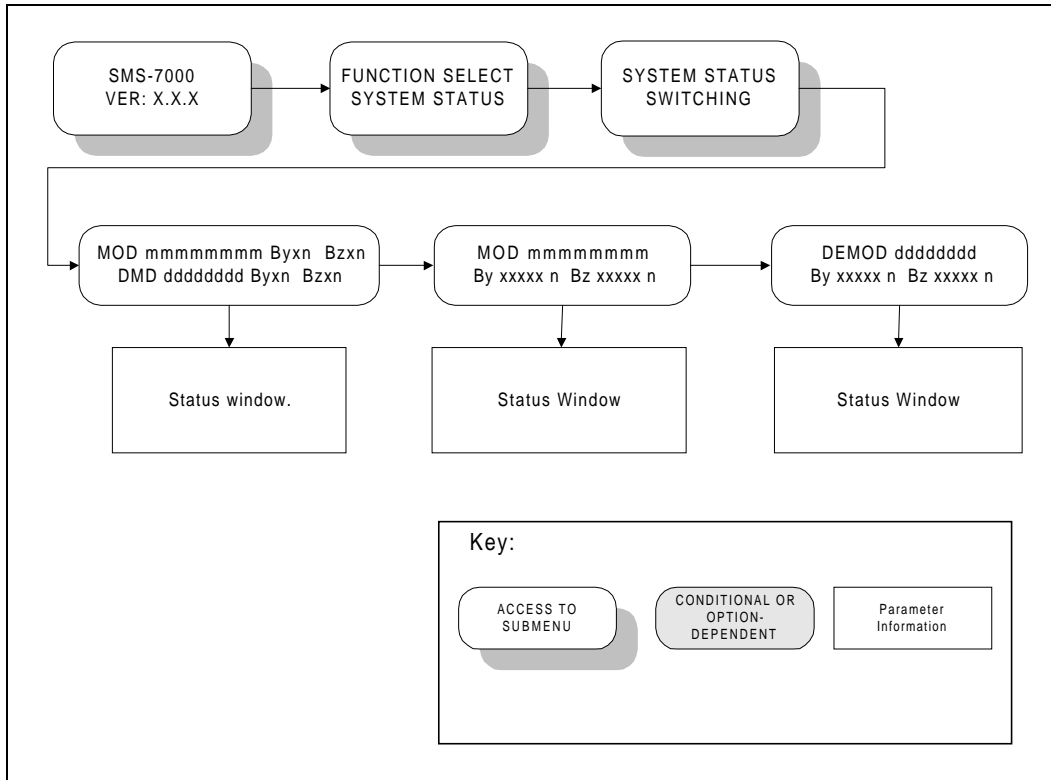


Figure 3-8. System Status Switching Menu

3.4.6 System Status Switching Menu

Refer to Figure 3-8.

<p>MOD mmmmmmmm Byxn Bzxn DMD dddddddd Byxn Bzxn</p>	<p>Status window. Displays summary of active prime Mods and online backup Mods on Line 1. Displays summary of active prime Demods and online backup Demods on Line 2. If a prime or backup Mod/Demod is faulted, an “F” alternates with Mod/Demod n # on display.</p> <p>Where: Mmmmmmmm = 1 through 8 active prime Mods/Demods. – = Not active. y = 1 backup Mod/Demod. z = 2 backup Mod/Demod. x = – if backup Mod/Demod is not online or HOT STANDBY. x = -> indicates prime Mod/Demod being backed up. x is blinking '-' indicates = transition to HOT STANDBY mode. x is blinking '->' indicates = Mod/Demod Backup operation in process.</p>
<p>MOD mmmmmmmm By xxxxx n Bz xxxxx n</p>	<p>Status window. One location for each active prime. (mmmmmmmm = 1 through 8.) '-' = if inactive. y = 1 backup Mod. z = 2 backup Mod. xxxxx = Condition of backup with respect to channel n: “STDBY” or “BCKUP”. (flashing if in process). n = Channel # for prime modem.</p>
<p>DEMODO dddddddd By xxxxx n Bz xxxxx n</p>	<p>Status window. One location for each active prime. (ddddddd = 1 through 8.) '-' = if inactive. y = 1 backup Demod. z = 2 backup Demod. xxxxx = Condition of backup with respect to channel n: “STDBY” or “BCKUP”. (flashing if in process). n = Channel #.</p>

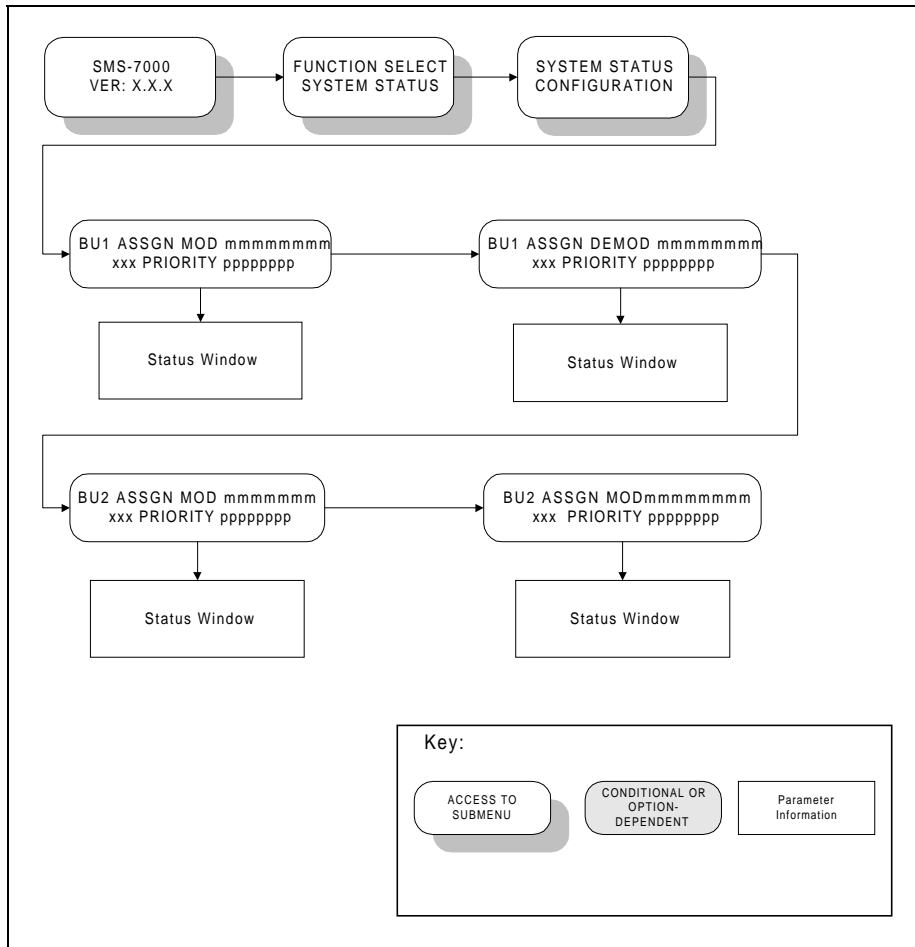


Figure 3-9. System Status Configuration Menu

3.4.7 System Status Configuration Menu

Refer to Figure 3-9.

<p>One of the following four menus sequences will be displayed based on current backup modem switching modes:</p> <ol style="list-style-type: none"> 1. Configuration: Backup #1 INDEPENDENT and Backup #2 INDEPENDENT 2. Configuration: Backup #1 INDEPENDENT and Backup #2 DEPENDENT 3. Configuration: Backup #1 DEPENDENT and Backup #2 INDEPENDENT 4. Configuration: Backup #1 DEPENDENT and Backup #2 DEPENDENT 	
<p>BU1 ASSGN MOD mmmmmmmm xxx PRIORITY pppppppp</p>	<p>Status window Where: mmmmmmmm = 1 through 8 active prime Mods. '-' = Not active. xxx = IND (Independent)/DEP (Dependent) active backup Mod switching mode. p= Active prime Mod priority. H = High. M = Medium. L = Low.</p>
<p>BU1 ASSGN DEMOD dddddddd xxx PRIORITY pppppppp</p>	<p>Status window. Where: dddddddd = 1 through 8 active prime Demods. '-' = Not active. xxx = IND (Independent)/DEP (Dependent) active backup Demod switching mode. p= Active prime Demod priority. H = High. M = Medium. L = Low.</p>
<p>BU2 ASSGN MOD mmmmmmmm xxx PRIORITY pppppppp</p>	<p>Status window. Where: mmmmmmmm = 1 through 8 active prime Mods. '-' = Not active. xxx = IND (Independent)/DEP (Dependent) active backup Mod switching mode. p= Active prime Mod priority. H = High. M = Medium. L = Low.</p>
<p>BU2 ASSGN DEMOD dddddddd xxx PRIORITY pppppppp</p>	<p>Status window. Where: dddddddd = 1 through 8 active prime Mods. '-' = Not active. xxx = IND (Independent)/DEP (Dependent) active backup Demod switching mode. p= Active prime Demod priority. H = High. M = Medium. L = Low.</p>

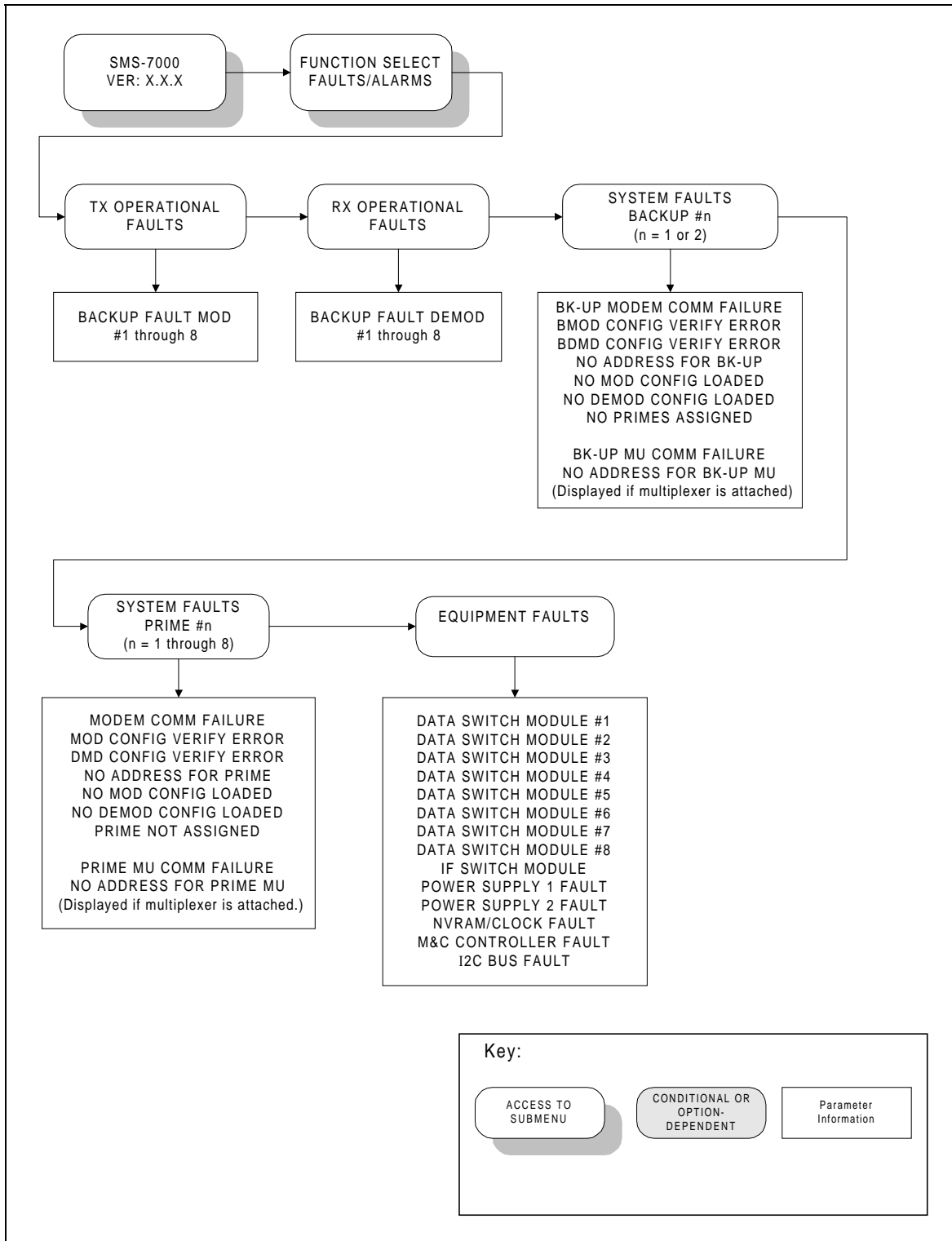


Figure 3-10. Faults/Alarms Menu

3.4.8 Faults/Alarms Menu

Refer to Figure 3-10.

TX OPERATIONAL FAULTS	n = prime modulators 1 to 8. If a number is present, the modulator is active, faulted, and not backed up. Fault indication clears when fault clears, or the <u>primary is successfully backed up.</u>
RX OPERATIONAL FAULTS	n = prime demodulators 1 to 8. If a number is present, the modulator is active, faulted, and not backed up. Fault indication clears when fault clears, or <u>primary is successfully backed up.</u>
SYSTEM FAULTS BACKUP #n (n = 1 or 2)	Faults are indicated by a + sign. Scroll to the + sign and press [ENTER] to see the fault condition. BK-UP MU COMM FAILURE and NO ADDRESS FOR BK-UP MU are displayed <u>only when the multiplexer is enabled.</u>
SYSTEM FAULTS PRIME #n (n = 1 through 8)	Faults are indicated by a + sign. Scroll to the + sign and press [ENTER] to see the fault condition. PRIME MU COMM FAILURE and NO ADDRESS FOR PRIME MU are displayed <u>only when the multiplexer is enabled.</u>
EQUIPMENT FAULTS	Faults are indicated by the + sign. Scroll to the + sign and enter to see the fault condition:

Note: Alerts to modem or switch faults are provided in several ways:

1. Indicators on the switch control panel with specifics available in the Faults/Alarms menu.
2. On demand via the switch remote port. Switch and modem fault information is available.
3. Audio and/or visual indicators wired directly to the switch fault and modem status ports on the rear of the SCU.

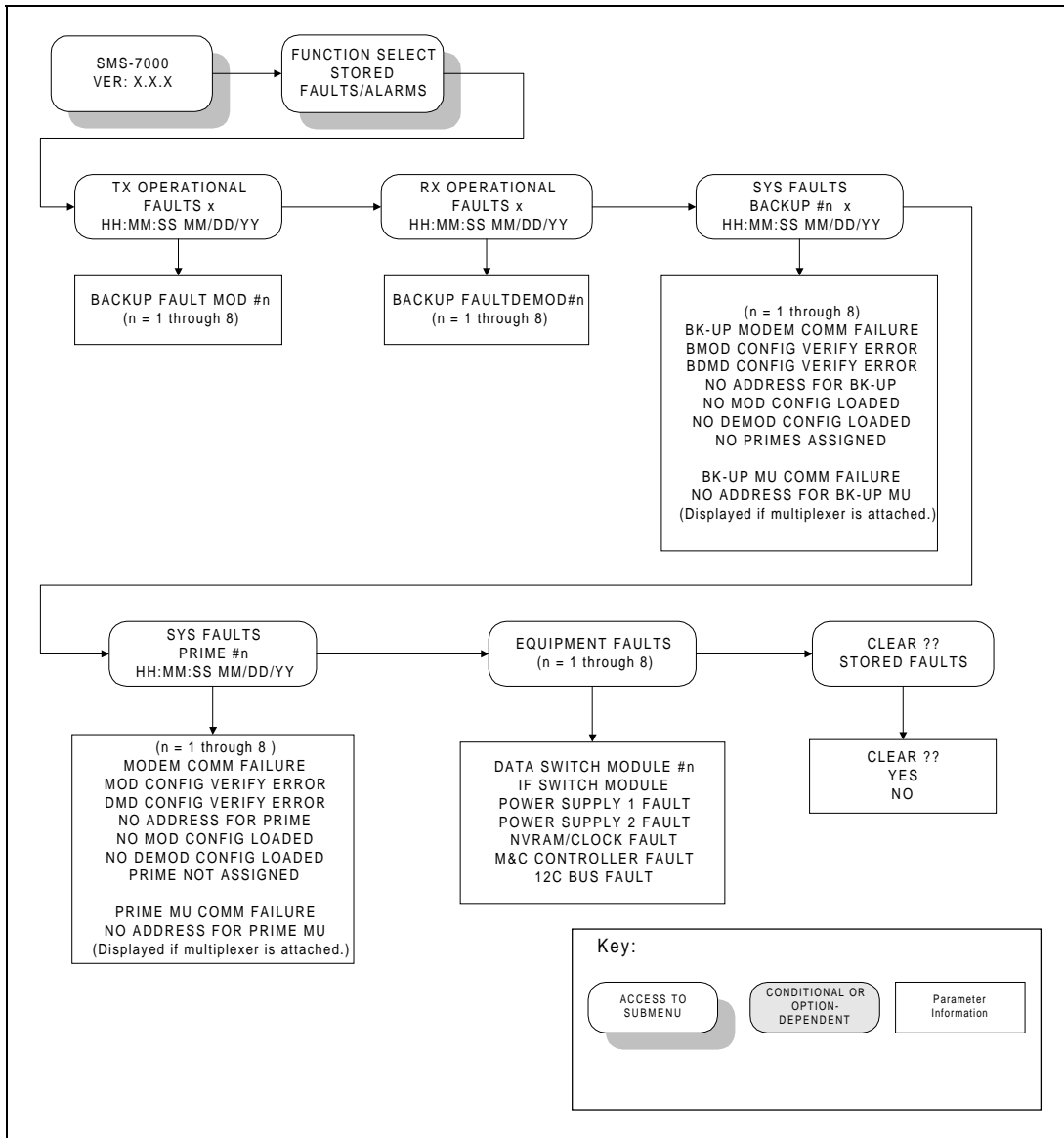


Figure 3-11. Stored Faults/Alarms Menu

3.4.9 Stored Faults/Alarms Menu

Refer to Figure 3-11.

TX OPERATIONAL FAULTS x HH:MM:SS MM/DD/YY	x = Number of events (0 to 9), where 0 is oldest. Time and date displayed if fault is recorded, otherwise displays "NO FAULT." Scroll up or down to see number of faults stored, up to 10. Press [ENTER] to see fault.
RX OPERATIONAL FAULTS x HH:MM:SS MM/DD/YY	x = Number of events (0 to 9), where 0 is oldest. Time and date displayed if fault is recorded, otherwise displays "NO FAULT." Scroll up or down to see number of faults stored, up to 10. Press [ENTER] to see fault.
SYS FAULTS BACKUP #n HH:MM:SS MM/DD/YY (n = 1 through 8)	x = Number of events (0 to 9), where 0 is oldest. Time and date displayed if fault is recorded, otherwise displays "NO FAULT." Scroll up or down to see number of faults stored, up to 10. Press [ENTER] to see fault. BK-UP MU COMM FAILURE AND NO ADDRESS FOR BK-UP MU displayed only if multiplexer is enabled.
SYS FAULTS PRIME #n HH:MM:SS MM/DD/YY (n = 1 through 8)	x = Number of events (0 to 9), where 0 is oldest. Time and date displayed if fault is recorded, otherwise displays "NO FAULT." Scroll up or down to see number of faults stored, up to 10. Press [ENTER] to see fault. PRIME MU COMM FAILURE and NO ADDRESS FOR PRIME MU displayed only if multiplexer is enabled.
EQUIPMENT FAULTS	x = Number of events (0 to 9), where 0 is oldest. Time and date displayed if fault is recorded, otherwise displays "NO FAULT." Scroll up or down to see number of faults stored, up to 10. Press [ENTER] to see fault.
CLEAR ?? STORED FAULTS	YES or NO. Press [ENTER] twice to clear stored faults.

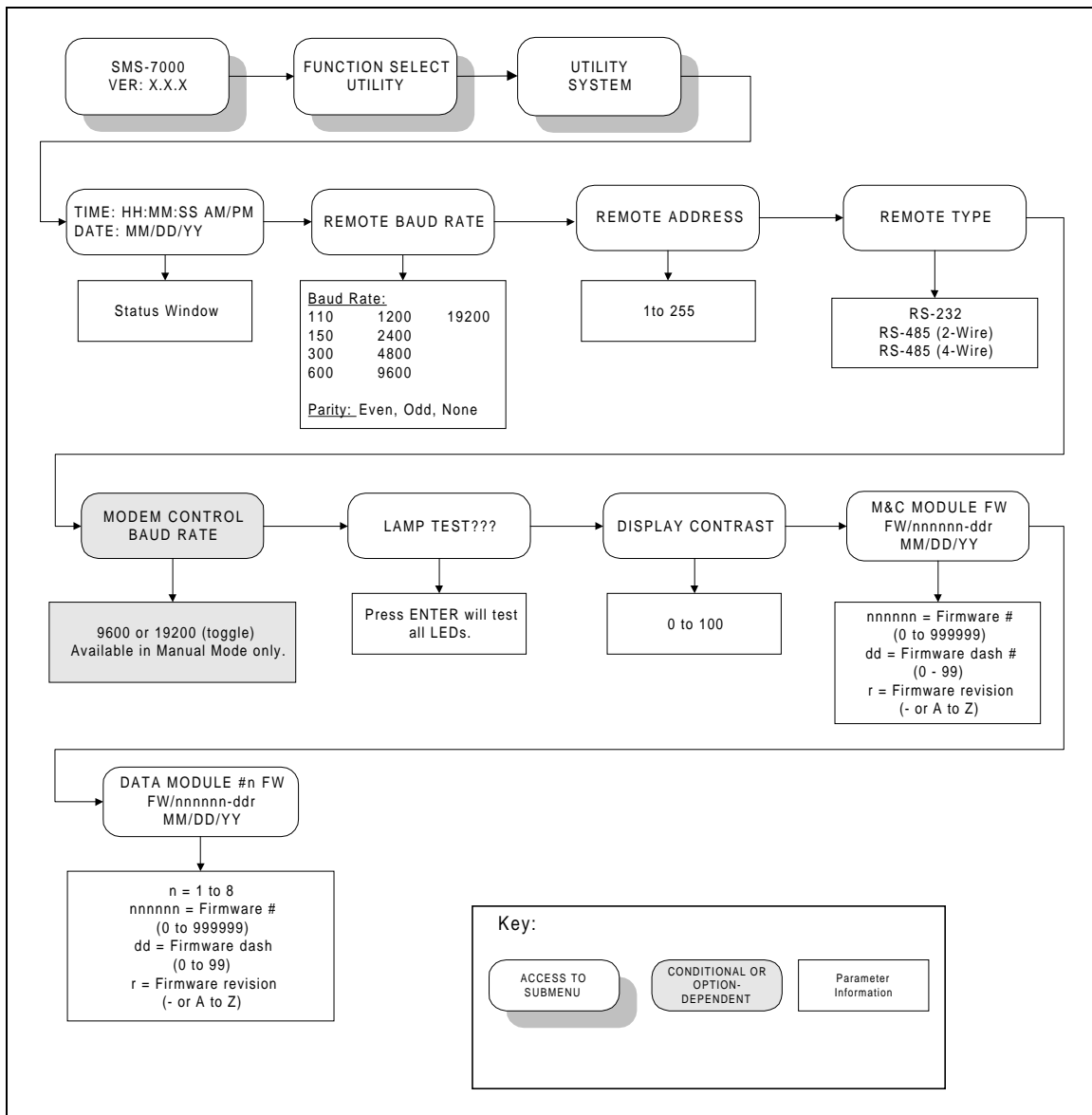


Figure 3-12. Utility System Menu

3.4.10 Utility System Menu

Refer to Figure 3-12.

TIME: HH:MM:SS AM/PM DATE: MMDDYY	Scroll left or right and press [↑] or [↓] to set, then press [ENTER].
REMOTE BAUD RATE nnnnn bit/s parity	This is the protocol set-up between the switch and an external terminal. The terminal may or may not be used to control the switch, or to make configuration changes to the modems. Scroll left or right and press [↑] or [↓] to set, then press [ENTER]. Rate Options: 19200, 9600, 4800, 2400, 1200, 600, 300, 150, 110. Parity: EVEN, ODD, or NONE.
REMOTE ADDRESS nnn	This is the address (nnn = 1 to 255) of the switch. Scroll left or right and press [↑] or [↓] to set, then press [ENTER]. Note: Address 0 is reserved for global communications.
REMOTE TYPE type	Scroll left or right, then press [ENTER]. Options: EIA-485 (2- or 4-wire), or EIA-232.
MODEM CONTROL BAUD RATE nnnnn bps	Scroll left or right, then press [ENTER]. Options: 9600 or 19.2 kbit/s. Controls the baud rate between the switch and the modems.
LAMP TEST ??	Press [ENTER] to test.
DISPLAY CONTRAST LEVEL: nnn	Scroll left or right and press [↑] or [↓] to set, then press [ENTER]. nnn = 1 to 100. Changes the darkness of the display characters.
M&C MODULE FIRMWARE FW/nnnnnn-ddr MM/DD/YY	Firmware # and date alternate on the display.
DATA MODULE #n FIRMWARE FW/nnnnnn-ddr MM/DD/YY	Firmware # and date alternate on the display. Displays "NOT AVAILABLE" if not in system.

3.5 Setup and Configuration

3.5.1 Utility Setup

Prior to configuration, it may be necessary to modify the following:

- Display Contrast — Adjust for optimum viewing in local ambient lighting conditions.
- Remote options — If a remote is to be used, appropriate remote options must be verified or defined from the Utility menus.
- Modem Control Baud Rate — Select the highest common baud rate for the modems attached to the switch.

3.5.2 Configuration

Once installed, the switch is ready for configuration to the specific application requirements. The switch mode must be in 'Manual' to make most configuration changes.

3.5.2.1 Backup

To configure the backup parameters, set the following:

- Address — Enter a unique 3-digit decimal address for remote communications.
- Mod/Demod, ON or OFF — Must be ON for consideration by the switch algorithm.
- Switching Mode — Select Dependent or Independent RX/TX switching.
- Prime Modems — Enter prime modems to be supported by this backup.

Note: The system will not allow the same prime modem to be assigned to backups with different switching modes. When pressing [ENTER], the system will beep twice and remove the prime from the backup list. For valid entry, the prime must first be removed from the other backup--or the other backup mode must be changed to agree.

3.5.2.2 Prime

The mode of the backup to which the prime is assigned (Independent or Dependent) determines the menu provided for the prime by the system.

- Address — Enter a 3-digit decimal address for remote communications.
- Mod/Demod, ON or OFF — Must be ON for consideration by the switch algorithm.
- Priority — This assignment, and the prime modem # (1 through 8), define the overall priority used by the switch algorithm when a modem failure occurs. If the prime is backed up by an independent backup, RX and TX priorities are assigned separately.
- Delay — Enter desired delay. If independent, enter delay for Mod and Demod. To switch properly in dependent mode, the prime modem demods must have input from a source modem other than their own. Otherwise, when the delay is set to NONE, the switch will oscillate between prime and backup modems. This occurs because the output of the modulator has been interrupted while the whole modem attempts to switch.
- Breakout Configuration — Select from available options, as applicable.

3.5.2.3 Load/Verify

Modem configuration must be loaded by the switch or the switch will not operate properly.

- Load — If any modem configurations have been changed, they must be loaded prior to exiting the configuration menus. A load may be done for an individual modem, or all modems.
- Verify — Retrieves the configuration from a modem, and compares it to the configuration stored in the switch. This ensures the switch uses the proper configuration data when preparing a backup for service.

Note: Check the Fault menus for any reported problems with the loading or verifying.

3.5.2.4 Operation Mode

Two modes of operation are available for the switch.

- Auto — Automatically allows the Backup modem to replace any prime modem when a MOD or DEMOD failure occurs.
- Manual — When Manual mode is selected, the system provides a dedicated menu through which the user may assign backup RX and TX functions to replace the prime modems.

Enter 0 under the CONFIG/OPERATION MODE/MANUAL/MODEM BACKUP PRIME MODEM menu to place the backup service on the intended prime modem.

3.6 Faults

Alerts to modem or switch faults are provided in several ways:

- Indicators on the switch control panel with specific information available in the Fault/Alarm menu.
- On demand via the switch remote port. Specifics for both switch and modem faults are available.
- Audio and/or visual indicators wired directly to the Switch Fault and Modem Status ports on the rear of the SCU.

Refer to Chapter 5 for troubleshooting switch faults and modem faults.

3.7 Revision Status

Refer to Table 3-3 for revision software history.

Table 3-3. Revision Status

Revision	FW/4958-1	Description
1.1.1	–	Original Issue
1.1.2	A	User interface changes
2.1.1	B	Added M2000 Multiplexer and revision emulation functionality.
2.1.2	C	User interface changes.
2.1.3	D	User interface changes.
2.1.4	E	Corrected communication faults on modem, data, and IF module.
2.1.5	F	Corrected automatic mode problem.
2.1.6	G	Corrected backup of SLM8650 and SLM6650 for 6650-00, 6650-02, 8650-00, 8650-02, 3650-00, 3650-02 modem types.
2.1.7	H	Corrected online signal problem.
2.1.8	J	Allow switch to operate with SDM8000 modem.

3.8 Initial Defaults

Refer to Table 3-4 for initial defaults.

Table 3-4. Initial Defaults

Configuration Backup #n (n = 1 or 2)			
Backup Mod #n	On	Backup #1 Multiplexer	Yes
Backup Demod #n	On	Backup #2 Multiplexer	No
Backup #n Switching Mode	Independent		
Configuration Independent Prime #n (n = 1 through 8)			
Prime Mod #n	On	Prime Demod #6, 7 Delay	Auto
Prime Mod #1, 2, 3, 4 Priority	High	Prime Demod #8 Delay	Manual
Prime Mod #5, 6 Priority	Medium	Prime #1, 2, 3, 4 Multiplexer	Yes
Prime Mod #7, 8 Priority	Low	Prime #5, 6, 7, 8 Multiplexer	No
Prime Mod #1 through 7 Delay	None	D&I #1, 2, 3, 4	Unbalanced
Prime Mod # 8 Delay	Manual	External Clock #1, 2, 3, 4	Unbalanced
Prime Demod #n	On	Insert Data Input #1, 2, 3, 4	Normal
Prime Demod #1, 2, 3, 4 Priority	High	D&I #5, 6, 7, 8	Balanced
Prime Demod #5, 6 Priority	Medium	External Clock #5, 6, 7, 8	Balanced
Prime Demod #7, 8 Priority	Low	Insert Data Input #5, 6, 7, 8	Loop
Prime Demod # 1 through 5 Delay	None		
Configuration Dependent Prime #n (n = 1 through 8)			
Prime Mod #n	On	Prime #1, 2, 3, 4 Multiplexer	Yes
Prime Demod #n	On	Prime #5, 6, 7, 8 Multiplexer	No
Prime Mod #1, 2, 3, 4 Priority	High	D&I #1, 2, 3, 4	Unbalanced
Prime Mod #5, 6 Priority	Medium	External Clock #1, 2, 3, 4	Unbalanced
Prime Mod #7, 8 Priority	Low	Insert Data Input #1, 2, 3, 4	Normal
Prime Mod #1 through 5 Delay	None	D&I #5, 6, 7, 8	Balanced
Prime Mod #6, 7 Delay	Auto	External Clock #5, 6, 7, 8	Balanced
Prime Mod # 8 Delay	Manual	Insert Data Input #5, 6, 7, 8	Loop
Configuration Operation Mode			
Operation Mode	Auto		
Utility System			
Time	Current	Parity	Even
Date	Current	Remote Type	EIA-485 (2-Wire)
Remote Baud Rate	9600 bit/s	Mode Control Baud Rate	9600 bit/s

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4 Chapter 4. THEORY OF OPERATION

This chapter provides the theory of operation for the switch and explains various interfaces and switching modes.

4.1 Interfaces

4.1.1 Configuration

The configuration interfaces (J1 and J2) are located on the rear panel of the SCU (refer to Figure 4-1).

- User remote (J1) is the remote port for configuration and control of the switch and associated modems. From the SCU front panel utilities menu (refer to Chapter 3), J1 is defined as EIA-232 or EIA-485 at 110 to 19200 baud rate.
- Modem remote (J2) is the port through which the switch controls and monitors modem configurations.

The J1 and J2 serial ports are electrically isolated but share the same address space. The switch buffers communicate between the two ports. This enables a remote user to communicate directly with the switch or modems attached to the switch, as though the ports were directly connected.

If the switch is communicating with a modem at the time the remote user issues a command, the switch responds with “BUSY.”

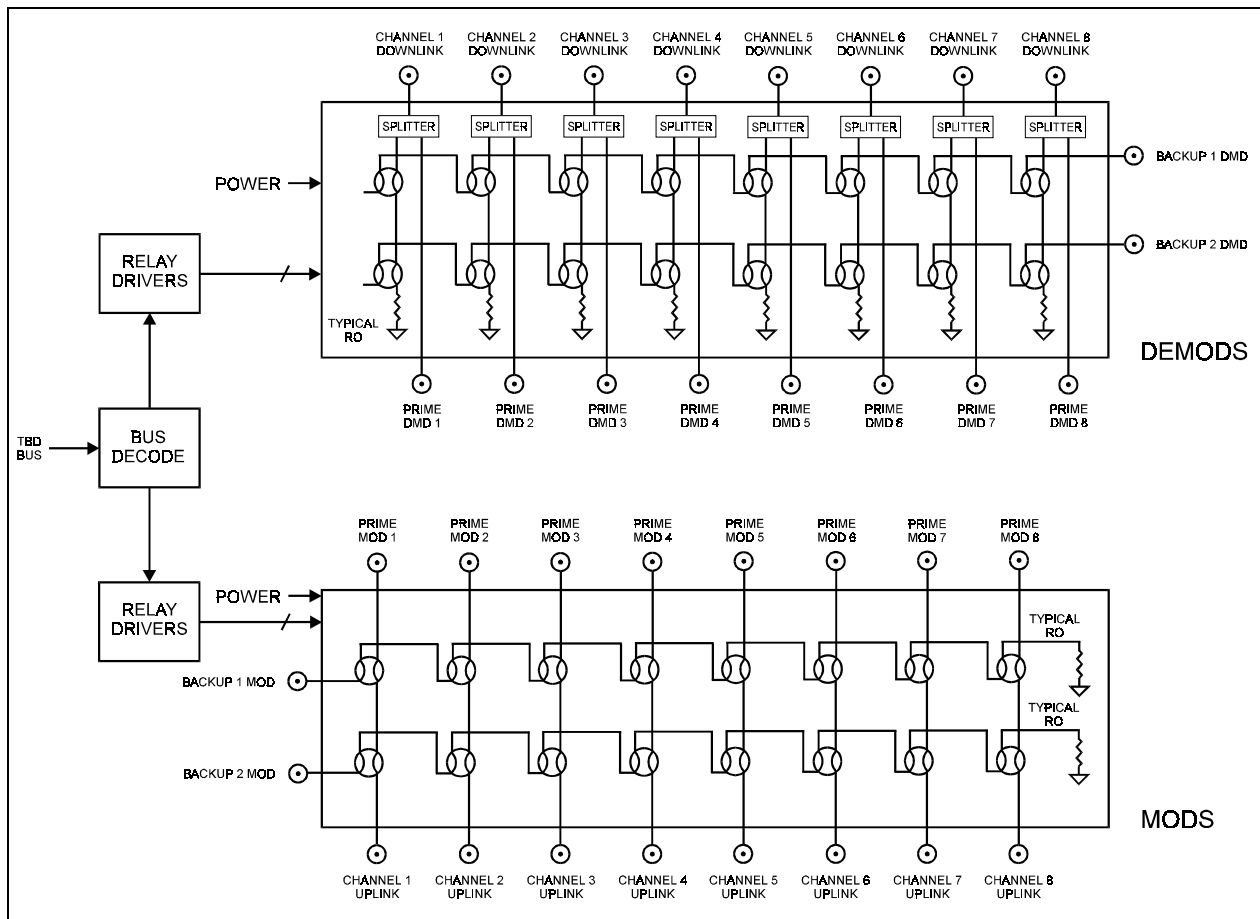


Figure 4-1. IF Switch Block Diagram

4.1.2 Terrestrial Data

All terrestrial data connections are provided on the face of the DSU. Each plug-in Data Switch Module (DSM) contains a built-in breakout panel that supports a variety of standard data and alarm interfaces (refer to Table 4-1). These interfaces can support IBS, IDR, D&I, or custom formats.

Table 4-1. DSM Interfaces

Data	J1 — V.35 Data/EIA-232-C Data	25-pin D
	J6 — EIA-422/MIL-STD-188 Data	37-pin D
	J3 — G.703 Balanced	15-pin D
	G.703/Drop & Insert Unbalanced	4 Coax
G.703/Drop & Insert Unbalanced	CP1 — SD/DDI	Coax
	CP2 — RD/IDO	Coax
	CP3 — DDO	Coax
	CP4 — IDI	Coax
	J5 — ADPCM Audio or 64K OH Data	9-pin D
	CP5 — External Clock Unbalanced	Coax
	J4 — Engineering Service Channel	25-pin D
	J2 — Alarms	25-pin D

4.1.3 IF Uplink/Downlink

Refer to Figure 4-1 for a block diagram of the IF switch.

The IF coaxial connectors are located on the IFU at the top of the DSU chassis. Each switch channel has a dedicated uplink and downlink port that provides total independence of link assignments.

Depending on the configuration, IF signals can be split and combined with minimum loss prior to connection to the switch

(Combiners and splitters are not provided with the switch. Customers may wish to purchase the Comtech EFData ICS-75 combiner/splitter, to fulfill this need.)

4.1.4 Monitors

Three connectors provide switch status and fault information on the rear of the SCU chassis (refer to Table 4-2).

Table 4-2. SCU Chassis Connectors

Switch Faults		
J3	System, Equipment, and Stored Faults	9-pin D
Online Status		
J6	Indicates whether prime modulators are on or offline	25-pin D
J5	Indicates whether prime demodulators are on or offline	25-pin D

Each set of fault output pins is isolated from internal switch electronics through single-pole and double-throw relays. The three contacts of each relay are provided to the user for direct application of visual and audio indicators. Relay contacts will support 1 mA of continuous current at up to 30 VDC.

Normally open (NO) pins are connected to common (COM) for non-faulted indications and online conditions. There is, however, one exception: the switch “COMMON EQUIPMENT” fault has the normally closed (NC) contact connected to the common (COM) for a no-fault condition (relay normally energized). This ensures that a fault is indicated in the event of switch power loss.

4.1.5 Modem Interfaces

Connectors on the modem side of the DSU and IFU chassis provide direct pin-for-pin data connections to the applicable Comtech EFData modems.

A connector on the rear of the SCU provides remote and switch control of the modems associated with the switch. Table 4-3 lists the SCU rear panel connector information.

Table 4-3. SCU Rear Panel Connectors

Connector	Function	Type	Unit
J1 to J10	Data	50-pin D	DSU
CP17 to CP36	RX and TX signals	BNC	IFU
J2	Modem remote	9-pin D	SCU

The signal pin assignments of each channel depend on the configuration of the attached prime modem. When commanded to load, the switch queries each prime modem for its data configuration. It then configures the breakout panels of each DSM accordingly. The breakout panels then switch the appropriate terrestrial data signals to the modem data connectors.

When placed online, the backup connectors (J9 and J10) reflect the connectors of the prime that is offline. The IF TX and RX signals (CP17 through CP36) are the remaining modem interface signals. These are located at the rear of the IF chassis and are numerically associated with their respective prime or backup modems.

4.2 Switching Modes

Three distinct modem configurations facilitate the function of both independent and dependent backup configurations:

- Dependent RX/TX — Both RX and TX functions are switched regardless of RX or TX prime fault.
- Independent RX — Only RX functions are switched with a prime RX fault—TX functions are not affected.
- Independent TX — Only TX functions are switched with a prime TX fault—RX functions are not affected.

The two switching modes are discussed in Sections 4.2.1 and 4.2.2.

4.2.1 Manual Mode

The Manual switching mode allows the operator to replace any prime modem with any backup modem to transmit functions, receive functions, or both (modem fault conditions have no effect). For switching without operator intervention, the switch must be in Auto mode.

Prior to placing a backup online, the switch configures the backup modem to match the configuration of the designated prime.

The system is normally set up with the switch in Manual mode. After the configuration parameters have been entered into the switch and modems, a “Load All” command is given to the switch. The switch then queries the modems for their configurations.

4.2.2 Auto Mode

In Auto mode one or two redundancy configurations may be defined by associating particular prime modems to a single backup modem. For example, a dual 1:4 configuration will have four different primes assigned to each of the two backup modems.

Priority level assignments are assigned by the user in the modem configuration menus. The switching algorithm resolves priority by considering all primes in a configuration by their priority level.

The prime modem with the lowest channel slot will have a backup modem in hot standby if all of the priorities are set to the same level. This does not mean that it is a firm priority level, it simply means that if no priorities are selected, then the switch must place the backup modem in standby for one of the modems. The first modem in the system is the logical choice.

It is important for the user to determine priority levels for the prime modems in order to achieve the desired switching results.

The switch will initially configure available backup modems in a standby condition based on channel priority assignments. This provides the operator with immediate recovery for critical service channels. Afterwards, the switch continually monitors the TX and RX fault status of the prime and backup modems.

Whenever a fault(s) is registered, the switch will configure and place online any nonfaulted backup according to priorities. The remaining backup, if any, will be placed in a standby condition for the highest priority non-faulted channel.

Switching requirements are itemized as follows:

- Backup (BU) modems when turned on (enabled in configuration) will resolve themselves (via the AUTO switching logic) to be either in the Standby (STBY) or Online condition.

Note: There is one exception for the 2:1 switch configuration: just one of the two BUs will be in the STBY or the Online condition.

- BU Standby modem service will migrate (via the switching logic) to the highest priority non-faulted primes when BU modems are not Online.
- BU Online modem service will migrate (via the switching logic) to the highest priority faulted primes at the expense of Standby service.
- If a BU modem is not faulted and is in a STBY condition for a faulted prime ready for backup, the backup will be switched Online.
- A faulted prime that has priority will be assigned a non-faulted BU modem in STBY prior to the BU being placed Online.
- A faulted prime that has priority will be assigned a BU modem already online for a lower priority prime. This occurs at the expense of the lower priority prime if another backup is not available.

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5 Chapter 5. MAINTENANCE

This chapter provides maintenance and troubleshooting information.

5.1 Periodic Maintenance

There is no periodic maintenance required to ensure proper switch operation.

5.2 Software Revisions

Installation of revised controller software may be necessary at times for implementing additions or enhancing features and/or corrective actions. Control software resides in a programmable device inside the one unit (1U) switch control chassis (AS/4800). To replace software:



When replacing the switch software, the previous switch configuration and loaded modem configurations will be lost.

1. Disconnect switch power.
2. Disconnect and remove switch controller from equipment rack.
3. Remove top cover fasteners and cover.
4. Remove and replace U30 on printed circuit assembly AS/4518. U30 is a socketed device.

5. Replace cover and fasteners.
6. Install and interconnect switch controller in rack.
7. Reconnect power to switch.
8. Perform a hard reset under the Utility/System menu.
9. Enter desired switch configuration.
10. Load all modems from Load/Verify menu or remote terminal.
11. Resume Auto mode, as required.

5.3 Fault Action

Corrective action should be taken whenever a fault is indicated. This action will guard against total switch failure and/or possible loss of service because of faulted prime modems.

5.3.1 Modem

Modem modulator and demodulator faults are reported by the switch as part of the overall configuration status. The details of modem faults are available from the individual modem fault menus. Refer to the appropriate modem installation and operation manual for corrective action.

To replace a faulted modem:

1. Disconnect power from the faulted modem.

Notes:

1. If the faulted modem is backed up by a backup modem in Dependent mode, the backup modem will remain online without interruption of service.
 2. If the faulted modem modulator or demodulator is backed up by a backup modem in Independent mode, disconnecting power will switch the previously unfaulted side of the modem to an available backup modem.
2. Set the switch operation mode to Manual, then turn off the modulator and demodulator of the faulted modem.

3. Replace the faulted modem with a properly functioning modem. Power up the replacement modem, and configure the modem exactly as the faulted modem was configured.
4. On the switch, turn on the modulator and demodulator for the modem that has been replaced. Verify the replaced modem's communication and configurations from the Load/Verify menu.

Note: A no-system fault condition ensures that the modem was correctly configured and is communicating to the switch. (See Table 5-1 for fault analysis, if a fault exists.)

5. Set the switch operation mode back to Auto.

5.3.2 Switch

All faults reported in the switch fault menus (other than modem modulator and demodulator faults) require corrective action to the switch or associated interconnections.

Table 5-1 lists the switch faults along with brief descriptions of fault mechanisms and checks/actions. If multiple faults occur, the common symptom listed in the "Action" column will be the source of the fault.

Note: It is recommended that power be removed from the switch when changing out the data switch modules.

Table 5-1. Switch Fault Analysis

Fault	Description	Action
MODEM COMM FAILURE	Modem fails to respond to switch commands on the modem remote bus, J2, of the SCU.	Verify modem agrees with switch configuration. If single modem failure, check modem connector or modem. If multiple modem failure, check modem remote cable. If all modem failure, check switch connector or SCU.
MOD CONFIG VERIFY ERROR	Results from inconsistencies between configuration stored in switch and configuration reported by modem.	Reload modem configuration from Load/Verify menu.
DMOD CONFIG ERROR	Results from inconsistencies between configuration stored in switch and configuration reported by modem.	Reload modem configuration from Load/Verify menu.
NO ADDRESS FOR MODEM	Address in configuration menu set to 0.	Enter correct modem address.

Table 5-1. Switch Fault Analysis (Continued)

Fault	Description	Action
NO MOD CONFIG LOADED	No configuration for modulators in memory.	Reload modem configuration from Load/Verify menu.
NO DMOD CONFIG LOADED	No configuration for modulators in memory.	Reload modem configuration from Load/Verify menu.
NO PRIMES ASSIGNED	Backup only. Backup is enabled for switching with no prime assignments.	Disable backup in configuration menu to OFF if not in use. Designate prime assignments.
PRIME NOT ASSIGNED	Prime only. Prime is enabled in switching algorithm but has not been assigned a backup.	Disable prime in configuration menu to OFF if not in use. Designate backup assignment for prime.
DATA SWITCH MODULE #1 to 8 or IF SWITCH MODULE	Set if module does not respond to commands from the SCU, or responds with error message.	If error is for single module, replace module. It is recommended that power be removed from the switch when changing a data switch module. If error is indicated by multiple modules, check data switch interface cable (J4) on rear of SCU and control unit.
POWER SUPPLY #1 FAULT POWER SUPPLY #2 FAULT	Set when power supply voltage(s) are out of tolerance.	Replace faulted power supply module.
M&C CONTROLLER FAULT		Replace controller.
I2C BUS FAULT		Replace controller.
MU COMM FAILURE	Multiplexer fails to respond to switch commands on the modem remote bus, J2 of the SCU.	Same as MODEM COMM FAILURE.
NO ADDRESS FOR MU	Address in configuration menu set to 0.	Enter correct multiplexer address.

Appendix A.

REMOTE CONTROL OPERATION

This appendix describes the remote control operation of the switch.

- Firmware number: FW/4958-1J
- Software version: 2.1.8

A.1 General

The remote controls and status for the switch are based on the SMS-658 and SMS-758 redundancy switches to facilitate the use of existing control code to the extent possible. Due to unique and advanced features of the switch, there are differences, additions, and deletions from the former command set. These changes are highlighted in bold type in the comparison chart, Table A-1.

Remote controls and status information are transferred via a 2-/4-wire EIA-485 (optional EIA-232) serial communications link.

Commands and data are transferred on the remote control communications link as US ASCII-encoded character strings.

The remote communications link is operated in a half-duplex mode at baud rates from 110 to 19200 bit/s.

Communications on the remote link are initiated by a remote controller or terminal. The switch never transmits data on the link unless it is commanded.

Command and status parameter selection will be determined by whether the backup modem switching mode has been configured as Independent or Dependent. The switch will default to Independent mode after a cold startup or hard reset.

Table A-1. SMS-7000 Remote Control: SMS-658/SMS-758 Comparison Table

Command	SMS-7000	SMS-658	SMS-758	Notes
Backup Modem Address	ADD_Bx_yyy	ADD_Bx_yyy	ADD_Bx_yyy	
Backup Mod Active	MA_Bx_yyy	MA_Bx_yyy	MA_Bx_yyy	
Backup Demod Active	DA_Bx_yyy	DA_Bx_yyy	DA_Bx_yyy	
Switching Mode Selection	SM_Bx_yyy			SMS-7000 only
Prime Modem Assignments	PMA_Bx_yyyyyyyy			SMS-7000 only
Backup Modem Interface Type		INT_Bx_y	INT_Bx_y	SMS-658/SMS-758 only
Prime Modem Interface Type		INT_x_y	INT_x_y	SMS-658/SMS-758 only
Prime Modem Address	ADD_x_yyy	ADD_x_yyy	ADD_x_yyy	
Prime Mod Active	MA_x_yyy	MA_x_yyy	MA_x_yyy	
Prime Demod Active	DA_x_yyy	DA_x_yyy	DA_x_yyy	
Prime Mod Priority	MP_x_y	MP_x_y	MP_x_y	
Prime Demod Priority	DP_x_y	DP_x_y	DP_x_y	
Prime Modem Priority	MP_x_y	MP_x_y	MP_x_y	
Prime Mod Online Delay	MD_x_yyy.y	MD_x_yyy.y	MD_x_yyy.y	
Prime Demod Online Delay	DD_x_yyy.y	DD_x_yyy.y	DD_x_yyy.y	
Prime Modem Online Delay	MD_x_yyy.y	MD_x_yyy.y	MD_x_yyy.y	
Mod Transponder		MT_x_y		SMS-658 only
Demod Transponder		DT_x_y	DT_x_y	SMS-658/SMS-758 only
Downlink Transponder Option			DTO_x	SMS-758 only
Load Backup Modem Config	LMC_Bx	LMC_Bx	LMC_Bx	Limited response
Load Prime Modem Config	LMC_x	LMC_x	LMC_x	Limited response
Load All Modem Configs	LMC_ALL	LMC_ALL	LMC_ALL	Limited response
Verify Backup Modem Config	VMC_Bx	VMC_Bx	VMC_Bx	Limited response
Verify Prime Modem Config	VMC_x	VMC_x	VMC_x	Limited response
Verify All Modem Configs	VMC_ALL	VMC_ALL	VMC_ALL	Limited response
Drop and Insert G.703 Data	DID_n_xxxxx			SMS-7000 only
External Clock	ECLK_n_xxxxx			SMS-7000 only
Insert Data Input	IDI_n_xxxx			SMS-7000 only
Time of Day	TIME_hh:mmxx	TIME_hh:mmxx	TIME_hh:mmxx	
Date	DATE_mm/dd/yy	DATE_mm/dd/yy	DATE_mm/dd/yy	
Modem Control Baud Rate	MBR_mmmmm			SMS-7000 only
Remote Operation	REM_			SMS-7000 only
Clear Stored Faults	CLSF_			SMS-7000 only
Operational Mode	MODE_xxxxxx	MODE_xxxxxx	MODE_xxxxxx	Different parameters/response
Backup Mod Online Offline	MOL_Bx_y	MOL_Bx_y	MOL_Bx_y	
Backup Demod Online Offline	DOL_Bx_y	DOL_Bx_y	DOL_Bx_y	
Backup Modem Online Offline	MOL_Bx_y	MOL_Bx_y	MOL_Bx_y	
Backup Mod Config Status	MCS_Bn	MCS_Bn	MCS_Bn	Different response
Backup Demod Config Status	DCS_Bn	DCS_Bn	DCS_Bn	Different response
Prime Mod Config Status	MCS_n	MCS_n	MCS_n	Different response
Prime Demod Config Status	DCS_n	DCS_n	DCS_n	Different response
Modulator Status	MS_	MS_	MS_	
Demodulator Status	DS_	DS_	DS_	
Backup Modem Fault Status	MFS_Bn	MFS_Bn	MFS_Bn	
Prime Modem Fault Status	MFS_n	MFS_n	MFS_n	
TX Operational Faults	TOFS_			SMS-7000 only
RX Operational Faults	ROFS_			SMS-7000 only
Backup Modem System Faults	SFS_Bn			SMS-7000 only
Prime Modem System Faults	SFS_n			SMS-7000 only
Equipment Fault Status	EFS_			SMS-7000 only
M:N Switch Fault Status	MNF_	MNF_	MNF_	Different response
Mod Operational Faults		MOF_	MOF_	SMS-658/SMS-758 only
Demod Operational Faults		DOF_	DOF_	SMS-658/SMS-758 only
Missing Parameter Faults		MPF_	MPF_	SMS-658/SMS-758 only

Table A-1. SMS-7000 Remote Control: SMS-658/SMS-758 Comparison Table (Continued)

Command	SMS-7000	SMS-658	SMS-758	Notes
TX Operational Stored Faults	TOSF_#			SMS-7000 only
RX Operational Stored Faults	ROSF_#			SMS-7000 only
Backup Modem System Stored Faults	SSF_Bn_#			SMS-7000 only
Prime Modem System Stored Faults	SSF_n_#			SMS-7000 only
Equipment Stored Faults	ESF_#			SMS-7000 only
Bulk Consolidated Status Faults	BCSF_	BCSF_	BCSF_	Different response
Equipment Type	ET_	ET_	ET_	Different response
M&C Firmware Information	MCFI_			SMS-7000 only
Data Switch Module Firmware Info	DMFI_			SMS-7000 only
IF Switch Module Firmware Info	IMFI_			SMS-7000 only
Firmware Version Status		VER_	VER_	SMS-658/SMS-758 only
Backup Multiplexer Attached	MU_Bx_yyy			SMS-7000 only
Backup Multiplexer Address	MUA_Bx_yyy	MUA_Bx_yyy	MUA_Bx_yyy	
Prime Multiplexer Attached	MU_x_yyy			SMS-7000 only
Prime Multiplexer Unit Address	MUA_x_yyy	MUA_x_yyy	MUA_x_yyy	

A.2 Message Structure

The ASCII character format used requires 11 bits/character:

- 1 start bit
- 7 information bits
- 1 parity bit
- 2 stop bits

or

- 1 start bit
- 8 information bits
- no parity bit
- 2 stop bits

Messages on the remote link fall into the categories of commands and responses:

- Commands are messages which are transmitted to a switch
- Responses are messages returned by a switch in response to a command

The general message structure is as follows:

- Start Character
- Device Address
- Command/Response
- End of Message Character

A.2.1 Start Characters

A single character precedes all messages transmitted on the remote link. This character flags the start of a message, as follows:

- “<” for commands
- “>” for switch responses, or “>>” for modem responses through the switch.A.2.2 Device Address

The device address is the address of the one switch or modem which is designated to receive a transmitted command, or which is responding to a command.

Valid device addresses are 1 to 3 characters long, and in the range of 1 to 255. Address 0 is reserved as a global address which simultaneously addresses all devices on a given communications link. Devices do not acknowledge global commands.

Each switch which is connected to a common remote communications link must be assigned its own unique address. Addresses are front panel software selectable, and must be in the range between 1 to 255.

A.2.2 Command/Response

The command/response portion of the message contains a variable-length character sequence which conveys command and response data.

If the switch receives a message addressed to it which does not match the established protocol or cannot be implemented, a negative acknowledgment message is sent in response. This message is:

- >add/?ER2_invalid parameter'cr'\f']
(Error message for a recognized command which cannot be implemented or has parameters which are out of range.)
- >add/?ER3_unrecognizable command'cr'\f']
(Error message for unrecognizable command or bad command syntax.)
- >add/?ER4_switch not in remote mode'cr'\f']
(Switch not in remote error; use the REM command to go to remote mode.)
- >add/?ER5_hard coded parameter'cr'\f']
(Error message indicating that the parameter is hardware dependent and may not be changed remotely.)
- >add/?ER6_busy'cr'\f']
(Error message indicating that the command sent cannot be carried out because local processing is utilizing the modem control bus.)

Notes:

1. “add” is used to indicate a valid 1 to 3 character device address in the range between 1 and 255.
2. The switch does not respond to erred communications (i.e., parity and framing errors).

A.2.3 End Character

Each message is ended with a single character which signals the end of the message. This character is:

- “cr” Carriage return character for commands
- “]” End bracket for responses

A.3 Configuration Commands/Responses

A.3.1 Backup Modem

Backup Modem Address	Command: Response:	<add/ADD_Bx_yyy'cr' >add/ADD_Bx_yyy'cr'lf]	Where: x = 1 or 2 (backup modem number). yyy = 0 to 255 (backup modem address; 0 places backup modem out of service).
	Status: Response:	<add/ADD_Bx_'cr' >add/ADD_Bx_yyy'cr'lf]	
Backup Modulator Active (Enable)	Command: Response:	<add/MA_Bx_yyy'cr' >add/MA_Bx_yyy'cr'lf]	Where: x = 1 or 2 (backup modem modulator number). yyy = YES or NO. Note: Enter command in Manual mode only.
	Status: Response:	<add/MA_Bx'cr' >add/MA_Bx_yyy'cr'lf]	
Backup Demodulator Active (Enable)	Command: Response:	<add/DA_Bx_yyy'cr' >add/DA_Bx_yyy'cr'lf]	Where: x = 1 or 2 (backup modem demodulator number). yyy = YES or NO. Note: Enter command in Manual mode only.
	Status: Response:	<add/DA_Bx'cr' >add/DA_Bx_yyy'cr'lf]	
Switching Mode Selection	Command: Response:	<add/SM_Bx_yyy'cr' >add/SM_Bx_yyy'cr'lf]	Where: x = 1 or 2 (backup modem number). yyy = IND (Independent) or DEP (Dependent). Note: Enter command in Manual mode only.
	Status: Response:	<add/SM_Bx'cr' >add/SM_Bx_yyy'cr'lf]	
Prime Modem Assign.	Command: Response:	<add/PMA_Bx_yyyyyyyy'cr' >add/PMA_Bx_yyyyyyyy'cr'lf]	Where: x = 1 or 2 (backup modem number). y = prime modems 1 through 8. (Each 'm' digit represents a prime modem assigned to a backup modem, i.e., <add/PMA_B1_1234 would assign prime modems 1 through 4 to backup #1. If the 'm' digit is omitted following the '_', then all prime modems will be removed from the backup modem.)
	Command: Response:	or <add/PMA_Bx_'cr' >add/PMA_Bx_'cr'lf]	
	Status: Response:	<add/PMA_Bx'cr' >add/PMA_Bx_yyyyyyyy'cr'lf]	Notes: 1. In a 1:4 configuration, in which one backup modem is assigned to 4 prime modems, and the other backup modem is assigned to the other 4 prime modems, one backup modem switching mode can be independent and the other dependent. 2. In a 2:8 configuration in which both backup modems are assigned to the same prime modem, the backup modem switching modes must both be the same. 3. Enter command in Manual mode only.
Backup Multiplexer Unit Attached	Command: Response:	<add/MU_Bx_yyy'cr' >add/MU_Bx_yyy'cr'lf]	Where: x = 1 or 2 (backup multiplexer number). yyy = YES or NO.
	Status: Response:	<add/MU_Bx'cr' >add/MU_Bx_yyy'cr'lf]	

Backup Multiplexer Unit Address	Command: Response:	<add/MUA_Bx_yyy'cr' >add/MUA_Bx_yyy'cr''lf']	Where: x = 1 or 2 (backup multiplexer number). yyy = 0 to 255 (backup multiplexer address; 0 places backup multiplexer out of service).
	Status: Response:	<add/MUA_Bx'cr' >add/MUA_Bx_yyy'cr''lf']	

A.3.2 Prime Modem

Prime Modem Address	Command: Response:	<add/ADD_x_yyy'cr' >add/ADD_x_yyy'cr''lf']	Where: x = 1 to 8 (prime modem number). yyy = 0 to 255 (prime modem address; 0 places prime modem out of service).
	Status: Response:	<add/ADD_n_'cr' >add/ADD_n_yyy'cr''lf']	
Prime Modulator Active (Enable)	Command: Response:	<add/MA_x_yyy'cr' >add/MA_x_yyy'cr''lf']	Where: x = 1 to 8 (prime modem modulator number). yyy = YES or NO. Note: Enter command in Manual mode only.
	Status: Response:	<add/MA_x'cr' >add/MA_x_yyy'cr''lf']	
Prime Demodulator Active (Enable)	Command: Response:	<add/DA_x_yyy'cr' >add/DA_x_yyy'cr''lf']	Where: x = 1 to 8 (prime modem demodulator number). yyy = YES or NO. Note: Enter command in Manual mode only.
	Status: Response:	<add/DA_x'cr' >add/DA_x_yyy'cr''lf']	
Prime Modulator Priority	Command: Response:	<add/MP_x_y'cr' >add/MP_x_y'cr''lf']	Where: x = 1 to 8 (prime modem modulator number). y = 1 (HIGH), 2 (MEDIUM), or 3 (LOW). Note: Independent switching mode.
	Status: Response:	<add/MP_x'cr' >add/MP_x_y'cr''lf']	
Prime Demodulator Priority	Command: Response:	<add/DP_x_y'cr' >add/DP_x_y'cr''lf']	Where: x = 1 to 8 (prime modem demodulator number). y = 1 (HIGH), 2 (MEDIUM), or 3 (LOW). Note: Independent switching mode.
	Status: Response:	<add/DP_x'cr' >add/DP_x_y'cr''lf']	
Prime Modem Priority	Command: Response:	<add/MP_x_y'cr' >add/MP_x_y'cr''lf']	Where: x = 1 to 8 (prime modem number). y = 1 (HIGH), 2 (MEDIUM), or 3 (LOW). Note: Dependent switching mode.
	Status: Response:	<add/MP_x'cr' >add/MP_x_y'cr''lf']	
Prime Modulator On-line Delay	Command: Response:	<add/MD_x_yyy.y'cr' >add/MD_x_yyy.y'cr''lf']	Where: x = 1 to 8 (prime modem modulator number). NONE, or MANUAL. yyy.y = 0.5 to 127.0 seconds (in 0.5 second increments). Notes: 1. If MANUAL is selected, enter the number of seconds for the delay. 2. Independent switching mode.
	Status: Response:	<add/MD_x'cr' >add/MD_x_yyy.y'cr''lf']	

Prime Demodulator On-line Delay	Command: Response: Status: Response:	<add/DD_x_yyy.y'cr' >add/DD_x_yyy.y'cr''lf'] <add/DD_x'cr' >add/DD_x_yyy.y'cr''lf']	Where: x = 1 to 8 (prime modem demodulator number). NONE, AUTO, or MANUAL. yyy.y = 0.5 to 127.0 seconds (in 0.5 second increments). Notes: 1. If AUTO is selected, switching occurs after a delay period of 2.5 minutes. 2. If MANUAL is selected, enter the number of seconds for the delay period. 3. Independent switching mode.
Prime Modem On-line Delay	Command: Response: Status: Response:	<add/MD_x_yyy.y'cr' >add/MD_x_yyy.y'cr''lf'] <add/MD_x'cr' >add/MD_x_yyy.y'cr''lf']	Where: x = 1 to 8 (prime modem number). yyy.y = 0.5 to 127.0 seconds (in 0.5 second increments), NONE, or AUTO. Notes: 1. If AUTO is selected, the delay is two times the sweep period. 2. Dependent switching mode.
Prime Multiplexer Unit Attached	Command: Response: Status: Response:	<add/MU_x_yyy'cr' >add/MU_x_yyy'cr''lf'] <add/MU_x'cr' >add/MU_x_yyy'cr''lf']	Where: x = 1 to 8 (prime multiplexer number). yyy = YES or NO.
Prime Multiplexer Unit Address	Command: Response: Status: Response:	<add/MUA_x_yyy'cr' >add/MUA_x_yyy'cr''lf'] <add/MUA_x'cr' >add/MUA_x_yyy'cr''lf']	Where: x = 1 to 8 (prime multiplexer number). yyy = 0 to 255 (Prime multiplexer address; 0 places prime multiplexer out of service).

A.3.3 Switch

Load Backup Modem X	Command: Response:	<add/LMC_Bx'cr' >add/LMC_Bx'cr''lf']	Where: x = 1 or 2 (backup modem number). Note: Status can be polled after operation by using the MNF_ or BCSF_ commands.
Load Prime Modem X	Command: Response:	<add/LMC_x'cr' >add/LMC_x'cr''lf']	Where: x = 1 or 8 (prime modem number). Note: Status can be polled after operation by using the MNF_ command.
Load All Modems	Command: Response:	<add/LMC_ALL'cr' >add/LMC_ALL'cr''lf']	Notes: 1. This command will load all active backup modem and prime modem configurations. 2. Status can be polled after operation by using the MNF_ command.
Verify Backup Modem X	Command: Response:	<add/VMC_Bx'cr' >add/VMC_Bx'cr''lf']	Where: x = 1 or 2 (backup modem number). Note: Status can be polled after operation by using the MNF_ command.

Verify Prime Modem X	Command: Response:	<add/VMC_x'cr' >add/VMC_x'cr"lf"]	Where: x = 1 or 8 (prime modem number). Note: Status can be polled after operation by using the MNF_ command.
Verify All Modems	Command: Response:	<add/VMC_ALL'cr' >add/VMC_ALL'cr"lf"]	Notes: 1. This command will verify all active backup and prime modem configurations match those stored in the switch. 2. Status can be polled after operation by using the MNF_ command.

A.3.4 Breakout

Drop and Insert G.703 Data	Command: Response: Status: Response:	<add/DID_n_xxxx'cr' >add/DID_n_xxxx'cr"lf"] <add/DID_n'cr' >add/DID_n_xxxx'cr"lf"]	Where: n = 1 to 8 (prime channel number). xxxx = BAL (Balanced) or UNBAL (Unbalanced).
External Clock	Command: Response: Status: Response:	<add/ECLK_n_xxxx'cr' >add/ECLK_n_xxxx'cr"lf"] <add/ECLK_n'cr' >add/ECLK_n_xxxx'cr"lf"]	Where: n = 1 to 8 (prime channel number). xxxx = BAL (Balanced) or UNBAL (Unbalanced).
Insert Data Input	Command: Response: Status: Response:	<add/IDI_n_xxxx'cr' >add/IDI_n_xxxx'cr"lf"] <add/IDI_n'cr' >add/IDI_n_xxxx'cr"lf"]	Where: n = 1 to 8 (prime channel number). xxxx = LOOP or NORM (for NORMAL).

A.3.5 System

Time of Day	Command: Response: Status: Response:	<add/TIME_hh:mmxx'cr' >add/TIME_hh:mmxx'cr"lf"] <add/TIME_'cr' >add/TIME_hh:mmxx'cr"lf"]	Where: hh = 1 to 12 (hours). mm = 00 to 59 (minutes). xx = AM or PM.
Date	Command: Response: Status: Response:	<add/DATE_mm/dd/yy'cr' >add/DATE_mm/dd/yy'cr"lf"] <add/DATE_'cr' >add/DATE_mm/dd/yy'cr"lf"]	Where: mm = 1 to 12 (month). dd = 1 to 31 (day). yy = 00 to 99 (year).
Modem Control Baud Rate	Command: Response: Status: Response:	<add/MBR_mmmmm'cr' >add/MBR_mmmmm'cr"lf"] <add/MBR_'cr' >add/MBR_mmmmm'cr"lf"]	Where: mmmmm = 9600 or 19200. Note: Enter command in Manual mode only.
Remote Operation	Command: Response:	<add/REM_'cr' >add/REM_'cr"lf"]	Notes: 1. Configures the SMS-7000 for remote operation. 2. The SMS-7000 will respond to any status request at any time. However, the SMS-7000 must be in Remote mode to change configuration parameters remotely.
Clear Stored Faults	Command: Response:	<add/CLSF_'cr' >add/CLSF_'cr"lf"]	This command is used to clear all stored faults logged by the SMS-7000.

A.3.6 Mode

Operational Mode	Command: Response:	<add/MODE_XXXXX'cr' >add/MODE_XXXXX'cr"lf]	Where: XXXXX = AUTO or MANUAL. Notes: 1. This command selects the mode of operation for the SMS-7000. 2. If AUTO is selected, the M&C in the SMS-7000 controls all switching decisions. 3. If MANUAL is selected, the operator controls all switching decisions via the following three commands.
Set Backup Modulator, On-line/Off-line (Manual mode, Independent Switching)	Command: Response:	<add/MOL_Bx_y'cr' >add/MOL_Bx_y'cr"lf]	Where: x = 1 or 2 (backup modem modulator number). y = 0 to 8 (prime modem modulator number 1 through 8; 0 takes backup modulator offline). Notes: 1. This command places specified backup modem modulator online or offline for the specified prime modem modulator. 2. Enter command in Manual mode only.
Set Backup Demod., On-line/Off-line (Manual mode, Independent Switching)	Command: Response:	<add/DOL_Bx_y'cr' >add/DOL_Bx_y'cr"lf]	Where: x = 1 or 2 (backup modem demodulator number). y = 0 to 8 (prime modem demodulator number 1 through 8; 0 takes backup modulator offline). Notes: 1. This command places specified backup modem demodulator online or offline for the specified prime modem demodulator. 2. Enter command in Manual mode only.
Set Backup Modem, Online/Offline (Manual mode, Dependent Switching)	Command: Response:	<add/MOL_Bx_y'cr' >add/MOL_Bx_y'cr"lf]	Where: x = 1 or 2 (backup modem number). y = 0 to 8 (prime modem number 1 through 8; 0 takes backup modem offline). Notes: 1. This command places specified backup modem online or offline for the specified prime modem. 2. Enter command in Manual mode only.

A.4 Status Commands/Responses

Backup Modulator Config. Status	Command: Response:	<pre><add/MCS_Bn'cr' >add/MCS_Bn'cr' MA_xxx'cr' ADD_mmm'cr' SM_xxx'cr' PMA_mmmmmmm'cr' MU_xxx'cr' MUA_mmm'cr'lf] (See Note)</pre>	<p>Where: n = 1 or 2 (backup modem number).</p> <p>Modulator Active (YES/NO) Modem Address Switching Mode (IND/DEP) Prime Modem Assignments Multiplexer Unit Attached (YES/NO) Multiplexer Unit Address</p> <p>The backup modulator configuration status command causes a block of data to be returned by the SMS-7000. The block of data reflects the stored configuration of the backup modem selected.</p> <p>Note: Status only returned if multiplexer unit attached.</p>
Backup Demodulator Config. Status	Command: Response:	<pre><add/DCS_Bn'cr' >add/DCS_Bn'cr' DA_xxx'cr' ADD_mmm'cr' SM_xxx'cr' PMA_mmmmmmm'cr' MU_xxx'cr' MUA_mmm'cr'lf] (See Note)</pre>	<p>Where: n = 1 or 2 (backup modem number).</p> <p>Demodulator Active (YES/NO) Modem Address Switching Mode (IND/DEP) Prime Modem Assignments Multiplexer Unit Attached (YES/NO) Multiplexer Unit Address</p> <p>The backup demodulator configuration status command causes a block of data to be returned by the SMS-7000. The block of data reflects the stored configuration of the backup modem selected.</p> <p>Note: Status only returned if multiplexer unit is attached.</p>
Prime Modulator Config. Status	Command: Response:	<pre><add/MCS_n'cr' >add/MCS_n'cr' MA_yyy'cr' MP_y'cr' MD_yyy.y'cr' ADD_mmm'cr' MU_xxx'cr' MUA_mmm'cr' (See Note) DID_xxxxx'cr' ECLK_xxxxx'cr' IDI_xxx'cr'lf]</pre>	<p>Where: n = 1 to 8 (prime modem number).</p> <p>Modulator Active (YES/NO) Modulator/Modem Priority Modulator/Modem Delay Modem Address Multiplexer Unit Attached (YES/NO) Multiplexer Unit Address Drop & Insert Data (BAL/UNBAL) External Clock (BAL/UNBAL) Insert Data Input (LOOP/NORM)</p> <p>The prime modulator configuration status command causes a block of data to be returned by the SMS-7000. The block of data reflects the stored configuration of the prime modem selected.</p> <p>Note: Status only returned if multiplexer unit is attached.</p>

<p>Prime Demodulator Config. Status</p>	<p>Command: Response:</p>	<pre><add/DCS_n'cr' >add/DCS_n'cr' DA_yyy'cr' DP_y'cr' MP_y'cr' DD_yyy.y'cr' MD_yyy.y'cr' ADD_mmm'cr' MU_xxx'cr' MUA_mmm'cr' DID_xxxxx'cr' ECLK_xxxxx'cr' IDI_xxx'cr'lf']</pre> <p>(Note 1) (Note 2) (Note 1) (Note 2) (Note 3)</p>	<p>Where: n = 1 to 8 (prime modem number).</p> <p>Demodulator Active (YES/NO) Demodulator Priority Modem Priority Demodulator Delay Modem Delay Modem Address Multiplexer Unit Attached (YES/NO) Multiplexer Unit Address Drop & Insert Data (BAL/UNBAL) External Clock (BAL/UNBAL) Insert Data Input (LOOP/NORM)</p> <p>The prime demodulator configuration status command causes a block of data to be returned by the SMS-7000. The block of data reflects the stored configuration of the prime modem selected.</p> <p>Notes: 1. Status only returned in Independent Mode. 2. Status only returned in Dependent Mode. 3. Status only returned if multiplexer unit is attached.</p>
<p>Modulator Status</p>	<p>Command: Response:</p>	<pre><add/MS_'cr' >add/MS_'cr' MOD_1_xxx'cr' MOD_2_xxx'cr' MOD_3_xxx'cr' MOD_4_xxx'cr' MOD_5_xxx'cr' MOD_6_xxx'cr' MOD_7_xxx'cr' MOD_8_xxx'cr' MOD_B1_xxx'cr' MOD_B2_xxx'cr'lf']</pre>	<p>Prime #1 Modulator Status (OK/FLT) Prime #2 Modulator Status (OK/FLT) Prime #3 Modulator Status (OK/FLT) Prime #4 Modulator Status (OK/FLT) Prime #5 Modulator Status (OK/FLT) Prime #6 Modulator Status (OK/FLT) Prime #7 Modulator Status (OK/FLT) Prime #8 Modulator Status (OK/FLT) Backup #1 Modulator Status (OK/FLT) Backup #2 Modulator Status (OK/FLT)</p> <p>The modulator status is returned as a block of data which provides fault information of all 'active' backup and prime modulators.</p> <p>Note: Response shown is for a system with all possible backup modulators and prime modulators active. Only active modulator status will be reported.</p>
<p>Demodulator Status</p>	<p>Command: Response:</p>	<pre><add/DS_'cr' >add/DS_'cr' DMD_1_xxx'cr' DMD_2_xxx'cr' DMD_3_xxx'cr' DMD_4_xxx'cr' DMD_5_xxx'cr' DMD_6_xxx'cr' DMD_7_xxx'cr' DMD_8_xxx'cr' DMD_B1_xxx'cr' DMD_B2_xxx'cr'lf']</pre>	<p>Prime #1 Demodulator Status (OK/FLT) Prime #2 Demodulator Status (OK/FLT) Prime #3 Demodulator Status (OK/FLT) Prime #4 Demodulator Status (OK/FLT) Prime #5 Demodulator Status (OK/FLT) Prime #6 Demodulator Status (OK/FLT) Prime #7 Demodulator Status (OK/FLT) Prime #8 Demodulator Status (OK/FLT) Backup #1 Demodulator Status (OK/FLT) Backup #2 Demodulator Status (OK/FLT)</p> <p>The demodulator status is returned as a block of data which provides fault information of all 'active' backup and prime demodulators.</p> <p>Note: Response shown is for a system with all possible backup demodulators and prime demodulators active. Only active demodulator status will be reported.</p>

Backup Modem Fault Status Summary	Command: Response:	<add/MFS_Bn'cr' >add/MFS_Bn'cr' MOD_xxx'cr' DMD_xxx'cr' lf]	Where: n = 1 or 2 (backup modem number). Modulator Status (OK/FLT) Demodulator Status (OK/FLT)
Prime Modem Fault Status Summary	Command: Response:	<add/MFS_n'cr' >add/MFS_n'cr' MOD_xxx'cr' DMD_xxx'cr' lf]	Where: n = 1 to 8 (prime modem number). Modulator Status (OK/FLT) Demodulator Status (OK/FLT)
Transmit Operational Faults Status	Command: Response:	<add/TOFS_'cr' >add/TOFS_'cr' MOD_1_xxx'cr' MOD_2_xxx'cr' MOD_3_xxx'cr' MOD_4_xxx'cr' MOD_5_xxx'cr' MOD_6_xxx'cr' MOD_7_xxx'cr' MOD_8_xxx'cr' SFLT_xx'cr' lf]	Prime #1 TX Operational Status (OK/FLT) Prime #2 TX Operational Status (OK/FLT) Prime #3 TX Operational Status (OK/FLT) Prime #4 TX Operational Status (OK/FLT) Prime #5 TX Operational Status (OK/FLT) Prime #6 TX Operational Status (OK/FLT) Prime #7 TX Operational Status (OK/FLT) Prime #8 TX Operational Status (OK/FLT) Number of Stored Faults Logged (0 through 10)
Receive Operational Faults Status	Command: Response:	<add/ROFS_'cr' >add/ROFS_'cr' DMD_1_xxx'cr' DMD_2_xxx'cr' DMD_3_xxx'cr' DMD_4_xxx'cr' DMD_5_xxx'cr' DMD_6_xxx'cr' DMD_7_xxx'cr' DMD_8_xxx'cr' SFLT_xx'cr' lf]	Prime #1 RX Operational Status (OK/FLT) Prime #2 RX Operational Status (OK/FLT) Prime #3 RX Operational Status (OK/FLT) Prime #4 RX Operational Status (OK/FLT) Prime #5 RX Operational Status (OK/FLT) Prime #6 RX Operational Status (OK/FLT) Prime #7 RX Operational Status (OK/FLT) Prime #8 RX Operational Status (OK/FLT) Number of Stored Faults Logged (0 through 10)
Backup Modem System Fault Status Summary	Command: Response:	<add/SFS_Bn'cr' >add/SFS_Bn'cr' COMM_xxx'cr' MOD_CONFIG_VFY_xxx'cr' DMD_CONFIG_VFY_xxx'cr' ADD_xxx'cr' MOD_CONFIG_LOAD_xxx'cr' DMD_CONFIG_LOAD_xxx'cr' PRIME_ASSIGNED_xxx'cr' MU_COMM_xxx'cr' (See Note) MU_ADD_xxx'cr' (See Note) SFLT_xx'cr' lf]	Where: n = 1 or 2 (backup modem number). Modem Communications (OK/FLT) Modulator Config Verify (OK/FLT) Demodulator Config Verify (OK/FLT) Backup Modem Address (OK/FLT) Modulator Config Loaded (OK/FLT) Demodulator Config Loaded (OK/FLT) Primes Assigned to Backup (OK/FLT) Multiplexer Unit Communications (OK/FLT) Multiplexer Unit Address (OK/FLT) Number of Stored Faults Logged (0 through 10) Note: Status only returned if multiplexer unit is attached.
Prime Modem System Fault Status Summary	Command: Response:	<add/SFS_n'cr' >add/SFS_n'cr' COMM_xxx'cr' MOD_CONFIG_VFY_xxx'cr' DMD_CONFIG_VFY_xxx'cr' ADD_xxx'cr' MOD_CONFIG_LOAD_xxx'cr' DMD_CONFIG_LOAD_xxx'cr' PRIMES_ASSIGNMENT_xxx'cr' MU_COMM_xxx'cr' (See Note) MU_ADD_xxx'cr' (See Note) SFLT_xx'cr' lf]	Where: n = 1 to 8 (prime modem number). Modem Communications (OK/FLT) Modulator Config Verify (OK/FLT) Demodulator Config Verify (OK/FLT) Prime Modem Address (OK/FLT) Modulator Config Loaded (OK/FLT) Demodulator Config Loaded (OK/FLT) Prime Assigned to Backup (OK/FLT) Multiplexer Unit Communications (OK/FLT) Multiplexer Unit Address (OK/FLT) Number of Stored Faults Logged (0 through 10) Note: Status only returned if multiplexer unit is attached.

<p>Equipment Fault Status Summary</p>	<p>Command: Response:</p>	<pre><add/EFS_ 'cr' >add/EFS_ 'cr' DATA_MODULE_1_ xxx'cr' DATA_MODULE_2_ xxx'cr' DATA_MODULE_3_ xxx'cr' DATA_MODULE_4_ xxx'cr' DATA_MODULE_5_ xxx'cr' DATA_MODULE_6_ xxx'cr' DATA_MODULE_7_ xxx'cr' DATA_MODULE_8_ xxx'cr' IF_MODULE_ xxx'cr' PS1_ xxx'cr' PS2_ xxx'cr' NVRAM_CLK_ xxx'cr' M&C_ xxx'cr' I2C_ xxx'cr' SFLT_ xx'cr"lf"]</pre>	<p>Data Switch Module #1 (OK/FLT) Data Switch Module #2 (OK/FLT) Data Switch Module #3 (OK/FLT) Data Switch Module #4 (OK/FLT) Data Switch Module #5 (OK/FLT) Data Switch Module #6 (OK/FLT) Data Switch Module #7 (OK/FLT) Data Switch Module #8 (OK/FLT) IF Switch Module (OK/FLT) Power Supply #1 (OK/FLT) Power Supply #2 (OK/FLT) NVRAM/Clock (OK/FLT) M&C Controller (OK/FLT) I2C Bus (OK/FLT) Number of Stored Faults Logged (0 through 10)</p>
<p>M:N Switch Fault Status Summary</p>	<p>Command: Response:</p>	<pre><add/MNF_ 'cr' >add/MNF_ 'cr' COM_FLT_ xxxxxxxxByBy'cr' MOD_CONFIG_FLT_ xxxxxxxxByBy'c r' DMD_CONFIG_FLT_ xxxxxxxxByBy'cr' NO_MOD_CONFIG_ xxxxxxxxByBy'cr ' NO_DMD_CONFIG_ xxxxxxxxByBy'cr ' NO_ADX_ xxxxxxxxByBy'cr' NOT_ASSIGNED_ xxxxxxxxByBy'cr' MU_COM_FLT_ xxxxxxxxByBy'cr' NO_MU_ADX_ xxxxxxxxByBy'cr' DATA_MODULE_FLT_ xxxxxxxx'cr' IF_MODULE_FLT'cr' PS1_FLT'cr' PS2_FLT'cr' NVRAM_CLK_FLT'cr' M&C_FLT'cr' I2C_FLT'cr"lf"]</pre>	<p>Modem Communications Faults Mod Config Verify Faults Demod Config Verify Faults No Mod Configuration Loaded No Demod Configuration Loaded No Address Specified for Modem Prime Assignment Fault Mux Communications Faults No Address Specified for Multiplexer Data Module Faults IF Module Fault Power Supply #1 Fault Power Supply #2 Fault NVRAM/Clock Fault M&C Controller Fault I2C Bus Fault</p> <p>Where: x = 1 to 8 (prime modem/data module number). y = 1 or 2 (backup modem number).</p> <p>Note: Fault status data is only returned if fault conditions exist.</p>
<p>Bulk Consol. Status Faults</p>	<p>Command: Response:</p>	<pre><add/BCSF_ 'cr' >add/BCSF_ 'a"b"c'...'y"z"aa"ab"ac"ad' 'ae"cr"lf"]</pre>	<p>This command causes all modem fault status to be returned. To reduce the length of the response, fault status is embedded into the bit structure of the characters that are returned. Faults are indicated by a binary 1 in the designated bit position.</p> <p>Character 'a': Modulator fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modulator fault #1 fault. Bit 4 = Prime modulator fault #2 fault. Bit 3 = Prime modulator fault #3 fault. Bit 2 = Prime modulator fault #4 fault. Bit 1 = Prime modulator fault #5 fault. Bit 0 = Prime modulator fault #6 fault.</p> <p>Character 'b': Modulator fault status character 2. Bit 6 = 1 always. Bit 5 = Prime modulator #7 fault. Bit 4 = Prime modulator #8 fault. Bit 3 = Backup modulator #1 fault. Bit 2 = Backup modulator #2 fault. Bit 1 = Reserved. Bit 0 = Reserved.</p>

			<p>Character 'c': Demodulator fault status character 1. Bit 6 = 1 always. Bit 5 = Prime demodulator #1 fault. Bit 4 = Prime demodulator #2 fault. Bit 3 = Prime demodulator #3 fault. Bit 2 = Prime demodulator #4 fault. Bit 1 = Prime demodulator #5 fault. Bit 0 = Prime demodulator #6 fault.</p> <p>Character 'd': Demodulator fault status character 2. Bit 6 = 1 always. Bit 5 = Prime modulator #7 fault. Bit 4 = Prime modulator #8 fault. Bit 3 = Backup modulator #1 fault. Bit 2 = Backup modulator #2 fault. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'e': TX Operational fault status character 1. Bit 6 = 1 always. Bit 5 = TX Prime #1 operational fault. Bit 4 = TX Prime #2 operational fault. Bit 3 = TX Prime #3 operational fault. Bit 2 = TX Prime #4 operational fault. Bit 1 = TX Prime #5 operational fault. Bit 0 = TX Prime #6 operational fault.</p> <p>Character 'f': TX Operational fault status character 2. Bit 6 = 1 always. Bit 5 = TX Prime #7 operational fault. Bit 4 = TX Prime #8 operational fault. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of TX Operational stored faults.</p> <p>Character 'g': RX Operational fault status character 1. Bit 6 = 1 always. Bit 5 = RX Prime #1 operational fault. Bit 4 = RX Prime #2 operational fault. Bit 3 = RX Prime #3 operational fault. Bit 2 = RX Prime #4 operational fault. Bit 1 = RX Prime #5 operational fault. Bit 0 = RX Prime #6 operational fault.</p> <p>Character 'h': RX Operational fault status character 2. Bit 6 = 1 always. Bit 5 = RX Prime #7 operational fault. Bit 4 = RX Prime #8 operational fault. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of RX Operational stored faults.</p> <p>Character 'i': Backup #1 system fault status character 1. Bit 6 = 1 always. Bit 5 = Backup modem communications failure fault. Bit 4 = Backup modulator configuration verify error fault. Bit 3 = Backup demodulator configuration verify error fault. Bit 2 = No address for backup fault. Bit 1 = No backup modulator configuration loaded fault. Bit 0 = No backup demodulator configuration loaded fault.</p> <p>Character 'j': Backup #1 system fault status character 2. Bit 6 = 1 always. Bit 5 = No primes assigned to backup fault. Bit 4 = Backup multiplexer communications failure fault. Bit 3 = No address for backup multiplexer fault. Bit 2 = Reserved.</p>
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			<p>Bit 1 = Reserved. Bit 0 = Reserved. Character 'k': Backup #1 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Backup #1 system stored faults.</p> <p>Character 'l': Backup #2 system fault status character 1. Bit 6 = 1 always. Bit 5 = Backup modem communications failure fault. Bit 4 = Backup modulator configuration verify error fault. Bit 3 = Backup demodulator configuration verify error fault. Bit 2 = No address for backup fault. Bit 1 = No backup modulator configuration loaded fault. Bit 0 = No backup demodulator configuration loaded fault.</p> <p>Character 'm': Backup #2 system fault status character 2. Bit 6 = 1 always. Bit 5 = No primes assigned to backup fault. Bit 4 = Backup multiplexer communications failure fault. Bit 3 = No address for backup multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'n': Backup #2 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Backup #2 system stored faults.</p> <p>Character 'o': Prime #1 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'p': Prime #1 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'q': Prime #1 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #1 system stored faults.</p> <p>Character 'r': Prime #2 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault.</p>
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			<p>Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 's': Prime #2 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 't': Prime #2 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #2 system stored faults.</p> <p>Character 'u': Prime #3 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'v': Prime #3 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'w': Prime #3 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #3 system stored faults.</p> <p>Character 'x': Prime #4 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'y': Prime #4 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'z': Prime #4 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #4 system stored faults.</p>
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			<p>Character 'aa': Prime #5 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'ab': Prime #5 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'ac': Prime #5 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #5 system stored faults.</p> <p>Character 'ad': Prime #6 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'ae': Prime #6 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'af': Prime #6 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #6 system stored faults.</p> <p>Character 'ag': Prime #7 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'ah': Prime #7 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved.</p>
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			<p>Bit 0 = Reserved. Character 'ai': Prime #7 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #7 system stored faults.</p> <p>Character 'aj': Prime #8 system fault status character 1. Bit 6 = 1 always. Bit 5 = Prime modem communications failure fault. Bit 4 = Prime modulator configuration verify error fault. Bit 3 = Prime demodulator configuration verify error fault. Bit 2 = No address for prime fault. Bit 1 = No prime modulator configuration loaded fault. Bit 0 = No prime demodulator configuration loaded fault.</p> <p>Character 'ak': Prime #8 system fault status character 2. Bit 6 = 1 always. Bit 5 = Prime not assigned to backup fault. Bit 4 = Prime multiplexer communications failure fault. Bit 3 = No address for prime multiplexer fault. Bit 2 = Reserved. Bit 1 = Reserved. Bit 0 = Reserved.</p> <p>Character 'al': Prime #8 system fault status character 3. Bit 6 = 1 always. Bit 5 = Reserved. Bit 4 = Reserved. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of Prime #8 system stored faults.</p> <p>Character 'am': Equipment fault status character 1. Bit 6 = 1 always. Bit 5 = Data Switch Module #1 fault. Bit 4 = Data Switch Module #2 fault. Bit 3 = Data Switch Module #3 fault. Bit 2 = Data Switch Module #4 fault. Bit 1 = Data Switch Module #5 fault. Bit 0 = Data Switch Module #6 fault.</p> <p>Character 'an': Equipment fault status character 2. Bit 6 = 1 always. Bit 5 = Data Switch module #7 fault. Bit 4 = Data Switch module #8 fault. Bit 3 = IF Switch Module fault. Bit 2 = Power Supply #1 fault. Bit 1 = Power Supply #2 fault. Bit 0 = NVRAM/Clock fault.</p> <p>Character 'ao': Equipment fault status character 3. Bit 6 = 1 always. Bit 5 = M&C Controller fault. Bit 4 = I2C fault. Bit 3 through Bit 0 = Binary representation (0 through 10) of the number of equipment stored faults.</p>
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A.5 Stored Faults

Information on stored faults is returned when requested. If no stored fault exists for a given fault number, the words “NO Fault” will be returned instead of the normal time/date status information.

The following symbols are commonly used to define the stored faults status commands:

- # Fault number (0 to 9). “0” is the first fault stored.
- hh Hours in 24-hour format.
- mm Minutes.
- ss Seconds.
- MM Month.
- DD Day.
- YY Year.

Transmit Operational Stored Faults	Command: Response:	<add/TOSF_#cr' >add/TOSF_#hh:mm:ssMM/DD/YY'cr' MOD_1_xxx'cr' MOD_2_xxx'cr' MOD_3_xxx'cr' MOD_4_xxx'cr' MOD_5_xxx'cr' MOD_6_xxx'cr' MOD_7_xxx'cr' MOD_8_xxx'cr''lf]	Prime #1 TX Operational Status (OK/FLT) Prime #2 TX Operational Status (OK/FLT) Prime #3 TX Operational Status (OK/FLT) Prime #4 TX Operational Status (OK/FLT) Prime #5 TX Operational Status (OK/FLT) Prime #6 TX Operational Status (OK/FLT) Prime #7 TX Operational Status (OK/FLT) Prime #8 TX Operational Status (OK/FLT)
Receive Operational Stored Faults	Command: Response:	<add/ROSF_#cr' >add/ROSF_#hh:mm:ssMM/DD/YY'cr' DMD_1_xxx'cr' DMD_2_xxx'cr' DMD_3_xxx'cr' DMD_4_xxx'cr' DMD_5_xxx'cr' DMD_6_xxx'cr' DMD_7_xxx'cr' DMD_8_xxx'cr''lf]	Prime #1 RX Operational Status (OK/FLT) Prime #2 RX Operational Status (OK/FLT) Prime #3 RX Operational Status (OK/FLT) Prime #4 RX Operational Status (OK/FLT) Prime #5 RX Operational Status (OK/FLT) Prime #6 RX Operational Status (OK/FLT) Prime #7 RX Operational Status (OK/FLT) Prime #8 RX Operational Status (OK/FLT)
Backup Modem System Stored Faults	Command: Response:	<add/SSF_Bn_#cr' >add/SSF_Bn_# hh:mm:ss MM/DD/YY'cr' COMM_xxx'cr' MOD_CONFIG_VFY_xxx'cr' DMD_CONFIG_VFY_xxx'cr' ADD_xxx'cr' MOD_CONFIG_LOAD_xxx'cr' DMD_CONFIG_LOAD_xxx'cr' PRIMES_ASSIGNED_xxx'cr''lf'] MU_COMM_xxx'cr' (See Note) MU_ADD_xxx'cr''lf] (See Note)	Where: n = 1 to 2 (backup modem number). Modem Communications (OK/FLT) Modulator Config Verify (OK/FLT) Demodulator Config Verify (OK/FLT) Backup Modem Address (OK/FLT) Modulator Config Loaded (OK/FLT) Demodulator Config Loaded (OK/FLT) Primes Assigned to Backup (OK/FLT) Multiplexer Unit Communications (OK/FLT) Multiplexer Unit Address (OK/FLT) Note: Status only returned if multiplexer unit is attached.

Prime Modem System Stored Faults	Command: Response:	<add/SSF_n_# 'cr' >add/SSF_n_# hh:mm:ss MM/DD/YY 'cr' COMM_ xxx 'cr' MOD_CONFIG_VFY_ xxx 'cr' DMD_CONFIG_VFY_ xxx 'cr' ADD_ xxx 'cr' MOD_CONFIG_LOAD_ xxx 'cr' DMD_CONFIG_LOAD_ xxx 'cr' PRIME_ASSIGNMENT_ xxx 'cr' MU_COMM_ xxx 'cr' (See Note) MU_ADD_ xxx 'cr' 'lf]' (See Note)	Where: n = 1 to 8 (prime modem number). Modem Communications (OK/FLT) Modulator Config Verify (OK/FLT) Demodulator Config Verify (OK/FLT) Prime Modem Address (OK/FLT) Modulator Config Loaded (OK/FLT) Demodulator Config Loaded (OK/FLT) Prime Assigned to Backup (OK/FLT) Multiplexer Unit Communications (OK/FLT) Multiplexer Unit Address (OK/FLT) Note: Status only returned if multiplexer unit is attached.
Equipment Stored Faults	Command: Response:	<add/ESF_# 'cr' >add/ESF_# hh:mm:ss MM/DD/YY 'cr' DATA_MODULE_1_ xxx 'cr' DATA_MODULE_2_ xxx 'cr' DATA_MODULE_3_ xxx 'cr' DATA_MODULE_4_ xxx 'cr' DATA_MODULE_5_ xxx 'cr' DATA_MODULE_6_ xxx 'cr' DATA_MODULE_7_ xxx 'cr' DATA_MODULE_8_ xxx 'cr' IF_MODULE_ xxx 'cr' PS1_ xxx 'cr' PS2_ xxx 'cr' NVRAM_CLK_ xxx 'cr' M&C_ xxx 'cr' I2C_ xxx 'cr' 'lf]'	Data Switch Module #1 (OK/FLT) Data Switch Module #2 (OK/FLT) Data Switch Module #3 (OK/FLT) Data Switch Module #4 (OK/FLT) Data Switch Module #5 (OK/FLT) Data Switch Module #6 (OK/FLT) Data Switch Module #7 (OK/FLT) Data Switch Module #8 (OK/FLT) IF Switch Module (OK/FLT) Power Supply #1 (OK/FLT) Power Supply #2 (OK/FLT) NVRAM/Clock (OK/FLT) M&C Controller (OK/FLT) I2C Bus (OK/FLT)

A.6 About Switch

Equipment Type	Command: Response:	<add/ET_ 'cr' >add/ET_ ttttttt_ xxx.yyy.zzz 'cr' 'lf]'	Where: ttttttt = Equipment type. xxx.yyy.zzz = Software version number (0.0.0 to 999.999.999). This command returns the equipment type and software version of the addressed device.
M&C Firmware Information	Command: Response:	<add/MCFI_ 'cr' >add/MCFI_ 'cr' VER_ aaa.bbb.ccc 'cr' FW/nnnnnn-zz,mm/dd/yy 'cr' 'lf]'	Where: aaa.bbb.ccc = Software version number (0.0.0 to 999.999.999). nnnnnn = Firmware number (0 to 99999). zz = Firmware dash number (0 to 99). r = Firmware revision (-, or A to Z). mm = 1 to 12 (month). dd = 1 to 31 (day). yy = 00 to 99 (year).

<p>Data Switch Module Firmware Information</p>	<p>Command: Response:</p>	<pre><add/DMFI_'cr' >add/DMFI_'cr' DM1_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM1_XXX'cr' DM2_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM2_XXX'cr' DM3_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM3_XXX'cr' DM4_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM4_XXX'cr' DM5_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM5_XXX'cr' DM6_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM6_XXX'cr' DM7_FW/nnnnnn-zzr,mm/dd/yy'cr' or DM7_XXX'cr' DM8_FW/nnnnnn-zzr,mm/dd/yy'cr'lf] or DM8_XXX'cr'lf]</pre>	<p>Where:</p> <p>nnnnnn = Firmware number (0 to 99999). zz = Firmware dash number (0 to 99). r = Firmware revision (-, or A to Z). mm = 1 to 12 (month). dd = 1 to 31 (day). yy = 00 to 99 (year). xxx = N/A (not available).</p>
<p>IF Switch Module Firmware Information</p>	<p>Command: Response:</p>	<pre><add/IMFI_'cr' >add/IMFI_FW/nnnnnn- zzr,mm/dd/yy'cr'lf] or >add/IMFI_XXX'cr'lf]</pre>	<p>Where:</p> <p>nnnnnn = Firmware number (0 to 99999). zz = Firmware dash number (0 to 99). r = Firmware revision (-, or A to Z). mm = 1 to 12 (month). dd = 1 to 31 (day). yy = 00 to 99 (year). xxx = N/A (not available).</p>

Appendix B. M-2000 MULTIPLEXER UTILIZATION

Appendix C describes the installation and operation of the switch when equipped with the M-2000 multiplexer (hereafter referred to as the “MUX”).

B.1 Installation

The switch M&C must have firmware #FW4958-1B, Version 2.1.1 or greater.



This equipment contains parts and assemblies sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when touching, removing, or inserting Printed Circuit Boards (PCBs).

The B-1950 breakout panel and cable CA-5622 must be installed for every prime modem that has a MUX attached to it. If a MUX is attached to the prime modem, the supporting backup modem must have a MUX attached as well.

Refer to Figure B-1 for terrestrial data interconnections.

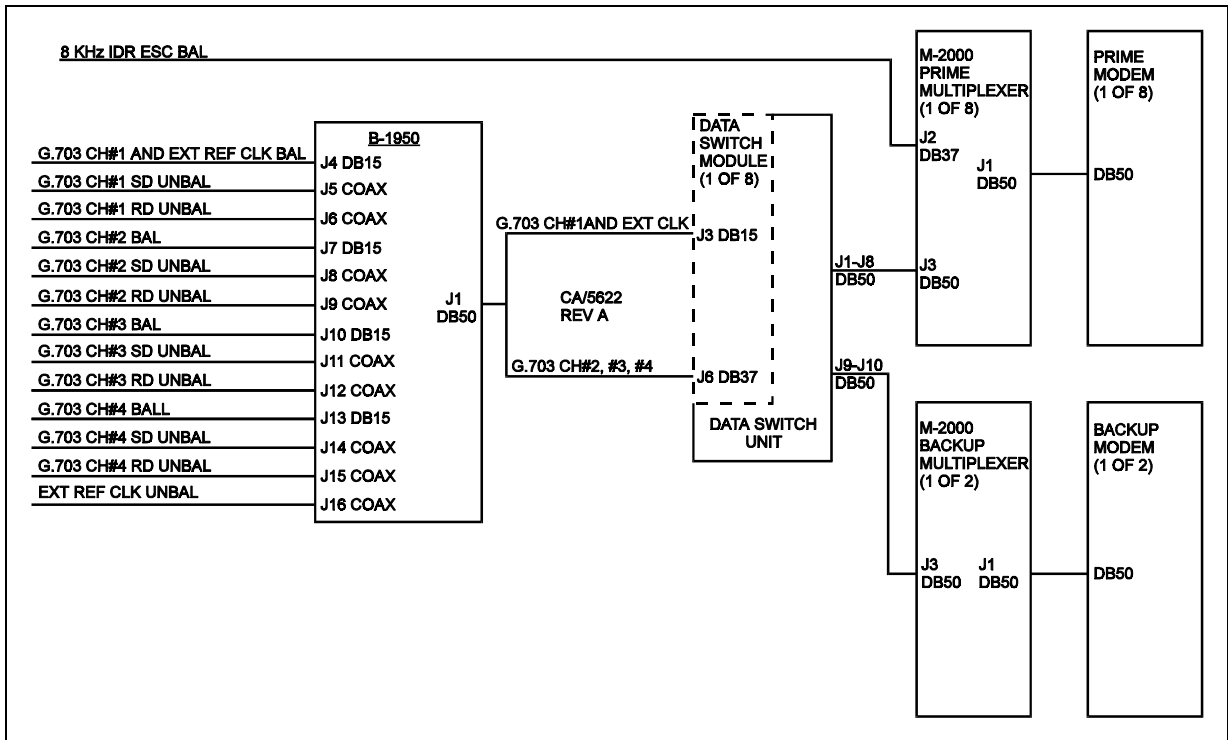


Figure B-1. Terrestrial Data Interconnections

Refer to Table B-1 for signal pinout information on the data switch module J6 connector equipped with a MUX.

Note: The 8 kbit/s IDR overhead data channel can be directly connected to the prime multiplexer. The 8 kbit/s overhead will not be switched to the backup in the event of a prime modem and/or multiplexer failure.

Connect all multiplexers via Remote port (J5) to Modem Remote (J2) on the switch M&C with an EIA-485 2-wire cable. All multiplexers must be configured for EIA-485 (2-wire), 9600 or 19200 baud with a unique address. Refer to the *M-2000 Multiplexer Installation and Operation Manual* for further information on the MUX.

Table B-1. SMS-7000/M-2000 50-Pin to 37-Pin Interface Cable Pinouts

50-Pin	Signal Name	37-Pin
1	Shield	1
37	CH2 SDA	4
38	CH2 SDB	22
39	CH2 RDA	6
40	CH2 RDB	24
21	CH3 SDA	5
22	CH3 SDB	23
23	CH3 RDA	8
24	CH3 RDB	26
4	CH4 SDA	3
5	CH4 SDB	21
6	CH4 RDA	15
7	CH4 RDB	33

B.2 Operation

On the switch M&C Configuration menu, enable multiplexers by selecting YES on the Multiplexer submenu for each modem with a multiplexer. Enter a unique address for each multiplexer. Load all modems and set Operation mode to Auto. Refer to Table 5-1 for fault information. Refer to the *M-2000 Multiplexer Installation and Operation Manual* for further operation information.

Note: To operate with the switch, the MUX must be configured with both transmit and receive faults enabled (ON).

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Glossary

The following is a list of acronyms and abbreviations that may be found in this manual:

Acronym/ Abbreviation	Definition
ADPCM	Adaptive Differential Pulse Code Modulation
ASCII	American Standard Code for Information Interchange
ASGN	Assign
ASYNC	Asynchronous
AUTO	Automatic
BCKUP	Backup
BOP	Break Out Panel
BU	Backup
BUS	Buss
CH	Channel
Coax	Coaxial
COM	Common
CONFIG	Configuration
D&I	Drop and Insert
DDI	Drop Data In
DDO	Drop Data Out
Demod	Demodulator
Dep	Dependent
DMD	Demodulator
DSM	Data Switch Module
DSR	Data Set Ready
DSU	Data Switch Unit
CE-Mark	Community Europe Mark
EMI	Electromagnetic Interference
EXC	External Clock
FW	Firmware
FEC	Forward Error Correction
lf	Line feed
GND	Ground
Hz	Hertz (cycle per second)

I/O	Input/Output
IBS	INTELSAT Business Services
IDI	Insert Data In
IDO	Insert Data Out
IDR	Intermediate Data Rate
IF	Intermediate Frequency
IFU	Intermediate Frequency Switch Unit
IND	Independent
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
M&C	Monitor and Control
MHz	Megahertz (10 ⁶ Hertz)
Mod	Modulator
NC	Normally Closed
N/C	No Connect
NO	Normally Open
PC	Personal Computer
PCB	Printed Circuit Board
PWB	Printed Wire Board
RD	Receive Data
RLSD	Receive Line Signal Detect
RR	Receiver Ready
RS	Reed-Solomon
RT	Receive Timing
RTS	Request to Send
RX	Receive (Receiver)
RXCLK	Receive Clock
SCR	Serial Clock Receive
SCT	Serial Clock Transmit
SCTE	Serial Clock Transmit External
SCU	Switch Control Unit
SD	Send Data
SMS	Satellite Multiservice System
ST	Send Timing
STBY	Standby
SYS	System
TD	Transmit Data
TT	Terminal Timing
TX	Transmit (Transmitter)
TXC	Transmit Clock
TXCLK	Transmit Clock
TXD	Transmit Data
TXO	TX Octet
US	United States
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
Ver or VER	Version
W	Watt



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



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