SFC2100A

Synthesized Frequency Downconverter

Installation and Operation Manual

TM107
Revision 1.1

Radyne Inc. • 3138 E. Elwood St. • Phoenix, AZ 85034 • (602) 437-9620 • Fax: (602) 437-4811 • www.radn.com


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Warranty Policy

WP

Radyne Inc. (Seller) warrants the items manufactured and sold by Radyne Inc. to be free of defects in material and workmanship for a period of two (2) years from date of shipment Radyne Inc. 's obligation under its warranty is limited in accordance with the periods of time and all other conditions stated in all provisions of this warranty.

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Radyne Inc. will not make warranty adjustments for failures of products or parts, which occur after the specified maximum adjustment period. Unless otherwise agreed, failure shall be deemed to have occurred no more than seven (7) working days before the first date on which Radyne Inc. receives a notice of failure. Under no circumstances shall any warranty exceed the period stated above unless expressly agreed to in writing by Radyne Inc.

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All obligations of Radyne Inc. under this warranty shall cease in the event its products or parts thereof have been subjected to accident, abuse, alteration, misuse or neglect, or which have not been operated and maintained in accordance with proper operating instructions.

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Statements made by any person, including representatives of Radyne Inc. , which are inconsistent or in conflict with the terms of this warranty, shall not be binding upon Radyne Inc. unless reduced to writing and approved by an officer of Radyne Inc.

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Before a warranty repair can be accomplished, a Repair Authorization must be received. It is at this time that Radyne Inc. will authorize the product or part to be returned to the Radyne Inc. facility or if field repair will be accomplished. The Repair Authorization may be requested in writing or by calling:

Radyne Inc.

3138 E. Elwood St.
Phoenix, Arizona 85034 (USA)
ATTN: Customer Support
Phone: (602) 437-9620
Fax: (602) 437-4811

Any product returned to Radyne Inc. for examination must be sent prepaid via the means of transportation indicated as acceptable to Radyne Inc. Return Authorization Number must be clearly marked on the shipping label. Returned products or parts should be carefully packaged in the original container, if possible, and unless otherwise indicated, shipped to the above address.

Non-Warranty Repair

When a product is returned for any reason, Customer and its shipping agency shall be responsible for all damage resulting from improper packing and handling, and for loss in transit, not withstanding any defect or nonconformity in the product. By returning a product, the owner grants Radyne Inc. permission to open and disassemble the product as required for evaluation. In all cases, Radyne Inc. has sole responsibility for determining the cause and nature of failure, and Radyne Inc. 's determination with regard thereto shall be final.

Preface

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This manual provides installation and operation information for the Radyne SFC2100A Synthesized Frequency Downconverter. This is a technical document intended for use by engineers, technicians, and operators responsible for the operation and maintenance of the SFC2100A.

Conventions

Whenever the information within this manual instructs the operator to press a pushbutton switch or keypad key on the Front Panel, the pushbutton or key label will be shown enclosed in "less than" (<) and "greater than" (>) brackets. For example, the Reset Alarms Pushbutton will be shown as <RESET ALARMS>, while a command that calls for the entry of a '7' followed by 'ENTER' Key will be represented as <7,ENTER>.

Cautions and Warnings

A caution icon 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.

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

A note icon identifies information for the proper operation of your equipment, including helpful hints, shortcuts, or important reminders.

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Copyright

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This manual has been thoroughly reviewed for accuracy. All statements, technical information, and recommendations contained herein 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. Radyne Inc. assumes no responsibility for use of any circuitry other than the circuitry employed in Radyne Inc. systems and equipment. Furthermore, since Radyne Inc. is constantly improving its products, reserves the right to make changes in the specifications of products, or in this manual at any time without notice and without obligation to notify any person of such changes.

Record of Revisions

Revision Level	Date	Reason for Change
1.0	8-27-04	Initial Release
1.1	2-27-06	Update Appendix B

Comments or Suggestions Concerning this Manual

Comments or suggestions regarding the content and design of this manual are appreciated. To submit comments, please contact the Radyne Inc. Customer Service Department.

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Introduction

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1.0 Description

This manual discusses the Radyne Corporation SFC2100A Synthesized Frequency Downconverter (Figure 1-1). It is a high-quality, rack mounted satellite downconverter that is intended for use in medium-to-large earth station installations where multiple carrier uplinks need to be established.

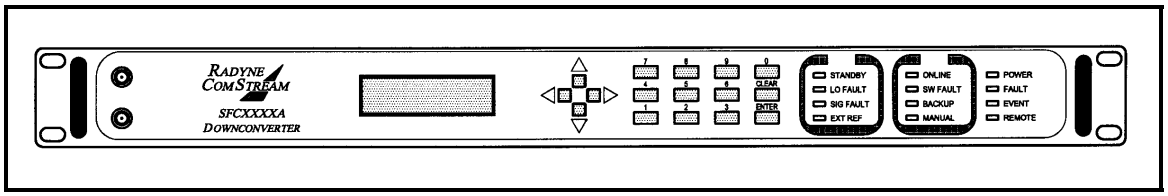

Figure 1-1. SFC2100A Downconverter Front Panel

The SFC2100A Downconverter is a Ka-Band, 125 kHz resolution synthesized satellite downconverter capable of converting a Ka-Band downlink in the range of 17700 to 21200 MHz In Bands, to either a 36 MHz bandwidth, 70 MHz IF output or optionally to a 72 MHz bandwidth, 140 MHz carrier.

All of the configuration, monitor, and control functions are available at the front panel. Operating parameters such as frequency, channel, gain, and gain offset can be readily set and changed at the front panel. Additionally, all functions can be accessed with a terminal or personal computer via a serial link (RS-232, RS-485, or Ethernet) for complete remote monitoring and control (M&C) capability. Extensive fault monitoring with masking capability, along with time and date stamped event storage is available.

The units monitor local oscillator (LO) phase-locked loop faults in the converter at all times during operation. If a fault is detected, the converter immediately goes into the Standby Mode. If multiple converters are configured to provide backup protection switching, a summary fault will signal the backup, which will put itself online and restore the failed circuit.

The RF Hardware consists of a broadband synthesizer, a fixed frequency phase locked oscillator, and the first and second converter modules. The broadband synthesizer provides the synthesized local oscillator for the conversion from RF to L-Band. The LO that tunes from 7600 to 9350 GHz performs this conversion. The second mixer converts the L-Band Signal to either the 70 or 140 MHz IF Output. A fixed frequency IFLO performs this frequency conversion.

A 40 dB gain control attenuator at the IF output controls the power out of the converter. This attenuator is capable of 0.2 dB resolution through a software linear interpolation of 1 dB calibration values.

The internal IF is converted by the Second Mixer LO to 70 or 140 MHz. The 70/140 MHz IF chain also performs filtering and phase equalization via an all-pass network. The gain calibration process also provides gain slope across all bands to be within the specified ± 0.75 dB. Additional gain compensation due to changes in ambient temperature provide for high gain stability over various operating conditions.

The SFC2100A Downconverter have been designed to provide performance that meets or exceeds all industry standards in effect today for satellite communications earth station frequency converter equipment found worldwide. In addition to providing robust performance, the SFC2100A Downconverter are loaded with features that will provide ease of integration and operation.

Installation

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2.0 Installation Requirements

SFC2100A Downconverter are designed to be installed within any standard 19 inch equipment cabinet or rack, and requires 1 Rack Unit (RU) mounting space (1.75 inches, 4.44 cm) vertically and 19 inches (48.26 cm) of depth. Including cabling, a minimum of 20 inches (50.8 cm) of rack depth is required. The power connector is located on the left and cabling enters from the center and right when viewed from the rear of the unit. Data and control cabling can enter from either side. The unit can be placed on a table or suitable stable surface if required.

! CAUTION!!

Before initially applying power to the unit, it is a good idea to disconnect the transmit output from the operating station equipment. This is especially true if the current SFC2100A Downconverter configuration settings are unknown, where incorrect setting could disrupt existing communications traffic.

! WARNING!!

There are no user-serviceable parts or configuration settings located inside the SFC2100A Downconverter Chassis. There is a potential shock hazard internally at the power supply module. DO NOT open the SFC2100A Chassis under any circumstances.

2.1 Unpacking

The SFC2100A Downconverter was carefully packaged to avoid damage and should arrive complete with the following items for proper installation:

SFC2100A Downconverter Unit
Power Cord, 6 foot with applicable AC Connector (for North America)
Installation and Operation Manual

2.2 Removal and Assembly

SFC2100A Downconverter are shipped fully assembled and do not require removal of the covers for any purpose in installation.

Carefully unpack the unit and ensure that all of the above items are in the carton. If available AC mains power available at the installation site requires a different cordset form the one included in the package, then a suitable and approved cordset (for the country where the equipment is to be installed) will be required before proceeding with the installation.

Should the Power Cable/AC Connector be of the wrong type for the installation, either the cable or the power connector end should be replaced. The power supply itself is designed for universal AC application. See specifications for the appropriate voltages and currents.

2.3 Mounting Considerations

When mounted in an equipment rack, adequate ventilation must be provided. The ambient temperature in the rack should be between 10°C and 35°C, and held constant for best equipment operation. The air available to the rack should be clean and relatively dry.

2.4 Initial Power-Up

Turn the unit 'ON' by placing the rear panel switch (above the power entry connector) to the 'ON' position. Upon initial and subsequent power-ups, the SFC2100A Downconverter will test itself and several of its components before beginning its main Monitor & Control Program. The Event Buffer LED will illuminate and the unit will log setup events upon power-up. This allows the user to tell if there was an accidental power failure or if the power was manually cycled for any reason while the unit was left unattended. These events can be cleared after setup. If any failure is detected, an Alarm LED will illuminate.

Theory of Operation

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3.0 Theory of Operation

The SFC2100A Downconverter has been designed to minimize the amount of hardware in the system while maximizing performance. Spurious performance in the Downconverter is critical and in particular, LO related spurious In-Band is nonexistent.

The SFC2100A Downconverter is double conversion microwave Downconverters. The basic block diagram is shown in Figure 3-1.

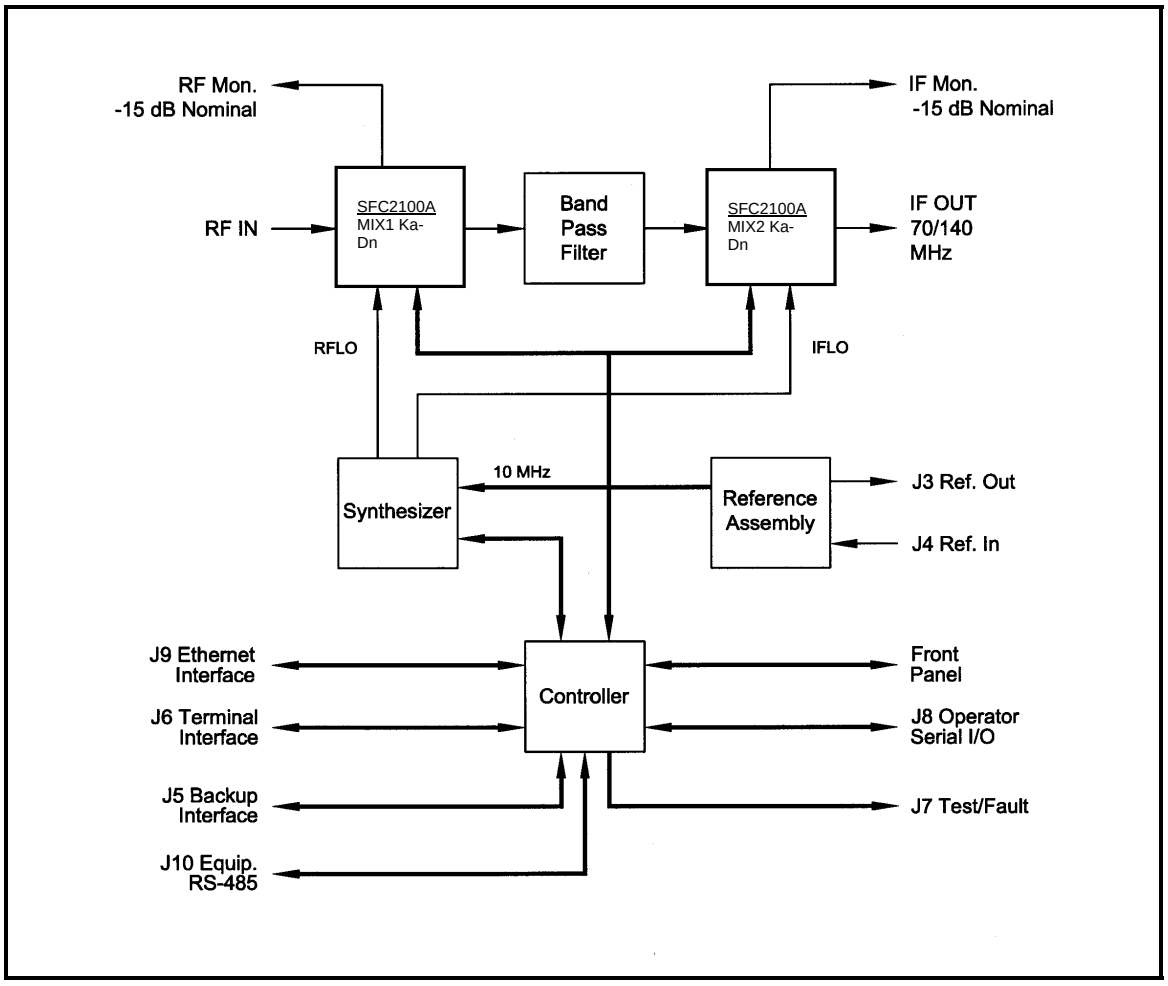

Figure 3-1. SFC2100A Downconverter Block Diagram

3.1 Converter Configuration

The user can set up all configurable parameters using one of the four different Front Panel Interfaces described in Section 4.


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User Interfaces

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4.0 User Interfaces

There are four user interfaces available for the SFC2100A Downconverter. These are:

- Front Panel
- Remote Port
- Terminal Port
- Ethernet Port

4.1 Front Panel User Interface

The Front Panel of the SFC2100A Downconverter allows for complete monitor and control (including but not limited to operation, calibration, and testing) of all parameters and functions via Monitoring Ports, a Keypad, LCD Display and Status LEDs.

The front panel layout is shown in Figure 4-1, showing the location and labeling of the front panel. The front panel is divided into four functional areas: Monitoring Ports, LCD Display, Cursor Control Arrows, Numeric Keypad, and LED Indicators. Each is described below. Table 4-1 lists each of these areas. They are further described below.

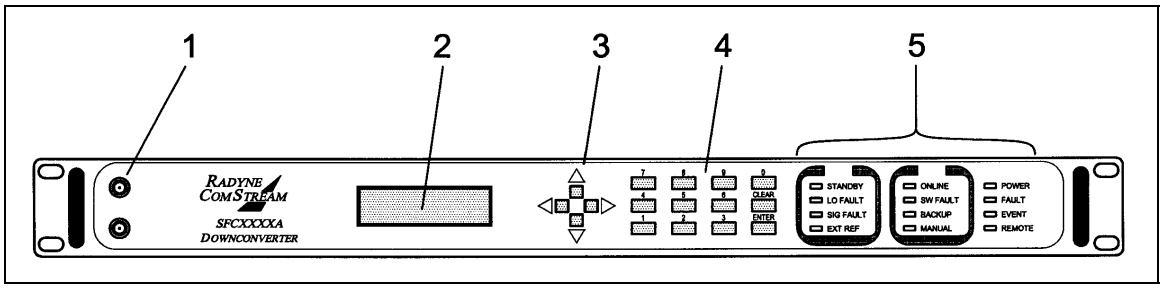


Figure 4-1. SFC2100A Downconverter Front Panel Controls and Indicators

Table 4-1. Front Panel User Interface		
Item No.	**Description**	**Function**
1	Monitoring Ports	Allow monitoring of the RF and IF Signals.
2	LCD Display	Displays SFC2100A Downconverter operating parameters and configuration data.
3	Cursor Control Arrows	Controls the left, right, up, and down motion of the cursor in the LCD Display window.
4	Numeric Keypad	Allows entry of numeric data and Clear and Enter Function Keys.
5	LED Indicators	Displays SFC2100A Downconverter operating status.

4.1.1 Monitoring Ports

Refer to Section 5.12.

4.1.2 LCD Display

The front panel display is a 2 line by 16-character LCD display. The display is lighted and the brightness can be set to increase when the front panel is currently in use. The LCD display automatically dims after a period of inactivity. The display has two distinct fields showing current information. The upper field shows the current parameter being monitored, such as 'FREQUENCY (GHz)' or 'CHNL GAIN (dB)'. The lower field shows the current value of that parameter. The LCD display is a single entry window into the large matrix of parameters that can be monitored and set from the front panel.

4.1.3 Cursor Control Arrows

Table 4-2. Cursor Control Arrow Keys

Key	Function
Left/Right Arrow Keys (→), (←)	The Left/Right Arrow Keys are used to move through the Menu structure. The Left/Right Arrow Keys are also used to move the cursor to a specific digit in a number field. No changes in the values or status can be executed from the left/right cursor movement.
Up/Down Arrow Keys (↑), (↓)	The Down Arrow Key is used to move from a Menu screen to the selections or submenus beneath that Menu. The Up Arrow does the reverse, moving from a submenu or selection to a higher-level Menu. The Up/Down Arrow Keys are also used to change the value of some parameters. Some Menu items, such as SYSTEM<CONTROL MODE, contain a list of possible settings. The Arrow Keys are used to scroll through the list until the desired setting is displayed. Similarly, these keys toggle the ± sign of any signed parameters. <ENTER> is then used to execute the selection. For numerical parameters, such as CONVERTER<FREQUENCY(GHz), the Arrow Keys can be used to scroll through the possible values of each particular digit. The Left/Right Keys are used to move the cursor to the desired digit. To execute a change, <ENTER> must be pressed.

4.1.4 Front Panel Keypad

The front panel keypad consists of two areas: a 10-key numeric entry with 2 additional keys for the ‘Enter’ and ‘Clear’ function. The second area is a set of ‘Arrow’ or ‘Cursor’ keys (↑), (↓), (→), (←), used to navigate the parameter currently being monitored or controlled. Table 4-3 describes the key functions available at the front panel.

Table 4-3. Front Panel Keypad	
Key	**Function**
0 to 9	The Number Keys are used to change numeric values in the value field of the LCD display.
CLEAR	If pressed before <ENTER> during a parameter change, the CLEAR Key will cause that parameter to return to its original value.
ENTER	The Enter Key will cause changes to Frequency, Status, and other operator-selected parameters to be executed. It also causes the status of the converter to be saved into non-volatile memory.

4.1.5 LED Indicators

There are twelve (12) LEDs on the SFC2100A Downconverter Front Panel to indicate the operation status (refer to Table 4-3).

Table 4-3. Front Panel LED Indicators		
LED	**Color**	**Function**
POWER	Green	When illuminated, indicates the presence of primary power and that the On/Off Switch located on the rear of the chassis is in the On Position.
FAULT	Red	When illuminated, Indicates a common fault (internal hardware).
EVENT	Yellow	When illuminated, indicates that an event (may be a fault or startup sequence) has occurred and is stored in the Event Buffer along with a date/time stamp.
REMOTE	Green	When illuminated, indicates that the converter is in Remote Mode. In this mode, the unit settings can only be modified and controlled via a remote interface.
ONLINE	Green	When illuminated, indicates that the backup converter has been placed online to backup a Prime Converter (backup converter Only).
SW FAULT	Red	No Function
BACKUP	Yellow	Not Used
MANUAL	Yellow	When illuminated, indicates that the backup converter has been Manually placed Online (backup converter Only).
STANDBY	Green	When illuminated, indicates that the converter has been taken offline and backed up by the Backup (Converter Prime Converter in a 1:1 or 1:N Switch Only).

LO FAULT	Red	If the Synthesized LO or IFLO System of the converter indicates an out-of-lock condition, the LO Fault LED will illuminate. At this time, the Summary Fault Relay Contacts will latch. If the LO Fault was due to an Intermittent Fault Condition, the LO Fault will flash at one-second intervals, and fault checked may be reset.
SIG FAULT	Yellow	Signal Faults are used in switch configuration to indicate switch status (when in the Backup Mode).
EXT REF	Yellow	This LED illuminates when an external 10 MHz reference signal has been applied to the converter. A LO fault may occur when the external reference is applied or removed. This indicates that a change in the reference has occurred. This fault can be cleared with a soft reset.

4.2 Front Panel Control Screen Menus

The complete set of SFC2100A Downconverter Front Panel Control Screens are contained within the following Main Menus:

4.2.1 Main Menus

Converter Menu Options and Parameters

Switch Menu Options and Parameters

Monitor Menu Options and Parameters

Alarms Menu Options and Parameters

System Menu Options and Parameters

Test Menu Options and Parameters

4.2.2 Converter Menu Options and Parameters

FREQUENCY (GHz):

{17700 – 18800} Plan A
{18800 – 19300} Plan B
{19200 – 20200} Plan C
{20000 – 21200} Plan D

Sets the RF input frequency. The available range depends upon the Converter model.

CHNL GAIN (dB):

{+00.0 – +40.0}
Sets the Channel Gain in 0.1 dB steps.

CURRENT CHNNL: **{01 – 30}**
Selects the current channel of the unit. Each channel allows entering of an independent set of parameters (Frequency, Gain, etc.). For example, Channel 1 Frequency might be set to 18.900 GHz and Channel 2 could be set to 19.000 GHz. Any of the other parameters could be different as well. The advantage is that by changing the channel number, a completely different setup can be achieved.

4.2.3 Monitor Menu Options and Parameters

REFERENCE: **{INTERNAL, EXTERNAL}**
Indicates the reference source of the unit. The SFC2100A Downconverter will detect a valid external reference source when it is connected to J4 on the rear panel and automatically select 'External'. Likewise, when no signal (or a signal not meeting the Reference input specification) is connected to J4, the unit will switch to the 'Internal'. The process is completely automatic, and it is independent of M&C control.

MON VOLTAGES:

DAC ATTEN V Monitors the voltage of the Output Attenuator DAC.

VCC1 VOLTAGE: Displays the voltage of the Controller PCB Microprocessor +5V.

+9V VOLTAGE: Displays the voltage of the System Supply +9V.

+15V VOLTAGE: Displays the voltage of the System Supply +15V.

- 15V VOLTAGE: Displays the voltage of the System Supply -15V.

MON DACS:

MIXER DAC VAL: Displays the decimal value written to the IF Attenuation DAC. This value is not under user control.

MIXER DAC VOL: Displays the expected voltage output of the IF Attenuation DAC.

REF DAC VALUE: Displays the decimal value written to the VCO Reference Control DAC. This value is entered by the user in the TEST\REF OFFSET Menu, and cannot be changed from this Menu.

REFDAC VOLTAGE: Displays the expected voltage output of the VCO Reference Control DAC.

EVENT BUFF The Event Buffer stores any faults that occur, including start up procedures, along with a time/date stamp.

PRESS CLR TO ERASE EVENTS: Pressing the <CLEAR> when this screen is displayed will erase all of the events currently stored in the Event Buffer.

4.2.4 Alarms Menu Options and Parameters

For the alarms listed below, the PASS/FAIL displayed is only an indicator and cannot be changed by the user. The MASK/UNMASKED Field, however, does allow user input. Masking an alarm will cause it to be ignored by the unit if that alarm fails. The LCD will display FAIL, but the unit will otherwise not respond to the Fault. This function can aid in troubleshooting system problems.

ACTIVE ALRMS:

MAJOR:

LO FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Reports an alarm when the Synthesizer Module indicates an unlocked condition.

SIGNAL FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Reports a failure when there is an IF Detect Fault.

MINOR:

RF DTECT FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a failure when the detected RF input signal falls below a fixed threshold.

IF DTECT FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a failure when the detected IF signal falls below a fixed threshold.

COMMON:

CPLD FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the Controller PCB Microprocessor reads back an unexpected value from the CPLD. This is a check performed on system power up.

FPGA FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the Controller PCB microprocessor reads back an unexpected value from the FPGA. This is also a check performed on system power up.

EEPROM FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the Controller PCB microprocessor reads back an unexpected value from the EEPROM. This is checked on system power-up, but is also monitored during normal operation.

REFERENCE ACT: **{PASS, FAIL/UNMASKED, MASKED}**
A failure indicates that there is no signal connected to the External Reference input on the back panel. In this condition, the Converter uses the internal reference oscillator.

VCC1 FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the +5V Supply Voltage of the Controller PCB Microprocessor is outside a fixed range.

+9V FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the +9V System Supply Voltage is outside a fixed range.

+15V FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the +15V System Supply Voltage is outside a fixed range.

- 15V FAULT: **{PASS, FAIL/UNMASKED, MASKED}**
Indicates a fault if the -15V system supply voltage is outside a fixed range.

LATCHED ALRM: The Latched Alarm Menu structure is identical to the Active Alarms. However, if any alarm is triggered it will be Latched. For example, if an External Reference is disconnected from the rear panel, an LO Fault will be reported while the LO regains lock. After the LO recovers, even though the Active Alarm no longer reports the alarm, the Latched Alarm will still display <FAIL>. In other words, the alarm was latched.

CLEAR ALARMS (ENT = Y,CLR = N): Pressing <ENTER> will clear all of the Latched Alarms currently stored.

4.2.5 System Menu Options and Parameters

CONTROL MODE: **{FT PANEL, TERMINAL, COMPUTER, ETHERNET}**
Sets the Control Mode of the Downconverter.

DATE: Allows the user to enter the date in DD/MM/YY format.

TIME: Allows the user to enter the time in HH:MM:SS format.

FRONT PANEL:

LEVEL: **{OFF, LOW, MID, HIGH}**
Allows the user to set the backlight intensity of the LCD display.

TIMEOUT: **{00 - 99}**
Allows the user to set the length of inactive time (in seconds) after which the display backlight shuts off automatically. Entering 00 allows the backlight to remain on continuously.

KEY CLICK: **{OFF, ON}**
Allows the user turn an audible key click on/off.

TERMINAL:

TERM. BAUD: **{2400, 9600, 19200}**
Allows the user to set the baud rate for terminal port communication.

EMULATION: **{ADDS VP, VT100, WYSE 50}**
Allows the user to set the terminal emulation mode.

ECHO MODE: **{OFF, ON}**
Allows the user to control whether the input at the terminal is echoed back.

REMOTE PORT:

REMOTE PRTOCOL: **{ASCII, RLLP}**
Allows the user to set the remote port communication protocol.

REMOTE ADDR: **{32 - 255 RLLP, 1 – 255 ASCII}**
Allows the user to set the communication address of the remote port.

REMOTE BAUD: **{2400, 9600, 19200}**
Allows the user to set the baud rate for remote port communication.

ECHO MODE: **{OFF, ON}**
Allows the user to control whether the input at the terminal is echoed back. Only valid in Remote ASCII Mode.

REMOTE LINE: **{RS-232, RS-485}**
Sets the interface type of the remote port.

HW/FW CONFIG:

FIRMWARE: **FW/XXXX - - Version Y.YY**
Displays the revision number of the installed M&C Firmware (where XXXX is the firmware number and Y.YY is the version).

FW/XXXX - - 19DEC2002
Displays the revision number and release date of the installed M&C Firmware.

CPLD VERSION: **{x.x}**
Displays version number of installed CPLD Firmware.

FPGA VERSION: **{x.x}**
Displays version number of installed FPGA firmware.

HARDWARE:

CONVRTR CONFIG: **{STAND ALONE}**
Allows the user to indicate the function of the Converter as it is connected in the system.

CONVERTER ID: **{1 - 11, 15}**
Displays a decimal version of the binary ID bits described above and in Section 5.10.

CONVERTER TYPE: **{DN CONVERTER, UPCONVERTER}**
Indicates whether the unit is an Upconverter or a Downconverter. This display will match the text on the Front Panel Overlay.

CONVERTER BAND: **{KA-BAND}**
Indicates that the unit is a Ka-Band Converter. This display will match the text on the Front Panel Overlay.

FREQUENCY TYPE: **{70 MHz, 140 MHz}**
Indicates the IF type of the Converter.

SYNTHESIZER: **{MFS-9.6, MFS-13.25}**
Displays the model number of the unit's installed synthesizer. The frequency range of each model is given below:

Model	IF LO Frequency	Frequency Range	
		Low	High
MFS 9_6	2430 MHz	8350 MHz	8850 MHz
MFS 13_5	2430 MHz	26.500 GHz	27.750 GHz

DEBUG MODE: Password protected. Enables additional Menus for debugging purposes.

LOAD DEFAULT: Password protected. Configures the Converter with a set of default parameters. Refer to Section 4.5 for actual default settings.

SNMP DEFAULT: Password protected. Configures the Converter SNMP (Ethernet Interface) settings to default values.

4.2.6 Test Menu Options and Parameters

REF OFFSET: **{0000 - 4095}**

The REF OFFSET field of the Test Menu allows the operator to adjust the frequency of the 10 MHz High Stability Internal Reference and vary the output of the Synthesized RF LO by ± 50 parts per billion (ppb). One part per billion represents a change of 1 Hz per GHz (1 billion Hz) of output frequency. Thus, each unit of ppb will allow a change in accuracy of the converter of 1×10^{-9}.

The exact frequency of the LO Output can be calculated from the displayed frequency on the converter front panel as follows:

LO = (Rx Freq. – 2500)/2

The RF Monitor output can be measured with a frequency counter of known calibration.

The stability of the 10 MHz Reference is related to the temperature of a 10 MHz crystal inside the unit. A proportionally controlled oven around the crystal maintains the temperature in the oven to 0.1°C. In addition, the precise temperature that the oven maintains has been determined empirically for each crystal during manufacturing. As long as the ambient temperature stays within limits (0 - 50°C) the reference will maintain stability of greater than 1×10^{-8} (refer to Figure 4-2).

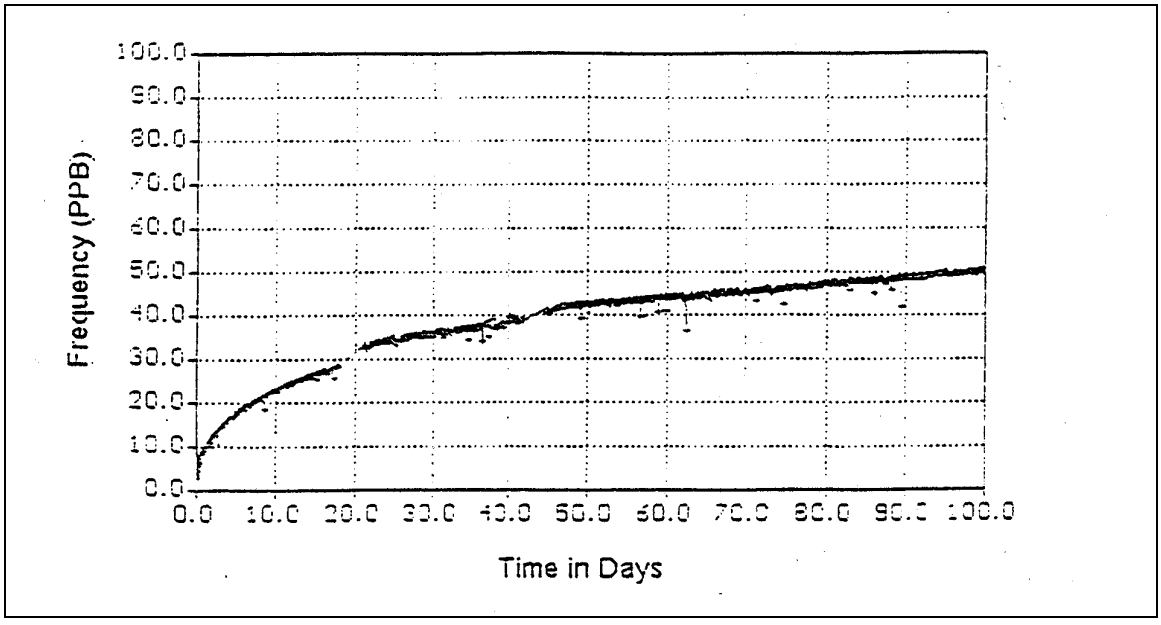


Figure 4-2. Typical Reference Aging vs. Time

Long-term stability of the reference is affected by factors other than temperature. Over days and months, the frequency of the reference will drift at a rate specified as aging. Typical aging rates of 1 to 5 parts in 10^{-10} per day are typical in a crystal that has been stabilized for a few weeks. The first month of operation for any crystal is a time where drift due to aging can be excessive.
The typical aging curve provides insight into the exponential decay in aging rate for a 10 MHz Reference. Converters shipped from the factory have had their reference oscillator aged for a minimum of 30 days and in addition, the aging rate has been verified in the final week to within tolerance. However, converters that have been in storage or powered off for a period of several weeks will exhibit a phenomenon whereby the aging curve return to the slope shown for zero days of aging. This aging reset in not well understood but the manufacturers of crystals believe it to be related to a gradual relaxation of the molecular makeup of the quartz substrates and the conductive films deposited on the quartz.

The rule of thumb when checking the frequency accuracy of the converter is to make sure that the crystal has stabilized before attempting any adjustment. For units that have been in storage or shipment for more than a week, allow several days of operation before verifying the accuracy. For this reason, converters shipped from Radyne Corporation are typically powered-up until the final day before shipment. In addition, the accuracy and aging rate are verified immediately prior to shipment.

For a converter that has been powered-up for several months, the operator can assume an aging rate of several ppb per month. If the aging rate has been established, the station operator can make calculated adjustments from the reference offset Menu at timed intervals.

LED TEST: **{OFF, ON}**
Allows the user to test the function of all front panel LEDs. All of the LEDs will cycle on and off except the Power LED, which is always lit when power is on.

4.3 Examples: Changing Parameters from the Front Panel

4.3.1 Changing Frequency: Numeric Keypad

NOTE

For this example, it is assumed that the Frequency is currently set to 4 GHz.

1. Upon powering up, the Initializing Screen can be seen on the Front Panel LCD Display for several seconds. This screen indicates the current revision of firmware. Next displayed is one of the following Boot Up Screens.

2. Press and release the Right Arrow Key once. The CONVERTER Menu is displayed.

3. Press and release the Left Arrow Key six (6) times. Notice that the Menu field "wraps" around and ends up at the CONVERTER screen again.

4. Press and release the Down Arrow Key. The FREQUENCY (GHz) Screen is displayed.

5. Press and release <ENTER> once. The cursor appears at the lower left corner of the LCD Display.

6. Press and release the Right Arrow Key until the cursor is at the digit to the left of the decimal point. Press and release <8> on the numeric Keypad. The “8” digit now appears at that position and the cursor moves one location to the right.

7. Press and release <ENTER> once. The cursor is no longer visible, and the frequency field now displays "18.0000".

4.3.2 Changing Frequency: Up/Down Arrow Keys

1. Upon powering up, the Boot-Up Screen is shown in the LCD display.

2. Press and release the Right Arrow Key once. The CONVERTER Menu is displayed.

3. Press and release the Down Arrow Key. The FREQUENCY (GHz) Screen is displayed.

4. Press and release <ENTER> once. The cursor appears at the lower left corner of the LCD display.

5. Press and release the Right Arrow Key until the cursor is at the digit to the right of the decimal point. Press the Up Arrow Key until the display shows "18.4000". The cursor is still visible and flashing over the number "4", to the right of the decimal point.

7. Press and release <ENTER> once. The cursor is no longer visible, and the frequency field now displays "18,4000".

8. Press and release <ENTER> once. The cursor appears at the lower left corner of the LCD Display.

9. Press and release the Right Arrow Key until the cursor is at the digit to the right of the decimal point. Press the Down Arrow Key until the display shows "18.2000". The cursor is still visible and flashing over the number "2", to the right of the decimal point.

10. Press and release <ENTER> once. The cursor is no longer visible, and the frequency field now displays "18.2000".

4.3.3 Changing Control Mode to 'TERMINAL'

1. Upon powering up, the Boot-Up Screen is shown in the LCD display.

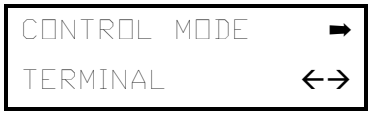
2. Continue pressing and releasing the Left Arrow Key until the SYSTEM Menu is displayed.

3. Press and release the Down Arrow Key. The CONTROL MODE screen is displayed.

4. Press and release <ENTER> once. The cursor appears at the lower left corner of the LCD Display.

5. Press and release the Up Arrow Key until the bottom field displays "TERMINAL".

6. Press and release <ENTER> once. The cursor is no longer visible, and the selection has now been changed to "TERMINAL".



4.3.4 Changing Control Mode Back to 'FT PANEL'

1. Upon powering up, the Boot-Up Screen is shown in the LCD display.

2. Press and release the Right Arrow Key until the SYSTEM Menu is displayed.

3. Press and release the Down Arrow Key. The CONTROL MODE Screen is displayed.

4. Press and release <ENTER> once. The cursor appears at the lower left corner of the LCD Display.

5. Press and release the Up Arrow Key until the bottom field displays "FT PANEL".

6. Press and release <ENTER> once. The cursor is no longer visible, and the selection has now been changed to "FT PANEL".

4.4 Remote Port Front Panel Interfaces

The SFC2100A Downconverter Operator Serial Port allows a remote operator to control the converter. Through the serial protocols (ASCII and RLLP) described below, the remote operator can control gain, frequency, calibration, status, and fault isolation. The connector on the rear panel labeled J8, OPERATOR SERIAL I/O (DB-9 Female) is the physical port used for these protocols. It can be configured as either a RS-232 or RS-485 interface. If RS-232 is selected, an adaptor is needed between the converter connector J8 and the remote controller. See Section 5.9 for detailed pinout information. The port is factory-set to communicate as the DCE (Data Communications Equipment) with the following settings:

9600 baud
8 data bits
1 start bit
1 stop bit
no parity

The serial protocol is designed to provide DTE-to-DCE Point-to-Point Communications. The converter is wired as the DCE to provide an interface to a dumb terminal (DTE) without a null modem connection. Because the serial protocol uses unique addressable commands, the converters are capable of providing multipoint communications between a number of converters and a customer-supplied serial interface. The typical multipoint communications configurations include full-and half-duplex RS-485. In addition, a multipoint RS-232 interface is also possible.

The theory of operation for multipoint requires that the M&C Computer Transmit Port be connected in parallel to all of the Receive Data Ports of the various converters. Likewise, the transmit ports of the various converters must all be connected in parallel and tied to the Receive Data Port of the M&C Computer. To prevent any one Converter Transmit Port from acting as a low impedance, thus hanging the bus, each transmit port of each converter remains in a high impedance state until asked by the M&C computer to transmit.

To prevent data collisions from all the converters responding at once, each converter must be software configured for 'echo off' in the Configuration Menu. If the converters are being linked to a dumb terminal, the echo should be turned on locally.

4.4.1 ASCII Serial Protocol

The ASCII serial protocol serves as a 'wrapper' for the M&C data.

4.4.1.1 ASCII Command Structure

This serial command structure uses an ASCII character string format that enables serial control through the use of a 'dumb terminal.' To differentiate a proper command string from noise, all serial commands have a header followed by the specific command characters, followed by numeric values where required, and are terminated by a character return <cr>. The basic command structure is as follows:

@{Unit Address/}{Command}{Numerical Value(s)}<cr>

For the following examples, a unit address of 01 is assumed.

Refer to Appendix A for Remote ASCII Commends.

4.4.2 RLLP Serial Protocol

The Radyne Link Level Protocol (RLLP) is an alternative serial protocol used in conjunction with the remote port.

4.4.2.1 RLLP Protocol Structure

CAUTION!!

When new features are added to Radyne Corporation equipment, the control parameters are appended to the end of the Non-Volatile Section of the Remote Communications Specification, and status of the features, if any, are added at the end of the Volatile Section. If a remote M&C queries two pieces of Radyne Corporation equipment with different revision software, they could respond with two different sized packets. The remote M&C MUST make use of the non-volatile count value to index to the start of the Volatile Section. If the remote M&C is not aware of the newly added features to the product, it should disregard the parameters at the end of the Non-Volatile Section and index to the start of the Volatile Section.

Before creating any software based on the information contained in this document, contact the Radyne Corporation Customer Service Department (602-437-9620) to find out if the software revision for that piece of equipment is current and that no new features have been added since the release of this document.

The Communications Specification (COMMSPEC) defines the interaction of computer resident Monitor and Control software used in satellite earth station equipment such as modems, redundancy switches, multiplexers, and other ancillary support gear. Communication is bi-directional, and is normally established on one or more full-duplex multi-drop control buses that conform to EIA Standard RS-485.

Each piece of earth station equipment on a control bus has a unique physical address, which is assigned during station setup/configuration or prior to shipment. Valid decimal addresses on one control bus range from 032 - 255 for a total of up to 224 devices per bus. Address 255 of each control bus is usually reserved for the M&C computer.

4.4.2.2 RLLP Protocol Wrapper

The Radyne COMMSPEC is byte-oriented, with the Least Significant Bit (LSB) issued first. Each data byte is conveyed as mark/space information with two marks comprising the stop data. When the last byte of data is transmitted, a hold comprises one steady mark (the last stop bit). To begin or resume data transfer, a space substitutes this mark. This handling scheme is controlled by the hardware and is transparent to the user. A pictorial representation of the data and its surrounding overhead may be shown as follows:

S1	***S2***	***B_0***	***B_1***	***B_2***	***B_3***	***B_4***	***B_5***	***B_6***	***B_7***	***S1***	***S2, etc.***

The stop bits, S1 and S2, are each a mark. Data flow remains in a hold mode until S2 is replaced by a space. If S2 is followed by a space, it is considered a start bit for the data byte and not part of the actual data (B_0 - B_7).

The COMMSPEC developed for use with the Radyne Link Level Protocol (RLLP) organizes the actual monitor and control data within a shell, or "protocol wrapper", that surrounds the data. The format and structure of the COMMSPEC message exchanges are described herein. Decimal numbers have no suffix; hexadecimal numbers end with a lower case h suffix and binary values have a lower case b suffix. Thus, 22 = 16h = 000010110b. The principal elements of a data frame, in order of occurrence, are summarized as follows:

<SYN> - the message format header character, or ASCII sync character, that defines the beginning of a message. The <SYN> character value is always 16h.

<BYTE COUNT> - the Byte Count is the number of bytes in the <DATA> field, ranging from 0 - ***TBD***.

<SOURCE ID> - the Source Identifier defines the message originator's multidrop address.

All nodes on a given control bus have a unique address that must be defined.

<DESTINATION ID> - The Destination Identifier specifies the multidrop address of the device(s) to which the message is sent.

<FRAME SEQUENCE NUMBER> - The FSN is a tag with a value from 0 - 255 that is sent with each message. It assures sequential information framing and correct equipment acknowledgment and data transfers.

<OPCODE> - The Operation Code field contains a number that identifies the message type associated with the data that follows it. Acknowledgment and error codes are returned in this field. This field is 2 Bytes for the SFC2100A protocol.

<...DATA..> - The Data field contains the binary, data bytes associated with the <OPCODE>. The number of data bytes in this field is indicated by the <BYTE COUNT> value.

<CHECKSUM> - The checksum is the modulo 256 sum of all preceding message bytes, excluding the <SYN> character. The checksum determines the presence or absence of errors within the message. In a message block with the following parameters, the checksum is computed as shown below in Table 4-4.

Table 4-4. Checksum Calculation Example		
BYTE FIELD	**DATA CONTENT**	**RUNNING CHECKSUM**
<BYTE COUNT> (Byte 1)	00h = 00000000b	00000000b
<BYTE COUNT> (Byte 2)	02h = 00000010b	00000010b
<SOURCEID>	F0h = 11110000b	11110010b
<DESTINATION ID>	2Ah = 00101010b	00011100b
<FSN>	09h = 00001001b	00100101b
<OPCODE> (Byte 1)	00h = 00000000b	00101000b
<OPCODE> (Byte 2)	03h = 00000011b	00101000b
<DATA> (Byte 1)	DFh = 11011111b	00000111b
<DATA> (Byte 2)	FEh = 11111110b	00000101b

Thus, the checksum is 00000101b; which is 05h or 5 decimal. Alternative methods of calculating the checksum for the same message frame are:

00h + 02h + F0h + 2Ah + 09h + 00h + 03h + DFh + FEh = 305h.

Since the only concern is the modulo 256 (modulo 100h) equivalent (values that can be represented by a single 8-bit byte), the checksum is 05h.

For a decimal checksum calculation, the equivalent values for each information field are:

0 + 2 + 240 + 42 + 9 + 0 + 3 + 223 + 254 = 773;

773/256 = 3 with a remainder of 5. This remainder is the checksum for the frame.

5 (decimal) = 05h = 0101b = <CHECKSUM>

4.4.2.3 Frame Description and Bus Handshaking

In a Monitor and Control environment, every message frame on a control bus port executes as a packet in a loop beginning with a wait-for-SYN-character mode. The remaining message format header information is then loaded, either by the M&C computer or by a subordinate piece of equipment requesting access to the bus. Data is processed in accordance with the OPCODE, and the checksum for the frame is calculated. If the anticipated checksum does not match then the wait-for-SYN mode goes back into effect. If the OPCODE resides within a command message, it defines the class of action that denotes an instruction that is specific to the device type, and is a prefix to the DATA field if data is required. If the OPCODE resides within a query message packet, then it defines the query code, and can serve as a prefix to query code DATA.

The Frame Sequence Number (FSN) is included in every message packet, and increments sequentially. When the M & C computer or bus-linked equipment initiates a message, it assigns the FSN as a tag for error control and handshaking. A different FSN is produced for each new message from the FSN originator to a specific device on the control bus. If a command packet is sent and not received at its intended destination, then an appropriate response message is not received by the packet originator. The original command packet is then re-transmitted with the same FSN. If the repeated message is received correctly at this point, it is considered a new message and is executed and acknowledged as such.

If the command packet is received at its intended destination but the response message (acknowledgment) is lost, then the message originator (usually the M&C computer) re-transmits the original command packet with the same FSN. The destination device detects the same FSN and recognizes that the message is a duplicate, so the associated commands within the packet are not executed a second time. However, the response packet is again sent back to the source as an acknowledgment in order to preclude undesired multiple executions of the same command.

To reiterate, valid equipment responses to a message require the FSN tag in the command packet. This serves as part of the handshake/acknowledge routine. If a valid response message is absent, then the command is re-transmitted with the same FSN. For a repeat of the same command involving iterative processes (such as increasing or decreasing transmit power level), the FSN is incremented after each message packet. When the FSN value reaches 255, it overflows and begins again at zero.

The full handshake/acknowledgment involves a reversal of source and destination ID codes in the next message frame, followed by a response code in the <OPCODE> field of the message packet from the equipment under control.

4.4.2.4 Global Response Operational Codes

In acknowledgment response packets, the operational code <OPCODE> field of the message packet is set to 0 by the receiving devices when the message intended for the device is evaluated as valid. The device that receives the valid message then exchanges the <SOURCE ID> with the <DESTINATION ID>, sets the <OPCODE> to zero in order to indicate that a good message was received, and returns the packet to the originator. This "GOOD MESSAGE" Opcode is one of nine global responses. Global response Opcodes are common responses, issued to the M&C computer or to another device, that can originate from and are interpreted by all Radyne equipment in the same manner. These are summarized as follows all Opcode values are expressed in decimal form:

Table 4-5. Response OPCODES

RESPONSE OPCODE DESCRIPTION	OPCODE
Good Message	0000h
Bad Parameter	00FFh
Bad Opcode	00FEh
Bad Checksum	00FDh
Command Not Allowed in LOCAL Mode	00FCh
Command Not Allowed in AUTO Mode	00FBh
Bad Destination	00FAh
Unable to Process Command	00F9h
Packet Too Long	00F8h

The following response error codes are specific to the SFC2100A Downconverter:

SFC2100A Response Error Code Descriptions	OPCODE
REMOTE_ERROR_CONTROL_MODE	0203h
REMOTE_ERROR_BAD_PARAMETER	0204h
REMOTE_ERROR_INVALID_TIME	0205h
REMOTE_ERROR_INVALID_DATE	0206h
REMOTE_ERROR_RANGE	0220h
REMOTE_ERROR_RANGE_LO	0221h
REMOTE_ERROR_RANGE_HI	0222h
REMOTE_ERROR_PRIME_NOTPRESENT	0223h
REMOTE_ERROR_PRIME_NOTLEARNED	0224h
REMOTE_ERROR_PRIME_NOTASSIGNED_A_BACKUP	0225h
REMOTE_ERROR_BACKUP_IN_MANUAL_MODE	0226h
REMOTE_ERROR_BACKUP_IN_AUTOMATIC_MODE	0227h
REMOTE_ERROR_IS_DOWN_CONVERTER	0228h
REMOTE_ERROR_IS_UP_CONVERTER	0229h
REMOTE_ERROR_IS_C_BAND_CONVERTER	022Ah
REMOTE_ERROR_IS_KU_BAND_CONVERTER	022Bh
REMOTE_ERROR_IS_KA_BAND_CONVERTER	022Ch
REMOTE_ERROR_INCOMPATIBILE_BAND	022Dh
REMOTE_ERROR_INCOMPATIBILE_TYPE	022Eh
REMOTE_ERROR_CHAIN_CARD_NOTPRESENT	022Fh
REMOTE_ERROR_INVALID_ENTRY	0240h
REMOTE_ERROR_INVALID_FREQUENCY	0241h
REMOTE_ERROR_INVALID_FREQUENCY_STEP	0242h
REMOTE_ERROR_INVALID_PRIME	0243h
REMOTE_ERROR_INVALID_COMPENSATION	0244h
REMOTE_ERROR_INVALID_PRIORITY	0245h
REMOTE_ERROR_INVALID_CHANNEL	0246h
REMOTE_ERROR_INVALID_GAIN	0247h

4.4.2.5 Collision Avoidance

When properly implemented, the physical and logical devices and ID addressing scheme of the COMMSPEC normally precludes message packet contention on the control bus. The importance of designating unique IDs for each device during station configuration cannot be overemphasized. One pitfall, which is often overlooked, concerns multi-drop override IDs. All too often, multiple devices of the same type are assigned in a direct-linked "single-thread" configuration accessible to the M&C computer directly. For example, if two SFC2100A Converters with different addresses DESTINATION IDs are linked to the same control bus at the same hierarchical level, both will attempt to respond to the M&C computer when the computer generates a multi-drop override ID of 1. If their actual setup parameters, status, or internal timing differs, they will both attempt to respond to the override simultaneously with different information, or asynchronously in their respective message packets and response packets, causing a collision on the serial control bus.

To preclude control bus data contention, different IDs must always be assigned to the equipment. If two or more devices are configured for direct-linked operation, then the M&C computer and all other devices configured in the same manner must be programmed to inhibit broadcast of the corresponding multi-drop override ID.

The multi-drop override ID is always accepted by devices of the same type on a common control bus, independent of the actual DESTINATION ID. These override IDs with the exception of "BROADCAST" are responded to by all directly linked devices of the same type causing contention on the bus. The "BROADCAST" ID, on the other hand, is accepted by all equipment but none of them returns a response packet to the remote M&C.

The following multi-drop override IDs are device-type specific, with the exception of "BROADCAST". These are summarized below with ID values expressed in decimal notation:

Table 4-6. Broadcast IDs

Directly-Addressed Equipment	Multi-Drop Override ID
Broadcast all directly-linked devices	00
DMD-3000/4000, 4500 or 5000 Mod Section, DMD15	01
DMD-3000/4000, 4500 or 5000 Demod Section, DMD15	02
RCU-340 1:1 Switch	03
RCS-780 1:N Switch	04
RMUX-340 Cross-Connect Multiplexer	05
CDS-780 Clock Distribution System	06
SOM-340 Second Order Multiplexer	07
DMD-4500/5000 Modulator Section	08
DMD-4500/5000 Demodulator Section	09
RCU-5000 M:N Switch	10
DMD15 Modulator	20
DMD15 Demodulator	21
DMD15 Modem	22
DVB3030 Video Modulator, DM240	23
Reserved for future equipment types	24 – 31

Multi-drop override ID 01 can be used interchangeably to broadcast a message to a DMD-3000/4000 modem, a DMD-4500/5000, a DMD15 modem, or a DVB3030. Radyne Corporation recommends that the multi-drop override IDs be issued only during system configuration as a bus test tool by experienced programmers, and that they not be included in run-time software. It is also advantageous to consider the use of multiple bus systems where warranted by a moderate to large equipment complement.

Therefore, if a DMD15 Modulator is queried for its equipment type identifier, it will return a "20" and DMD15 Demodulator will return a "21". A DMD15 Modem will also return an "22". A DVB3030 Video Modulator will return a "23."

4.4.2.6 Software Compatibility

The COMMSPEC, operating in conjunction within the RLLP shell, provides for full forward and backward software compatibility independent of the software version in use. New features are appended to the end of the DATA field without OPCODE changes. Older software simply discards the data as extraneous information without functional impairment for backward compatibility.

If new device-resident or M&C software receives a message related to an old software version, new information and processes are not damaged or affected by the omission of data.

The implementation of forward and backward software compatibility often, but not always, requires the addition of new Opcodes. Each new function requires a new Opcode assignment if forward and backward compatibility cannot be attained by other means.

When Radyne equipment is queried for bulk information (Query Mod, Query Demod, etc.) it responds by sending back two blocks of data; a Non-Volatile Section (parameters that can be modified by the user) and a Volatile Section (status information). It also returns a count value that indicates the size of the Non-Volatile Section. This count is used by M&C developers to index into the start of the Volatile Section.

When new features are added to Radyne equipment, the control parameters are appended to the end of the Non-Volatile Section, and status of the features, if any, are added at the end of the Volatile Section. If a remote M&C queries two pieces of Radyne equipment with different revision software, they may respond with two different sized packets. The remote M&C MUST make use of the non-volatile count value to index to the start of the Volatile Section. If the remote M&C is not aware of the newly added features to the Radyne product, it should disregard the parameters at the end of the Non-Volatile Section and index to the start of the Volatile Section.

If packets are handled in this fashion, there will also be backward-compatibility between Radyne Corporation equipment and M&C systems. Remote M&C systems need not be modified every time a feature is added unless the user needs access to that feature.

4.4.2.7 RLLP Summary

The RLLP is a simple send-and-wait protocol that automatically re-transmits a packet when an error is detected, or when an acknowledgment (response) packet is absent.

During transmission, the protocol wrapper surrounds the actual data to form information packets. Each transmitted packet is subject to time out and frame sequence control parameters, after which the packet sender waits for the receiver to convey its response. Once a receiver verifies that a packet sent to it is in the correct sequence relative to the previously received packet, it computes a local checksum on all information within the packet excluding the <SYN> character and the <CHECKSUM> fields. If this checksum matches the packet <CHECKSUM>, the receiver processes the packet and responds to the packet sender with a valid response (acknowledgment) packet.

The response packet is therefore either an acknowledgment that the message was received correctly. If the sender receives a valid acknowledgment (response) packet from the receiver, the <FSN> increments and the next packet is transmitted as required by the sender.

If an acknowledgment (response) packet is lost, corrupted, or not issued due to an error and is thereby not returned to the sender, the sender re-transmits the original information packet; but with the same <FSN>. When the intended receiver detects a duplicate packet, the packet is acknowledged with a response packet and internally discarded to preclude undesired repetitive executions. If the M&C computer sends a command packet and the corresponding response packet is lost due to a system or internal error, the computer times out and re-transmits the same command packet with the same <FSN> to the same receiver and waits once again for an acknowledgment.

Refer to Appendix B for Remote RLLP.

4.5 Terminal Port User Interface

The Terminal Port allows for complete control and monitoring of all Downconverter parameters and functions via an RS-232 Serial Interface. Terminal Mode' can be entered from the front panel by selecting 'System' and then 'Control Mode' followed by 'Terminal.' The default settings for the terminal are as follows:

VT100
9600 baud
8 data bits
no parity
1 stop bit

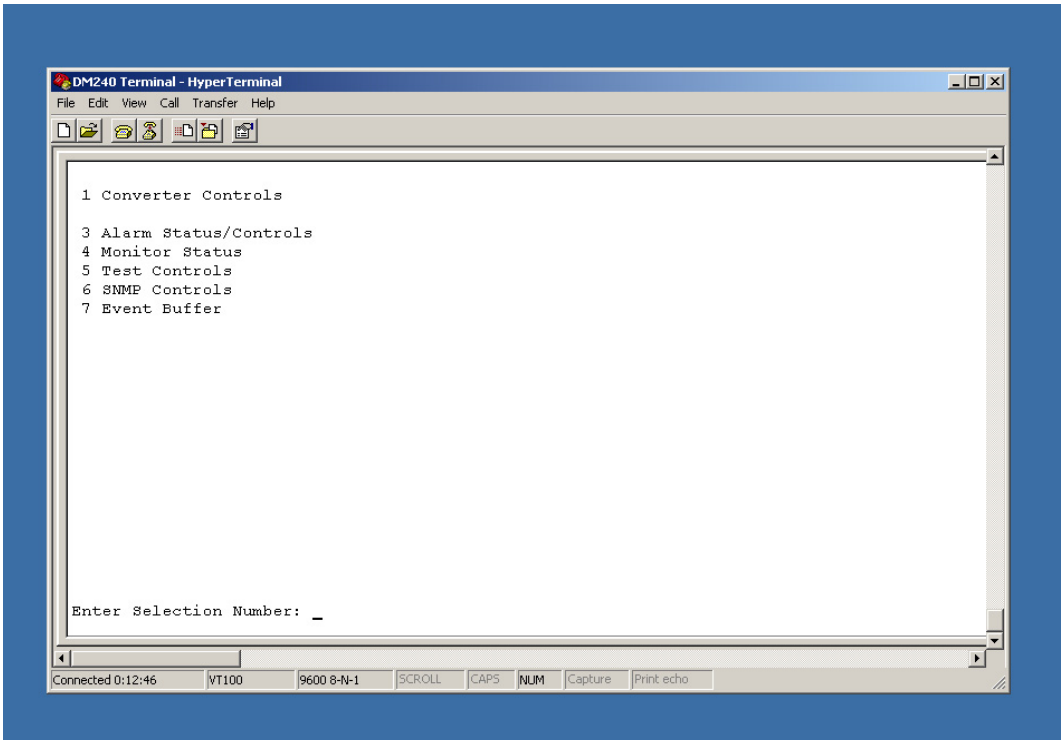
These settings can be changed at the front panel by using the *System>Terminal>* Menu.

The Terminal Control Mode is Menu-driven and the allowable values for each item number will be shown. To change an item, type in its number followed by <ENTER>. If the parameter to be changed requires a numeric value, enter the number followed by <ENTER> If the parameter is non-numeric, press <SPACE> to cycle through the list of available entries.

Items that do not have ID numbers are Status only and cannot be changed.

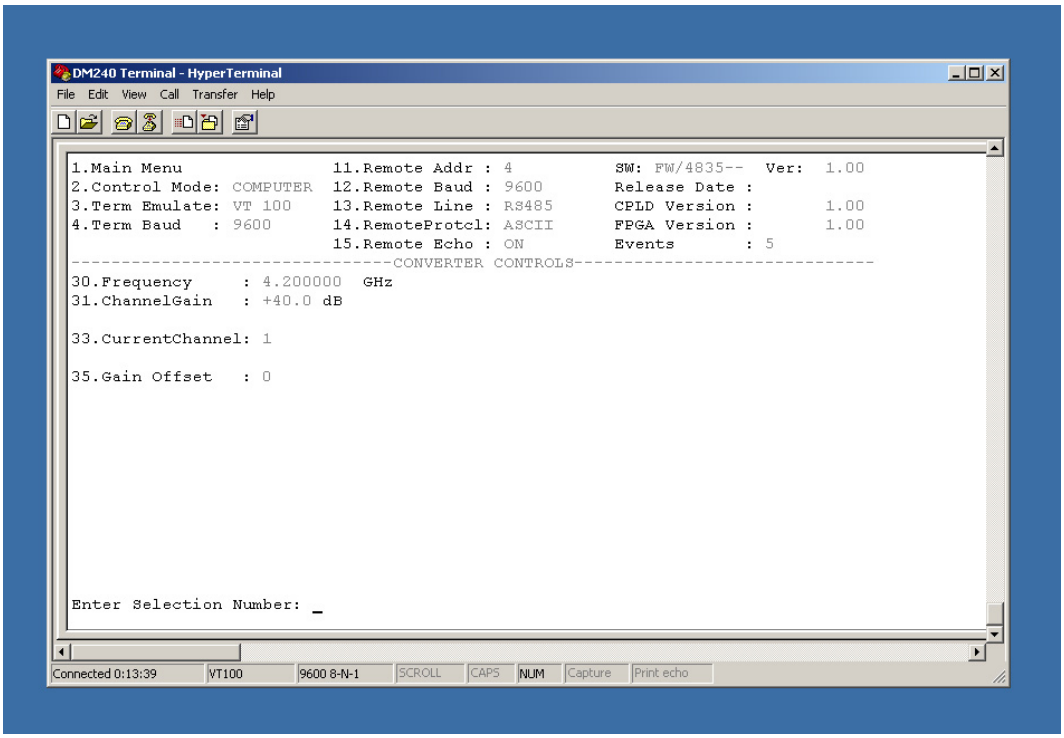
Unless otherwise indicated, all terminal Menu items shown below are identical to those described in Section 4.1.6 (LCD Display Menus) above.

4.5.1 Terminal Main Menu

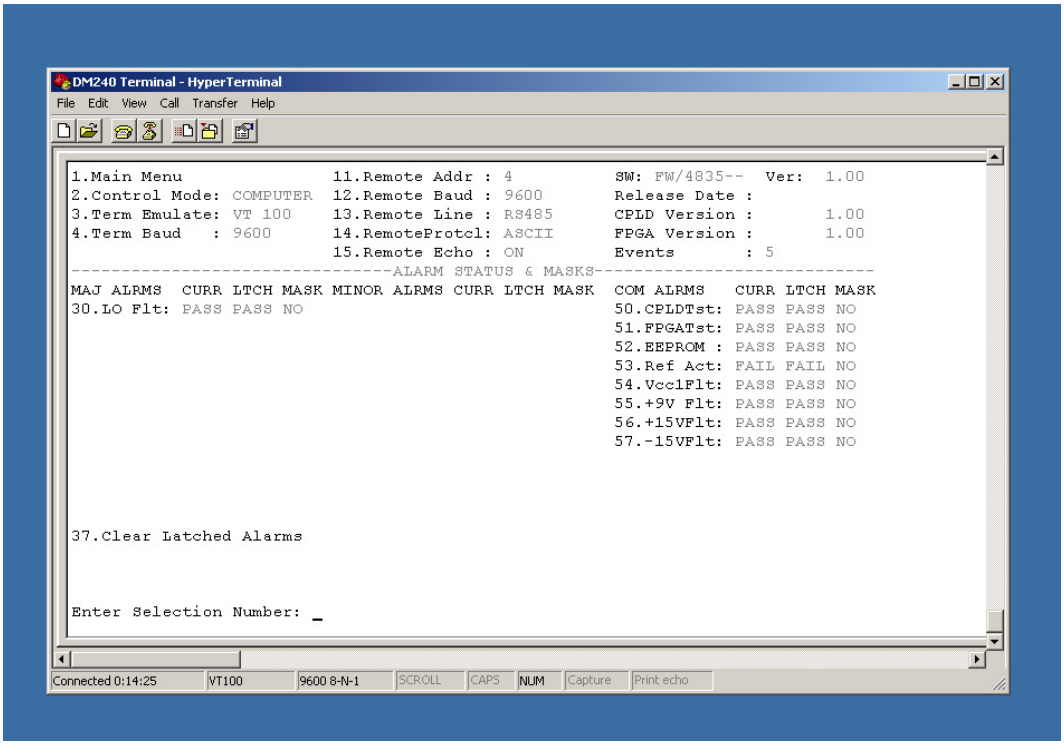


Menu is available only for a backup converter.

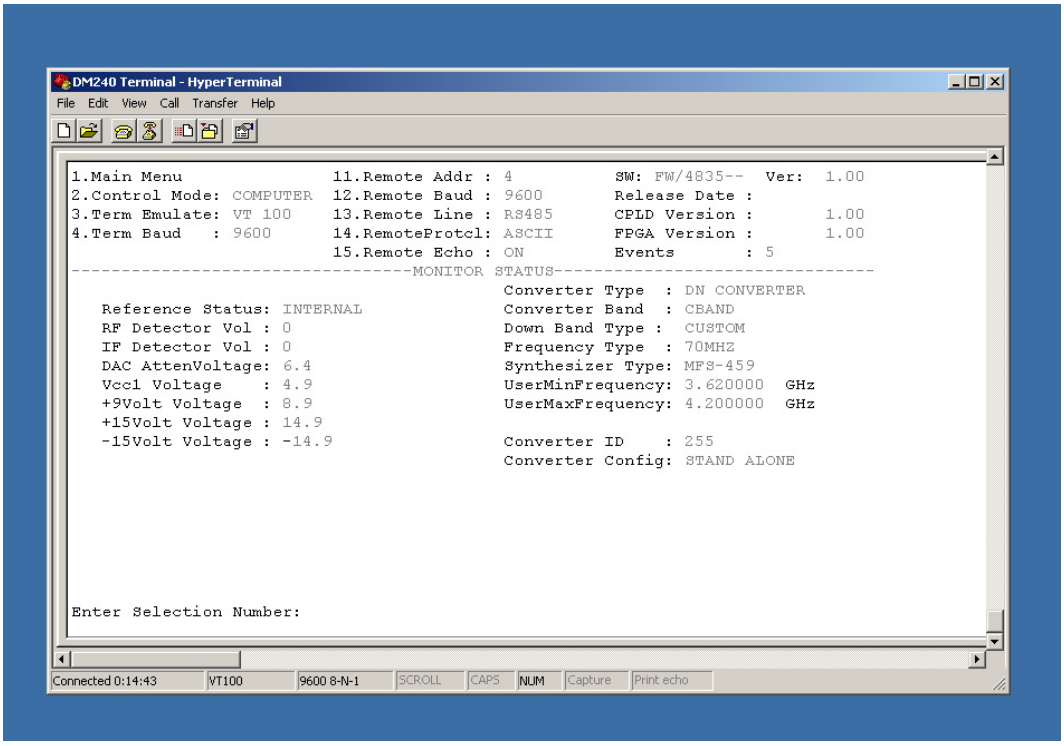
4.5.2 Terminal Converter Controls Menu



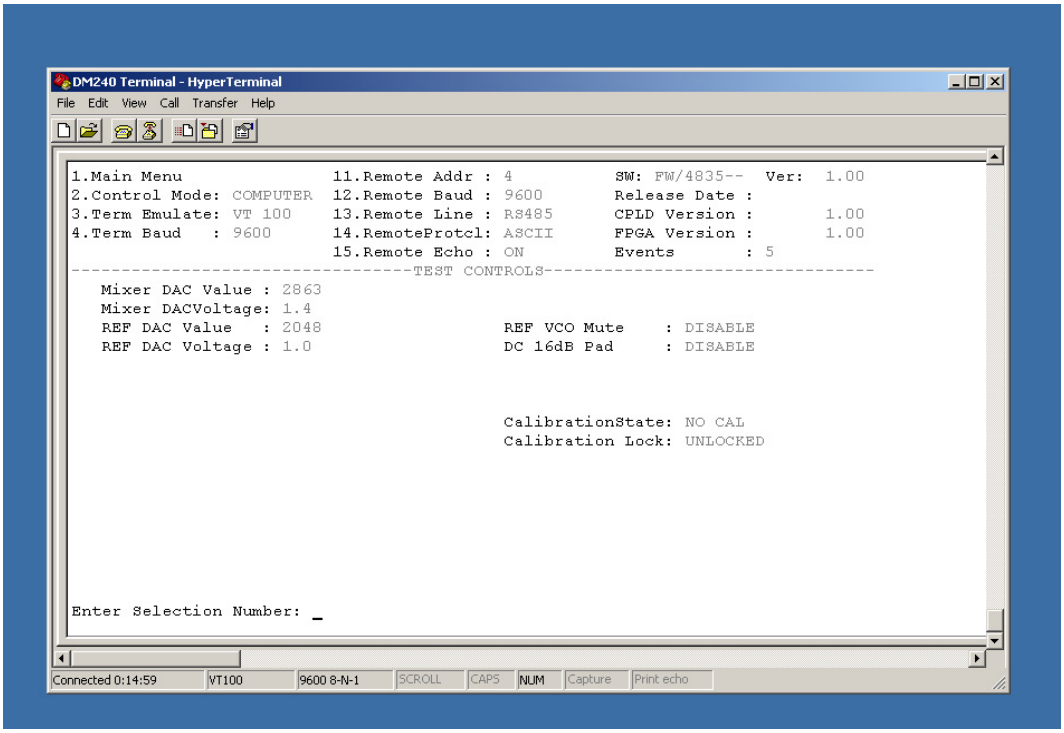
4.5.3 Terminal Alarm Status & Masks Menu



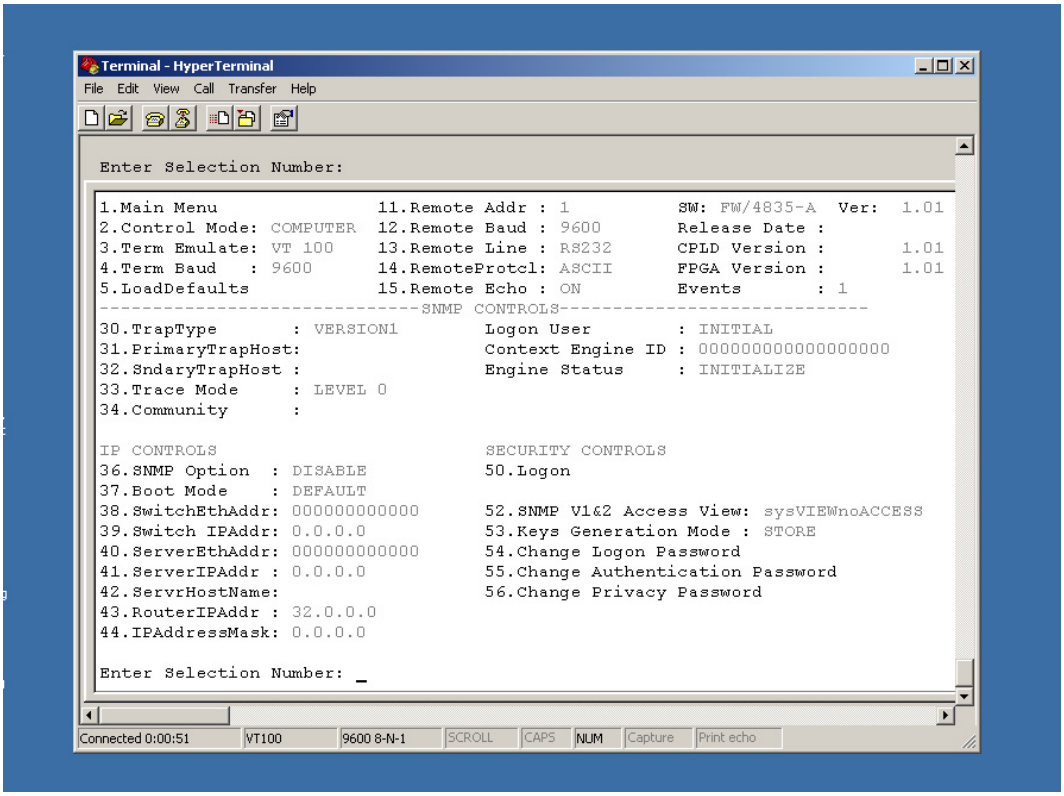
4.5.4 Terminal Monitor Status Menu



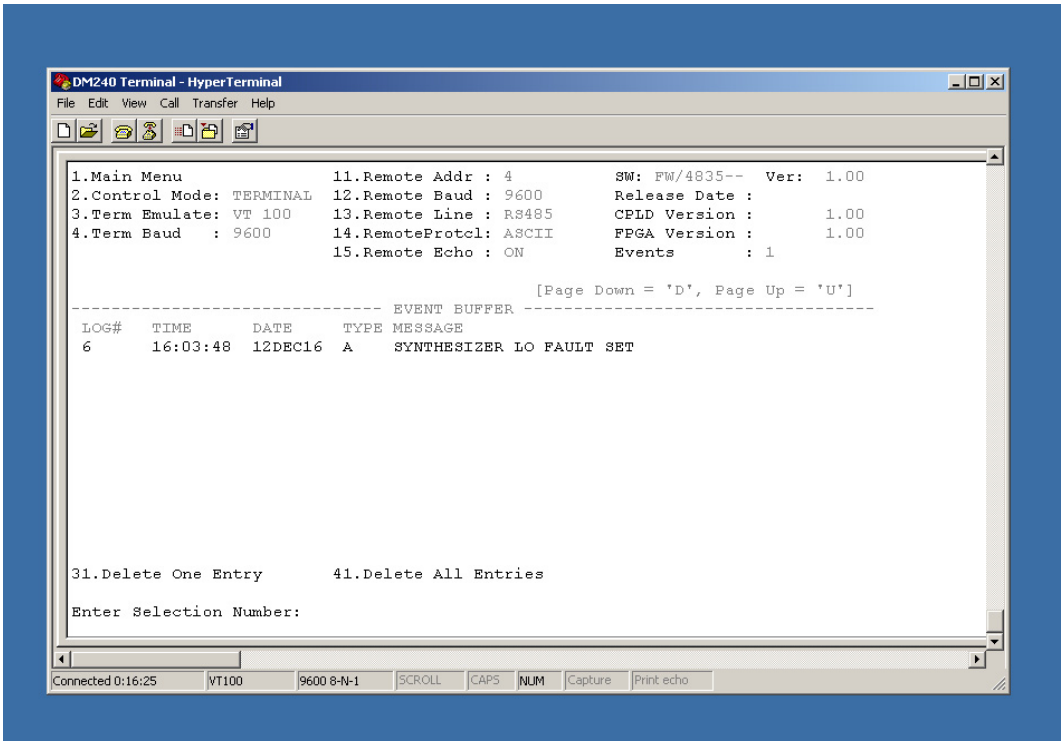
4.5.5 Terminal Test Controls Menu



4.5.6 SNMP Controls Menu



4.5.7 Terminal Event Buffer Menu



4.6 Ethernet Port User Interface

The Ethernet Port allows for complete control and monitoring of all Downconverter parameters and functions via a 10BaseT or 100BaseT Ethernet connection.

4.6.1 Ethernet Port Configuration

4.6.1.1 Connecting the Terminal

1. Connect a computer serial port (or dumb terminal port) to the SFC2100A Downconverter Terminal Connector (J6) on the rear of the unit.

2. Verify that the emulation software is set to the following:

   VT100
   9600 baud
   8 data bits
   no parity
   1 stop bit

   Modify the Downconverter selection, if necessary, to match the settings (Front Panel Menu: *System>Terminal>*).

4.6.1.2 SNMP Option

1. From the Main Menu, select '6' for SNMP Control. Verify that Selection 36, SNMP Option is enabled. The SFC2100A Downconverter SNMP Option is enabled at the factory if purchased by the user. Please contact the Radyne Customer Service Department if the SNMP feature is not available.

4.6.2 Network Configuration

4.6.2.1 Terminal Screens

1. The SNMP main setup screen is Menu 6. on the Terminal Main Menu screen.

2. The SNMP Configuration can be monitored and controlled via a full screen presentation of current settings and status. The <Esc> Key redraws the entire screen and aborts input any time. The Spacebar refreshes the status area and is used to scroll through selection when in user input mode.

3. To modify an item, the user simply presses its terminal selection followed by <ENTER>. The converter responds by presenting the options available and requesting input. If the input is multiple choices, the user is prompted to use the Spacebar to scroll to the desired selection and then press <ENTER>. An input can be aborted at any time by pressing <Esc>. Invalid input keys cause an error message to be displayed on the terminal. Some input or display status only appears when the user has the right access levels.

4.6.2.2 Logging on and Passwords

There are several available logon users each setup with a default password. The user must be logged on in order to view or change some settings. There are 3 levels of access rights in the SFC2100A Downconverter. These are:

Initial Access: The default when no user is logged on.

Viewer Access: Allows its user to modify its own logon and authentication passwords.

Operator Access: All other SNMP and security selections can only be accessed.

Listed in the table below are the available user names and corresponding default passwords:

Security User	Logon Password	Authentication Password	Privacy Password
Initial			
Viewer	Viewer	Viewer	
Oper–md5	Oper	Oper	Oper
Viewer–sha	Viewer	Viewer	
Oper-sha	Oper	Oper	Oper

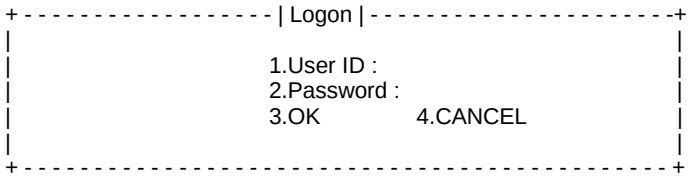
Note: All entries are case sensitive

4.6.2.3 Exiting SNMP Configuration

1. Select the Main Menu by pressing ‘1’ followed by <ENTER>, to go back to the top-level Menu screen.

4.6.2.4 Logging On

1. The user must be logged on to have access to SNMP Features. To log on the SNMP configuration, press ‘50’ followed by <ENTER> to open the Logon Dialog Box.



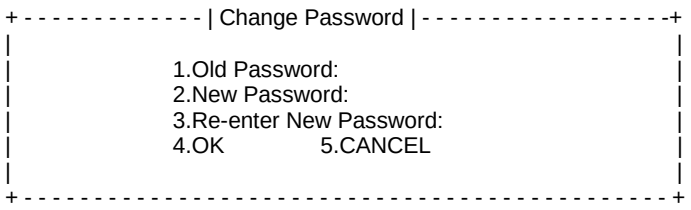
2. In the User ID Text Box, enter “Oper-md5” (case sensitive).

3. In the Password Text Box, enter “Oper” (case sensitive).

4. Select OK

4.6.2.5 Changing the Logon Password

To change the password, logged on so that the “SNMP/Security” selection appears. Press ‘54’ followed by <ENTER> to open the Change Logon Password dialog.



1. In the Old Password Text Box, enter “Oper” (case sensitive).

2. In the New Password Text Box, enter the new password (case sensitive, only *’s appear for security).

3. Re-enter the new password to verify the desired setting.

4. Select OK

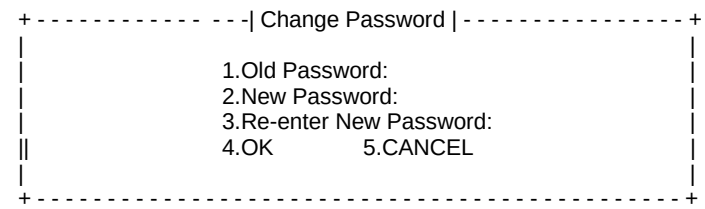
4.6.2.6 Logging Off

1. To log off the SNMP Configuration, press ‘51’ followed by <ENTER>. The following confirmation message will be displayed to avoid inadvertent exits:

You will be logged off. Are you sure? (Y/N):

4.6.2.7 Changing Your Authentication Password

1. Select 55. followed by <ENTER> to open the Change Password Dialog.



2. In the Old Password Text Box, enter “Oper” (case sensitive).

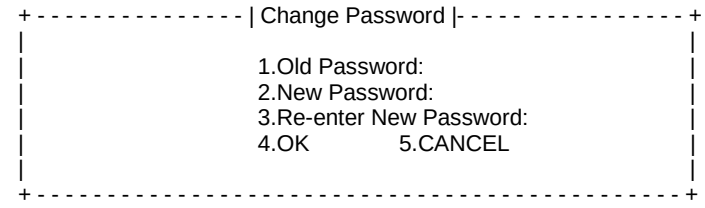
3. In the New Password Text Box, enter the new password (case sensitive, only *’s appear for security).

4. Re-enter the new password to verify desired setting.

5. Select OK

4.6.2.8 Changing Your Privacy Password

To change your privacy password, select 56 followed by <ENTER> to open the Change Password dialog.



1. In the Old Password Text Box, enter “Oper” (case sensitive).

2. In the New Password Text Box, enter the new password (case sensitive, only *’s appear for security).

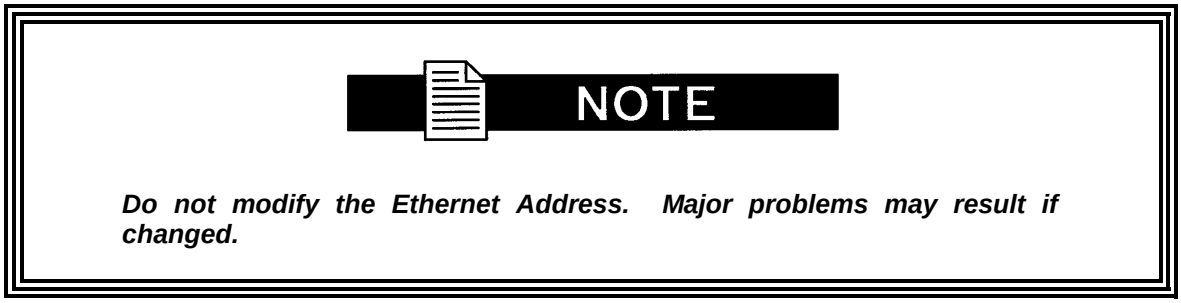
3. Re-enter the new password to verify desired setting.

4. Select OK

4.6.2.9 Converter Ethernet Address

1. The SFC2100A Converter Ethernet Address is configured at the factory. It is a unique Radyne equipment identifier.

   Example: 0010650903EB



4.6.2.10 Converter IP Address

1. Select '39', Converter IP Address:. Enter the SFC2100A Downconverter Internet Address in dot notation and press <ENTER>. Please consult your network administrator for valid addresses.

   Example - 192.168.0.35

2. The IP Address that is selected will be used for the Ethernet Test that follows.

4.6.2.11 Server Ethernet Address

This section refers to the boot host.

1. Select 40.ServerEthAddr:. Enter the Server 12 Digit Ethernet Address and press <ENTER>. Zero out this address if not known at this time. The system will resolve it dynamically at run time.

   Example: 0FD0640203ED or 000000000000

4.6.2.12 Server IP Address

This section refers to the Host that will be used to optionally boot the Downconverter on power-up. The host should be acceptable to the transport layer. In other words, the transport layer needs to be able to open a connection to the entity specified by the server IP Address field.

1. Select 41.ServerIPAddr :. Enter the Server Internet Address in dot notation and press <ENTER>. Please consult your network administrator for valid addresses.

   Example: 192.168.0.50

2. The IP Address that is selected will be used for the Ethernet Test that follows.

4.6.2.13 Router IP Address

Select 42.RouterIPAddr :. Enter the router Internet Address in dot notation and press <ENTER>. Please consult your network administrator for valid addresses.

Example: 192.168.0.254

4.6.2.14 IP Address Mask

In the mask (more clearly seen in the binary format), binary 1s indicate the position of the network and subnet portion of the IP Address while binary 0s identify bits that represent the individual interfaces. To recognize a subnet, each system in the subnet must have the same subnet mask. Please consult your network administrator for a valid address class mask.

1. Select 43.IPAddressMask:. Enter the IP Address mask in dot notation and press <ENTER>.

   Example: 255.255.0.0

4.6.2.15 Boot Mode (Optional)

1. Select 37.Boot Mode : from the Controls Menu and press <ENTER>. Scroll through the various selections to 'NVBOOT' and press <ENTER>. The above settings will be enabled the next time the system is rebooted. If a bootp server is available, the Downconverter can be remotely configured by selecting bootp mode. This option is currently not available.

4.6.2.16 Community

Each managed station controls its own local MIB and must be able to control the use of that MIB by a number of management stations. This relates to security concerns. A managed MIB such as the Downconverter needs to protect itself from unwanted and unauthorized access. SNMP, as defined in RFC 1157, provides only a limited capability for such security, namely the concept of a community. An SNMP Community is the relationship between an SNMP Agent and Management Stations.

1. To set the community string on the SFC2100A Downconverter, select 34.Community:. Enter the desired community name and press <ENTER>.

   Example: "public"

4.6.2.17 Trap Type and Trap Hosts

Traps enable the converter to notify the management station of significant events such as alarms. Version1 and version2 Traps are supported at this time. These are Operator selectable using Terminal Command Number 30. The messages are sent to specific pre-defined hosts. The Primary and Secondary Trap Hosts IP Addresses are setup using Terminal Commands 31 and 32. Each host should be acceptable to the transport layer. In other words, the transport layer needs to be able to open a connection to the entities specified by the trap host fields.

4.6.2.18 Trace Mode

1. For debugging purposes, a trace mode is specified by the Operator users for various diagnostic levels.

4.6.2.19 SNMP V1 & 2 Access View

The default access rights for Version 1 and 2 SNMP users are minimal. They are limited to a system view, and a description of the Downconverter System and Contact Information. For additional information, go to View-Based Access Control Section. To accommodate older systems, an Operator user may modify these access rights to allow full or partial read/write access. SNMP Version 1 and 2 does not use any security measures, therefore users should be very careful when changing access rights.

4.6.2.20 Key Generation Mode

The password localization algorithm is intensive enough that the Motorola 68332 Embedded Processor cannot handle the process in a timely manner. This selection allows the Operator user to optionally store localized keys in non-volatile memory. These keys correspond to a set of passwords and Modem IP Address. If either changes, the SNMP agent automatically recalculates the new keys and stores them in non-volatile memory (only if the Key Generation Mode is set to 'STORE').

4.6.2.21 Context Engine ID

"contextEngineID" is the unique identifier of the Downconverter SNMP Engine that provides services for sending and receiving messages, authenticating and encrypting messages, and controlling access to managed objects.

1. The Context Engine ID, 80000A1F01AC1264B0, is formatted as follows:

    a. The first 4 bytes are the Radyne Private Enterprise Number (2591).

    b. The very first bit is set to 1, for example: 80000A1F (H).

    c. The fifth byte indicates how the 6th and remaining bytes are formatted. A '1' means it's an IPv4 Address.

    d. The last 4 bytes are the IP Address 172.18.100.176 (AC1264B0).

4.6.2.22 View-Based Access Control

SNMPv3 defines a method of access control known as the View-based Access Control Model (VACM). It is defined as a means to restrict access to particular subsets of variables based on the identity of the manager and the security level used in the request.

A view is a group of MIB variables on the agent. The agent defines a view for each user based on the user identity (securityName) and security level. Following are the major views:

System view: Access to system description

MIB-II view: Access to the standard MIB-II information

Device view: Access to the device private information

World view: Access to every managed object in the MIB

Following are the available access groups:

Group	Context/Community	Security Level	Read Access	Write Access
NULL	mib2	NoAuth/noPriv	System view	NONE
Viewer	mib2	Auth/noPriv	MIB-II view	NONE
Viewer	Dev	Auth/Priv	Device view	NONE
Oper	mib2	Auth/noPriv	MIB-II view	MIB-II view
Oper	Dev	Auth/Priv	Device view	Device view

The NULL Security Name is for backward compatibility with SNMP Version 1 and 2 management stations (security names are not defined for earlier protocols). In this case, the contextName in each view may refer to either a contextName or a communityName. The securityLevel would then be noAuth/noPriv.

4.6.3 Connecting the Ethernet Cable and Testing the Link

1. Connect the computer to the Downconverter Ethernet port (J9) using the RJ-45 to RJ-45 10BaseT Cables via a hub as shown in Figure 4-3.

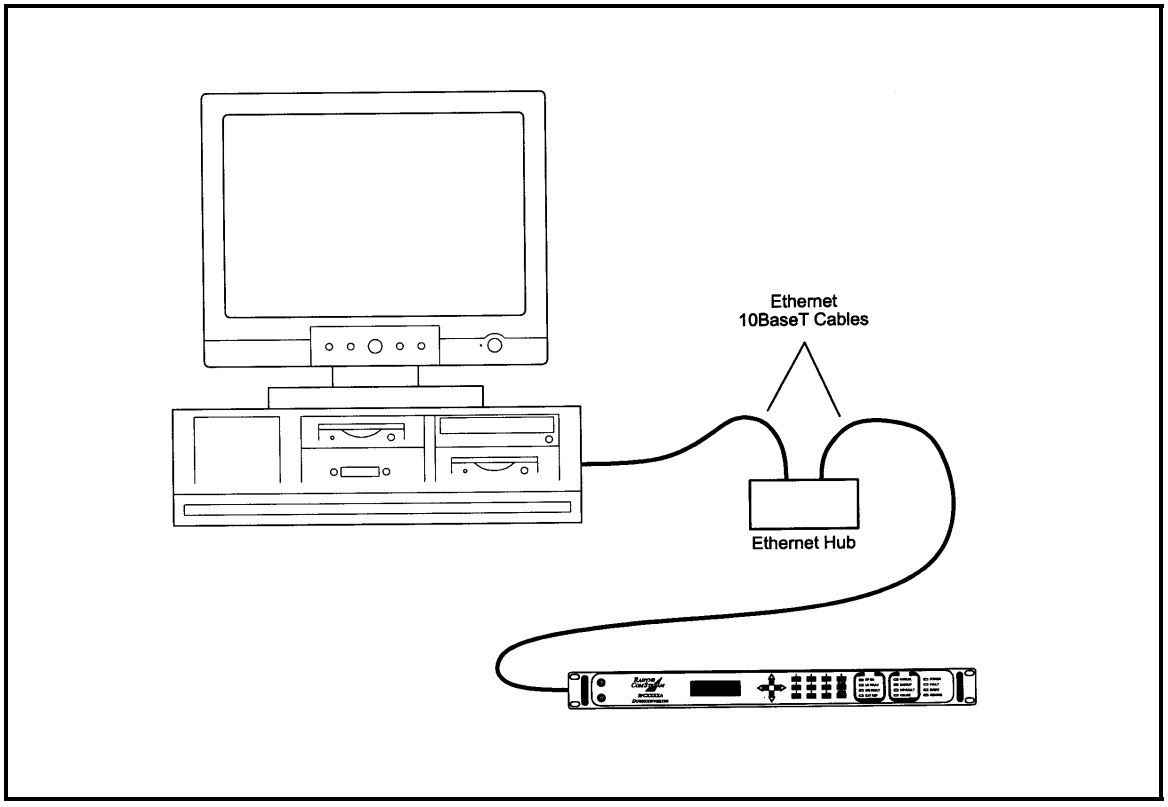


Figure 4-3. Ethernet Connection

4.6.3.1 Ping Program

1. PING is an application that uses the ICMP protocol to report if a host is responding. To check whether the SFC2100A Downconverter is reachable, use the PING program installed on your computer along with the converter IP Address set in Section 4.6.2.10.

   Example: ping 192.168.0.35

2. If everything is functioning correctly, replies from the converter will appear on the computer screen along with the time it took to respond. If unsuccessful, verify the following:

   a. The cables are secured.
   b. The Link Light is illuminated.
   c. The IP Address that is used matches the converter's IP Address.
   d. The Server and converter are on the same subnet.

4.6.3.2 SNMP Test

1. Once it is determined that the SFC2100A Downconverter is reachable, compile the custom Management Information Base (MIB) for use by the Network Management Station (NMS). The MIB uses a hierarchical naming scheme. Each managed object in the Downconverter is identified by an Object Identifier (OID), a sequence of non-negative integers that uniquely describes the path taken through the hierarchical structure.

2. Using the Downconverter IP Address, perform a Walk of the MIB to retrieve all the MIB objects managed in the Downconverter.

4.6.4 Management Information Base Structure

This section defines the terminology and hierarchy associated with management information base structure at Radyne Corporation.

4.6.4.1 Simple Network Management Protocol (SNMP)

Simple Network Management Protocol (SNMP), as its name suggests, is a relatively simple protocol by which management information for a network device may be inspected and/or altered by remote administrators.

4.6.4.2 The Management Information Base (MIB)

Management objects are defined in the Management Information Base (MIB), which uses a hierarchical naming scheme. In this scheme, an Object Identifier (OID) identifies each object. The OID is a sequence of non-negative integers that uniquely describes the path taken through the hierarchical structure.

MIB objects may then be specified either from the Root (which has no designator), or alternatively from anywhere within the hierarchical structure.

For example: 1.3.6.1.4.1.2591.4 is equivalent to {iso(1). org(3). dod(6). internet(1). private(4). enterprises(1). Radyne(2591). RCS10L(4)} (See Figure 4-4).

In general, we are mainly concerned with just two groups that reside in the *internet* subtree, namely the *mgmt*, and *private* groups. For completeness however, the four major groups are discussed below:

Directory {internet 1} 1.3.6.1.1

This area was reserved to describe how the OSI directory structure may be used in the Internet. To date this has not been implemented and therefore is of little interest to us.

Mgmt {internet 2} 1.3.6.1.2

This area was reserved to describe objects in the standard MIB. As RFCs defining new groups are ratified, the Internet Assigned Numbers Authority (IANA) assigns new group IDs.

Experimental {internet 3} 1.3.6.1.3

This subtree provides an area where experimentation is carried out. Only those organizations directly involved in the experiment have any interest in this subtree.

Private {internet 4} 1.3.6.1.4

This is possibly the most important area of the MIB, since it is within this subtree that vendors place objects specific to their particular devices. Beneath the private branch, there is a subtree called enterprises, beneath which each vendor may define its own structure. Vendors are assigned Private Enterprise Numbers (PENs) that uniquely identify them. They may then place all objects specific to their devices in this tree, provided of course that the object conforms to the format defined by SMI. Radyne Corporation's Private Enterprise Number is 2591. Other products are added to Radyne Corporation's subtree as they become remotely manageable through SNMP.

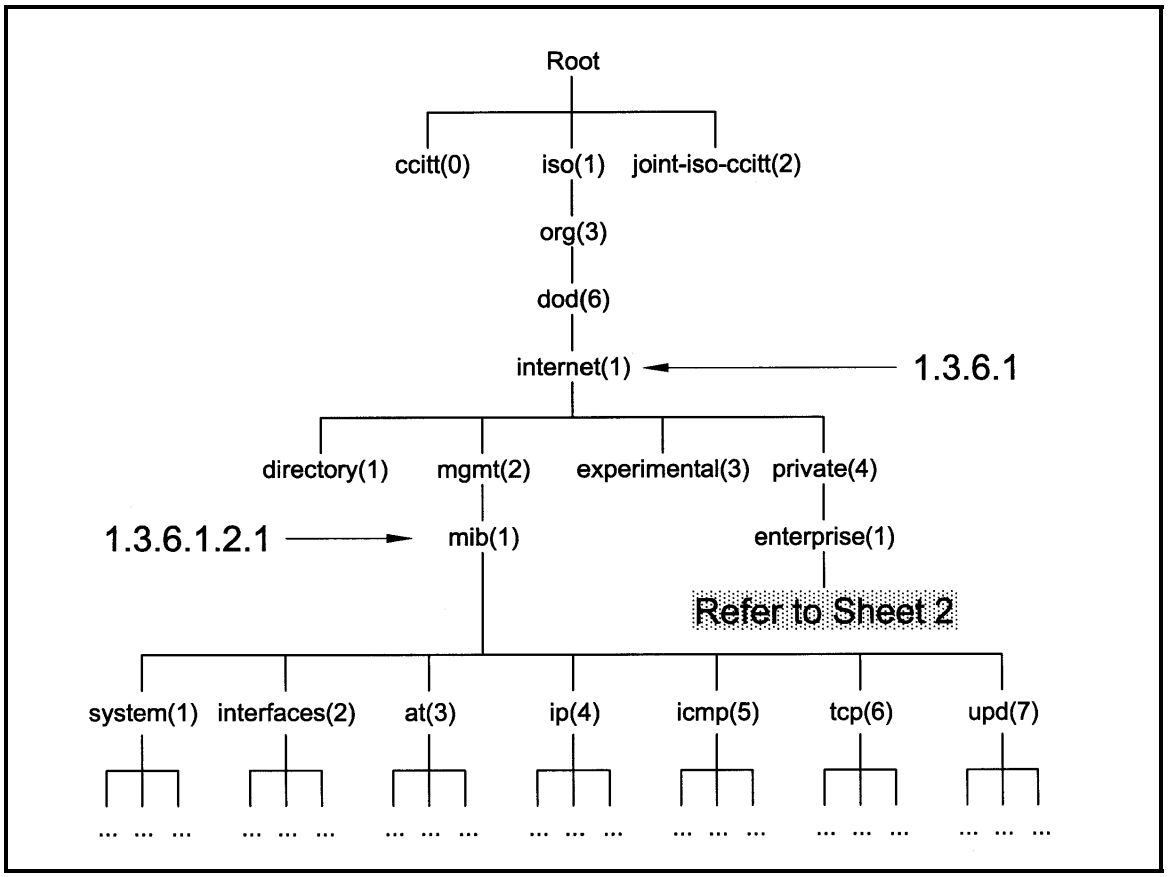


Figure 4-4. Object Identifiers in the Management Information Base (Sheet 1 of 2)

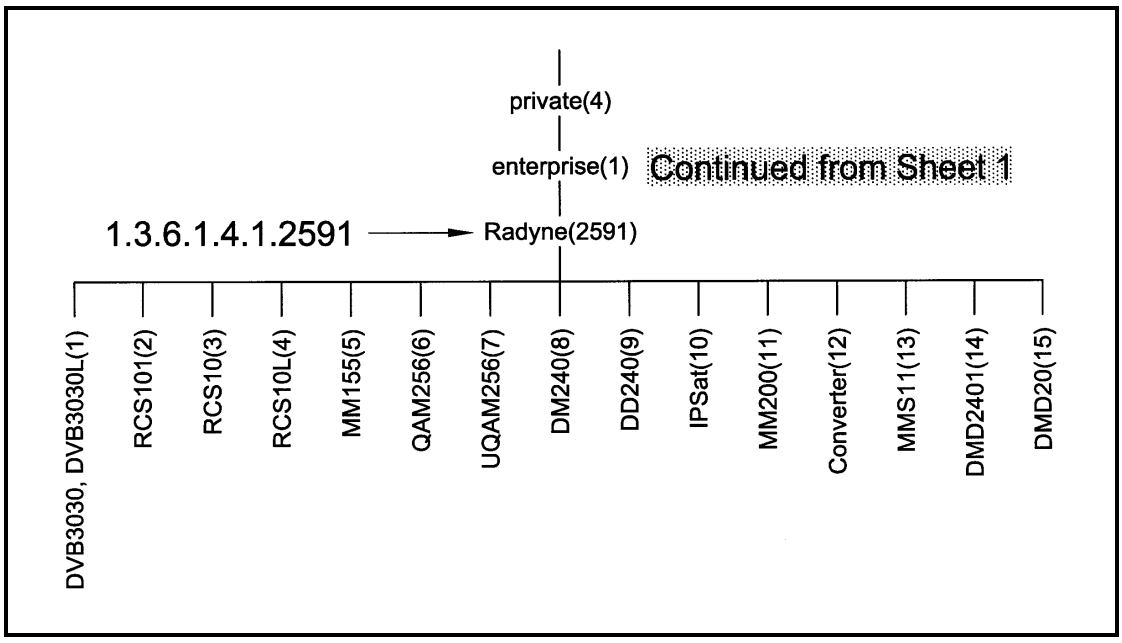


Figure 4-4. Object Identifiers in the Management Information Base (Sheet 2 of 2)

Refer to Appendix C for MIB listing.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Rear Panel Interfaces

5

5.0 SFC2100A Downconverter Connections

All SFC2100A Downconverter connections are made to labeled connectors. Any connection to an SFC2100A Downconverter must be made with the appropriate mating connector. Refer to Figure 5-1 for the various connector locations.

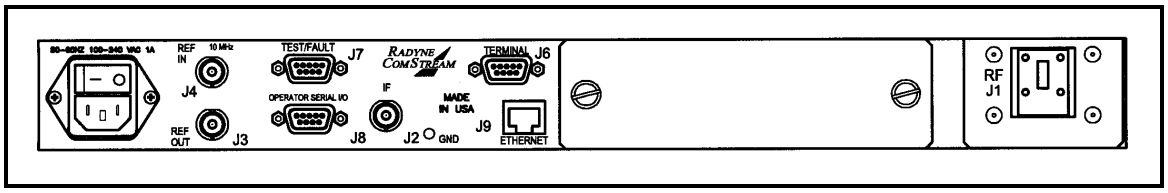

Figure 5-1. SFC2100A Downconverter Back Panel

5.1 Power

Located on the left side of the SFC2100A Downconverter Rear Panel is the AC Power Input Connector. This connector is an IEC/EN6032/C13 Power Entry Module. The unit is powered from a 100 – 240 VAC, 50 – 60 Hz source. Maximum unit power consumption is 50 W. The switch turns power on and off to the unit. A chassis ground connection can be made at the #10 size stud located between the IF (J2) and Ethernet (J9) connectors.

The Power Cord/connector for the SFC2100A Downconverter is a supplied item.

5.2 10 MHz Ref In (J4)

The Reference Input is a 50 Ohms BNC-F connector (J4) that allows the operator to synchronize the synthesizer of the converter to an external 10 MHz reference. When an external reference is properly applied to the reference input, the external reference LED will illuminate on the front panel.

5.3 10 MHz Ref Out (J3)

The 10 MHz Reference Out (J3) is a 50 Ohms BNC-F Connector that provides a 10 MHz, 50 Ohms AC coupled reference output signal at 0 dBm. In normal operation (no external reference) this output is synchronous with the internal high stability 10 MHz reference.

5.4 Test/Fault (J7)

The Test/Fault connector (J7) is a status port that allows monitoring of several system status indications at the back panel. These items are described in Table 5-1.

Table 5-1. J7 – Test/Fault Interface – D-Sub 9-Pin Female Connector

Pin No.	Signal	I/O	Description
1	N.C.	N.A.	No Connect
2	IF_LO_FAULT	O	1 = LO Fault Condition
3	GND	N.A.	Ground
4	IF_SIG_DET	O	Detected Power Level of IF Signal 0 to 5 VDC
5	N.C.	N.A.	No Connect
6	RLY_NO	N.A.	Form-C relay normally open contact, summary fault
7	RLY_NC	N.A.	Form-C relay normally closed contact, summary fault
8	RLY_C	N.A.	Form-C relay common contact, summary fault
9	RF_SIG_DET	O	Detected Power Level of RF Signal (Upconverter only, 0 - 5 VDC)

5.5 Operator Serial I/O (J8)

The Operator Serial I/O Port (J8) is a D Sub 9-Pin Female Connector. This port provides a serial interface that can be configured as either an RS-232 or RS-485 interface and allows the user to remotely control all of the features outlined in the Serial Protocol (See Section 4.2, Remote Port Front Panel Interfaces). The serial port comes configured as an RS-485 Serial Port unless otherwise indicated. The pinout for this interface is listed in Table 5-2.

The function of Pin 1 and Pin 9 depends on whether the protocol is set to RS-232 or RS-485 (Front Panel LCD Menu: SYSTEM < REMOTE PORT < REMOTE LINE).

Table 5-2. J8 – Operator Serial I/O Port – D-Sub 9-Pin Female Connector			
Pin No.	**Signal**	**I/O**	**Description**
1	RX_485 – A RX_232	I	Inverted RS-485 Receive RS-232 receive
2	TX_485-B	O	Non-Inverted RS-485 transmit
3	RX_485-B	I	Non-Inverted RS-485 receive
4	DTR	N.A.	Connected internally to Pin 6-DSR
5	GND	N.A.	Ground
6	DSR	N.A.	Connected internally to Pin 4-DTR
7	RTS	N.A.	Connected internally to Pin 8-CTS
8	CTS	N.A.	Connected internally to Pin 7-RTS
9	TX_485 – A TX_232	O	Inverted RS-485 Transmit RS-232 Transmit

If the RS-232 option is chosen, an adapter must be used between J8 and the serial cable to the DTE. One end of the adapter will be a DB-9 Male Connector, which plugs into J8 on the Downconverter back panel. The other end will be a DB-9 Female Connector, which plugs into the PC serial port or dumb terminal. The pinout is given in Figure 5-3.

Table 5-3. – RS-232 Adaptor – Operator Serial I/O Port			
Pin No. DB-9 Male to Downconverter J8	**Pin No. DB-9 Female to DTE**		
1	3		
5	5		
9	2		
2,3,4,6,7,8	N.A.		

5.6 IF Out (J2)

The IF Out Connector (J2) is a 75 Ohms BNC-F Connector (50 Ohms available). Outputs are within 50 – 90 MHz for standard units and 100 – 180 MHz for units equipped with 140 MHz.

5.7 Terminal (J6)

The Terminal Port allows for complete control and monitoring of all Downconverter parameters and functions via an RS-232 Serial Interface. The interface comes configured as a DCE device. The pinout is given in Table 5-4.

Table 5-4. J8 – Terminal Port – D-Sub 9-Pin Female Connector

Pin No.	Signal	I/O	Description
2	TX_232	O	RS-232 transmit
3	RX_232	I	RS-232 receive
5	GND	N.A.	Ground
1, 4, 6, 7, 8, 9	N.A.	N.A.	No Connect

5.8 Ethernet (J9)

The Ethernet connector can be used for monitor & control functions of the Downconverter. The physical interface is a standard RJ-45 connector.

5.9 RF In (J1)

The RF In (J1) is the RF Input of the SFC2100A Downconverter. It is a WR-42 Waveguide Connector for the SFC2100A.

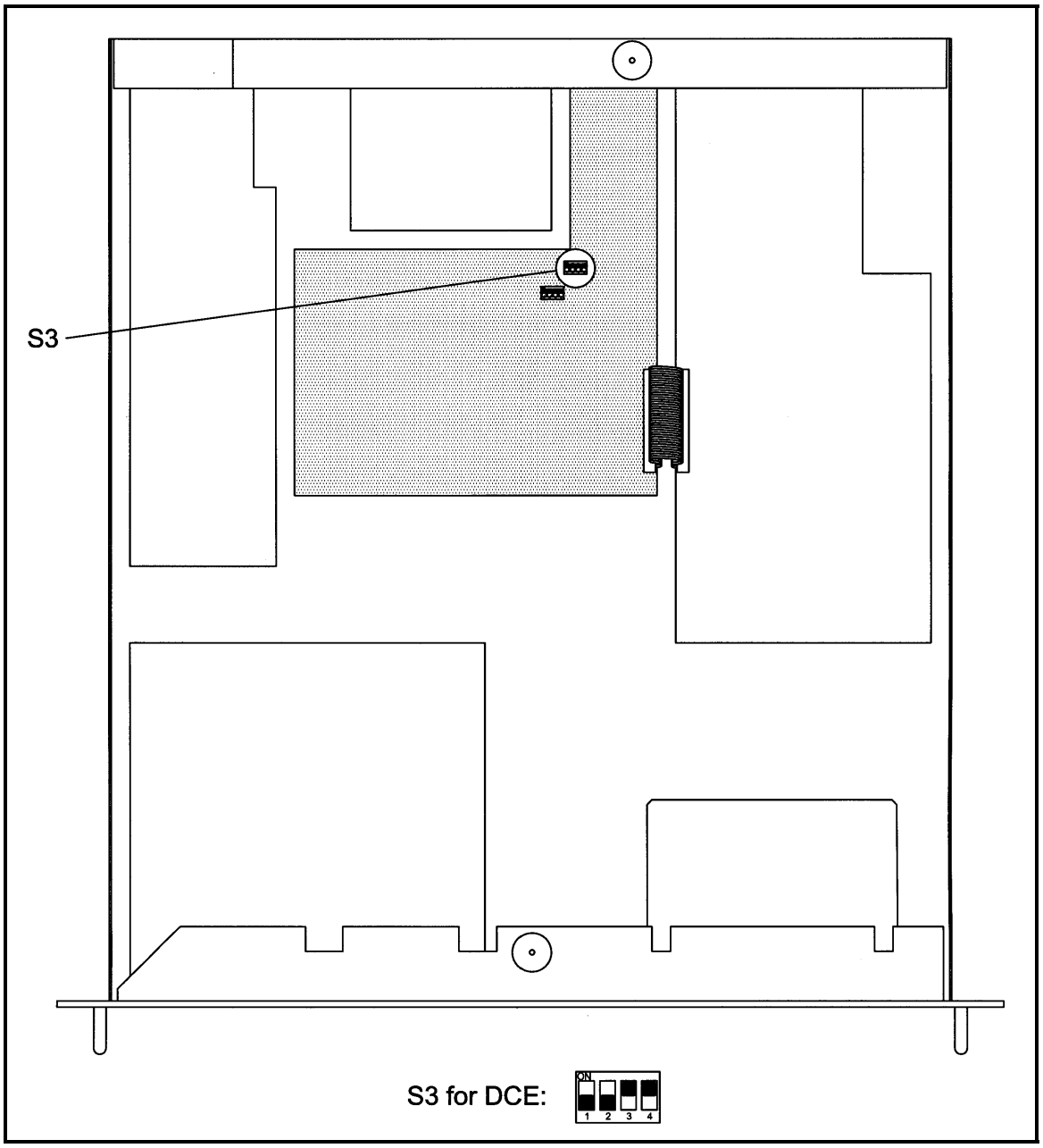

Figure 5-2. DIP Switch Settings for DCE

5.10 Monitor Ports

The SFC2100A Downconverter have Monitor Ports located on the Front Panel (Figure 5-3) that allow the operator to monitor the IF Output and RF Input.

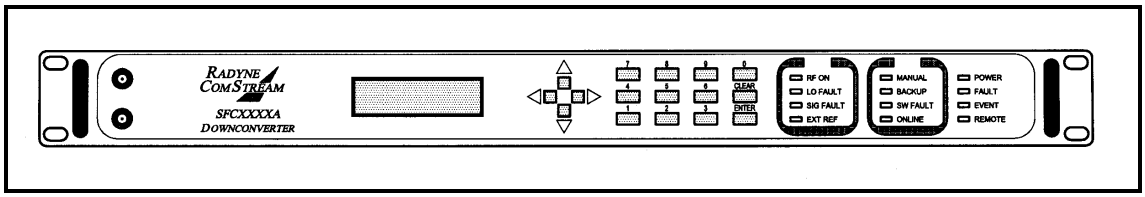

Figure 5-3. SFC2100A Downconverter Front Panel with Monitor Ports

5.10.1 IF Monitor Port

The IF Monitor Port is an SMA-F Type Connector located on the front panel that allows monitoring of the Downconverter's IF Output. The power level of the monitored signal will be-15 dB nominal below the level present at J2.

5.10.2 RF Monitor Port

The RF Monitor port is an SMA-F Type Connector located on the front panel that allows monitoring of the Downconverter's RF Input. The power level of the monitored signal will be -15 dB nominal below the level present at J1.


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Maintenance and Troubleshooting

6

6.0 Periodic Maintenance

Radyne Corporation SFC2100A Downconverter are designed to provide many thousands of hours of continuous operation. Normal aging and drifting of electronic components can cause the accuracy of the converter to change over time. As with any converter, these changes will affect the frequency accuracy and frequency conversion amplitude accuracy over time.

6.1 Failure Analysis

Faults in the converter are limited in scope to either a LO Fault or a Signal Fault. Other faults, such as a failure of the micro controller, may or may not provide an indication.


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Technical Specifications

7

7.0 Introduction

This section defines the technical performance parameters and specifications for the SFC2100A Synthesized Frequency Downconverters

7.1 Output Characteristics

Frequency:	17700 - 18800 MHz (Plan A) 18800 - 19300 MHz (Plan B) 19200 - 20200 MHz (Plan C) 20000 - 21200 MHz (Plan D)
Impedance:	50 Ohms
Return Loss:	≥19 dB
P1 dBm Input:	+10 dBm Minimum
Connector:	WR-42 Waveguide

7.2 Output Characteristics

Frequency:	70 MHz ±18 MHz Standard 140 MHz ±36 MHz Optional
Impedance:	75 Ohms (50 Ohms Optional)
Return Loss:	-23 dB
P1 dBm Output:	+15 dBm
Connector:	75 Ohm BNC (50 Ohms BNC, F Optional)

NOTE

Performance specifications guaranteed at nominal levels only.

7.3 Transfer Characteristics

Transfer Characteristics	
Type:	Double Conversion, No Spectral Inversion
Gain:	40 dB Minimum @ Minimum Attenuation
Gain Control:	40 dB in 0.2 dB Increments
Gain Ripple:	±0.25 dB/36 MHz ±0.75 dB/72 MHz (140 MHz Input Option)
Gain Slope:	±0.025 dB/MHz (36 MHz Minimum)
Gain Stability:	±0.25 dB/24 Hours, ±2.0 dB; 0 to 50°C
Noise Figure:	12 dB Max. @ 0 dB Attenuation

Spurious:	-70 dBm Local Oscillator Related Spurious (In-Band) at Minimum Attenuation -60 dBc Signal Related Spurious (In-Band) at Minimum Attenuation
Intermodulation Distortion:	-60 dBc IMD Two Tones with -10 dBm Total Output Power
AM/PM Conversion:	0.2°/dB @ -10 dBm Output
Image Rejection:	80 dB

7.4 Frequency Synthesizer

Resolution:	125 kHz Step Size
Stability:	$\pm 5 \times 10^{-9}$ Over Temperature (0 to 50°C) $+1 \times 10^{-9}$/24 Hours
Accuracy:	$\pm 5.0 \times 10^{-9}$ After 20 Minutes

7.5 Single Side Band Phase Noise

Offset	**SFC2100A**
100 Hz	-70 dBc/Hz
1 kHz	-80 dBc/Hz
10 kHz	-82 dBc/Hz
100 kHz	-92 dBc/Hz
1 MHz	-110 dBc/Hz
Ext. Reference	10 MHz, 0 dBm, 50 Ohms (5 MHz Optional)

7.6 Group Delay

Linear:	0.03 nsec./MHz Maximum
Parabolic:	0.01 nsec./MHz^2
Ripple:	1.0 nsec. p-p for ±18 MHz

7.7 Operator Interface

7.7.1 Front Panel

Keypad Control
LED Indicators
LCD Indicators

7.7.2 Remote Interfaces

Terminal (RS-232)
ASCII
RLLP (RS-232/RS-485)
Serial Interface, and SNMP (Ethernet) 10Base-T

7.7.3 Rear Panel Interfaces

RF Input (WR-42 Waveguide)
IF Output (75 Ohm BNC)
Operator Serial Port (DB 9-Pin)
10 MHz REF In (BNC)
REF Out (BNC)
Fault/Test (DB 9-Pin)
IEC/EN60320/C13 Power Entry Module/Switch
#10 Ground Lug

7.7.4 Front Panel Test Ports

RF Monitor:	-10 to -20 dB Relative to RF Level
IF Monitor:	-10 to -20 dB Relative to IF Level

7.7.5 Converter Settings

Monitored and/or controlled from the front panel or remotely, using the RS-232/RS-484 or Ethernet remote port:

Frequency
Channel Gain
Current Channel
Gain Offset
Event Buffer
Faults Status and Mask
Power Supply Voltages
Frequency Reference Status and Offset Control
Terminal Emulation and Baud
Remote Protocol
Baud, Line and Echo Rate Modes
Converter and Frequency Type
Converter Band and User Minimum/Maximum Frequencies
RF Detector
IF Detector
DAC Attenuation Voltages

7.7.6 LED Indicators

Standby
LO Fault
Ext Ref Online
Backup, SwFault
Manual (Backup Only)
Power
Fault
Event

7.8 Physical Characteristics

Size:	19” wide x 1.75” high x 19” deep (48.2 cm wide x 4.44 cm high x 48.26 cm deep)
Weight:	12 lb. (5.44 kg)
Primary Power:	100 - 240 VAC, 50 - 60 Hz
Power Consumption:	50 Watts

7.9 Environmental Characteristics

Operating Temperature:	0 to 50°C
Humidity:	To 95% Non-Condensing
Altitude:	To 8,000 Feet (2.438 meters) AMSL
Shock and Vibration:	No loss of frame synchronization at the BER Test set due to a standard hammer drop test on any outside surface of converter. Likewise, no loss of frame sync for temp gradient of ± 22°C/Hour
Non-Operating Temperature:	-32 to +65°C, 99% Humidity, Non-Condensing

Remote ASCII

A

A.0 Control Commands

Control Commands are those commands that alter the setup or operating parameters of the converter. The applicable commands are as follows:

HELP	displays all available user commands
STATUS	displays converter status
DATA	displays data formats associated with commands
SHOWRSS	displays Received Signal Strength
SETFREQ	sets the frequency for the current channel
SETGAIN	sets the gain for the current channel
SETCHAN	sets the current channel
STORE	saves all data under the current channel
RFON	turns RF on
RFOFF	turns RF off
SETATTN	sets the input attenuation for the current channel
CLRFAULT	clears latched faults
RAMGAIN	sets the gain for another/alternate channel
RAMFREQ	sets the frequency for another/alternate channel
ERASE	erases stored status, frequency and gain data upon next reset
RESTART	restarts the converter
DUMPCAL	-------
RDATTEN	displays the DAC value for a given freq and gain indexes
DMPCHAN	displays the contents of the entire channel table
DMPCAL	displays DAC values in the calibration table for the given freq Index
CURDAC	displays the DAC value used for the unit's current configuration
DACFOR	displays the DAC value used for the given frequency and gain values

A.1 Remote Help Menu (All)

The following command returns information on all remote serial commands. The command is as follows:

@01/HELP<cr>

The converter will return the following:

For Upconverter:

<cr><lf>	
HELP	Show all commands
DATA	Show data associated with commands
STATUS	Show status
RFOFF	Mutes the output
RFON	Un-mutes the output
CLRFAULT	Clears any stored faults
DUMPADC	Dump ADC data
ERASE	Erases saved data when the converter is restarted
RESTART	Restarts the converter
SETCHANcc	Retrieve specified channel
SETFREQffff.t	Set current channel's frequency
SETGAINsgg.g	Set current channel's gain
SETATTNaa	Set converter input attenuation
STORE	Save current channel's frequency & gain
RAMGAINccsgg.g	Set stored gain for the specified channel
RAMFREQccffff.t	Set stored frequency for the specified channel
<cr><lf>	
<cr><lf>	{End of transmission}

For Downconverter:

<cr><lf>	
HELP	Show all commands
DATA	Show data associated with commands
STATUS	Show status
SHOWRSS	Displays the received signal strength
CLRFAULT	Clears any stored faults
DUMPADC	Dump ADC data
ERASE	Erases saved data when the converter is restarted
RESTART	Restarts the converter
SETCHANcc	Retrieve specified channel
SETFREQffff.t	Set current channel's frequency
SETGAINsgg.g	Set current channel's gain
SETATTNaa	Set converter input attenuation
STORE	Save current channel's frequency & gain
RAMGAINccsgg.g	Set stored gain for the specified channel
RAMFREQccffff.t	Set stored frequency for the specified channel
<cr><lf>	
<cr><lf>	{End of transmission}

A.2 Status Command (All)

This command returns the current status of the converter. The command is as follows:

@01/STATUS<cr>

The converter will return the following string of information:

For Upconverter:

<cr><lf>
Configuration: Single
Status: {Offline, Warming up/Offline/Setup/Online}
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
Input Atten: aa dB {aa = input attenuation}
RF: {Off/On}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

For Downconverter:

<cr><lf>
Configuration: Single
Status: {Offline, Warming up/Offline/Setup/Online}
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
RSS: aa dBm {aa = received signal strength}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

A.3 Data (All)

This command returns the applicable data formats for the various commands. The command is as follows:

@01/DATA

The converter will return the following string of information:

For Upconverter:

<cr><lf>
cc = channel (01 to 30)
gg.g = gain (0.0 to 40.0) depending on Input Attenuation
s = sign (+ or -)
ffff = frequency MHz (ffff.0 to ffff.0) {ffff.0 = frequency in MHz, low end to high end}
t = Kilohertz step (0 to 7 for 000 - 875 in 125 kHz increments)
aa = Input Attenuation (00 to 30)
<cr><lf>
<cr><lf> {End of transmission}

For Downconverter:

<cr><lf>
cc = channel (01 to 30)
gg.g = gain (0 to +40.0 dB) depending on Input Attenuation
ffff = frequency MHz (ffff.0 to ffff.0) {ffff.0 = frequency in MHz, low end to high end}
t = Kilohertz step (0 to 7 for 000 - 875 in 125 kHz increments)
<cr><lf>
<cr><lf> {End of transmission}

A.4 Show Received Signal Strength Command (Downconverter Only)

This command will cause the converter to output the Received Signal Strength.

@01/SHOWRSS<cr>

The converter will return the following:

<cr><lf>
RSS: vv {vv = value for Received Signal Strength}
<cr><lf>
<cr><lf> {End of transmission}

A.5 Set Current Channel Frequency Command

This command alters the stored frequency of the current channel. The command is as follows:

@01/SETFREQffff.t<cr>

The frequency numerical values include four digits for MHz and one digit "t" which indicates the resolution in 125 kHz steps.

The values of "t" are as follows:

t	**frequency**
0	000 kHz
1	125 kHz
2	250 kHz
3	375 kHz
4	500 kHz
5	625 kHz
6	750 kHz
7	875 kHz

Valid frequency ranges are dependent upon device configuration: To see range for current configuration, send the SETFREQ Command without any data (i.e. “@01SETFREQ<cr>”). This will result in an error message being returned that contains the current freq limits. Frequencies outside this range or frequencies that are of an invalid form will be responded to by the ‘illegal frequency’ prompt. If the synthesizer is unable to tune to the desired band and frequency, the converter will indicate an LO Fault Condition status indication and will change to an off-line or out-of-service indication.

If successful, the converter will return the following string:

For Upconverter:

<cr><lf>
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
Input Atten: aa dB {aa = input attenuation}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

For Downconverter:

<cr><lf>
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

A.6 Set Current Channel Gain Command

This command alters the stored Gain of the current channel. The command is as follows:

@01/SETGAINsgg.g<cr>

The numeric value ‘s’ indicates the ‘plus’ sign (+) or ‘minus’ sign (-). The numeric value ‘g’ consists of three digits indicating gain. Valid Gain ranges are dependent upon device configuration: To see range for current configuration, send the setgain command without any data (i.e. “@SETGAIN<cr>”). This will result in an error message being returned that contains the current gain limits. Gain values outside this range will be responded to by the ‘ILLEGAL GAIN’ prompt.

If successful, the converter will return the following string:

For Upconverter:

<cr><lf>
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
Input Atten: aa dB {aa = input attenuation}
RF: {Off/On}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

For Downconverter:

<cr><lf>
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
RSS: nn {n = current Received Signal Strength}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

A.7 Set Channel Command

This command changes the Current Channel and thus the Gain and Frequency of the converter to one of the 30 preprogrammed channels. The command is as follows:

@01/SETCHANcc<cr>

Where ‘cc’ represents a channel number from 01 - 30.

If successful, the converter will return the following string:

For Upconverter:

<cr><lf>
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
Input Atten: aa dB {aa = input attenuation}
RF: {Off/On}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

For Downconverter:

<cr><lf>
Channel: cc {cc = current channel number, 01 to 30}
Frequency: ffff.fff {ffff.fff = frequency in MHz}
Gain: sgg.g {s = ± and gg.g = gain in dB}
RSS: nn {n = current Received Signal Strength}
Stored Faults: {None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference: {Internal/External}
<cr><lf>
<cr><lf> {End of transmission}

A.8 Store Current Channel Settings

This command stores the current settings for the Frequency and Gain into the channel table for the currently selected channel. The command is as follows:

@01/STORE<cr>

If successful, the converter will return the following string:

<cr><lf>	
Channel: cc	{cc = current channel number, 01 to 30}
Frequency: ffff.fff	{ffff.fff = frequency in MHz}
Gain: sgg.g	{s = ± and gg.g = gain in dB}
Stored Faults:	{None/Signal Fault/LO Fault/LO Fault, Signal Fault}
Reference:	{Internal/External}
<cr><lf>	
<cr><lf>	{End of transmission}

A.9 Clear Faults Command (All)

This command clears any stored faults. The command is as follows:

@01/CLRFAULT<cr>

The converter will not return a string.

A.10 Set Stored Gain For a Specified Channel (S, P1: 1, P1: 8)

This command allows the user to set the Stored Gain for a specified channel. The command is as follows:

@01/RAMGAINccsgg.g<cr>

If successful, the converter will not return a string.

A.11 Set Stored Frequency For a Specified Channel (S, P1: 1, P1: 8)

This command allows the user to set the Stored Frequency for a specified channel other than the current one. The command is as follows:

@01/RAMFREQccffff.t<cr>

If successful, the converter will not return a string.

A.12 Erase (All)

This command allows the user to erase the Stored Status, Frequency and Gain Information the next time the unit is reset. The command is as follows:

@01/ERASE<cr>

If successful, the converter will not return a string.

A.13 Restart

This command allows the user to reset/restart the converter. The command is as follows:

@01/RESTART<cr>

If successful, the converter will not return a string.

A.14 Read DAC Value by Index

This command is used to display the contents of the calibration table (DAC value) for the given Frequency Index (ff) and the given Attenuation Index (aa). The command is as follows:

@01/RDATTENff aa<cr>

NOTE

Parameters are not actual values for frequency and attenuation but the actual index into the various arrays that make up the power calibration table: The valid ranges for these values are dependent on device type and configuration.

If successful, the converter will return the following string:

<cr><lf>
Cal Data = dddd: {dddd is the DAC value}
<cr><lf>
<cr><lf> {End of transmission}

A.15 Dump Channel Table

This command returns the contents of the Channel Table. The command is as follows:

@01/DMPCHAN<cr>

If successful, the converter will return the following string:

<cr><lf>
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
<cr><lf>
<cr><lf> {End of transmission}

where:
ffff.f {f = frequency for channel entry]
sgg.g {s = '+' or '-' : gg.g = Gain for channel entry]

A.16 Dump Calibration Table Set

This command returns the contents (DAC values for all gains) of the Power Calibration Table for the given Frequency Index. The command is as follows:

@01/DMPCALff<cr>

where:
ff {Index into the frequency array portion of the table}

If successful, the converter will return the following string:

<cr><lf>
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
[ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g] [ffff.f,sgg.g]
<cr><lf>
<cr><lf> {End of transmission}

where:
ffff.f {f = frequency for channel entry}
sgg.g {s = '+' or '-' : gg.g = Gain for channel entry}

A.17 Get Current DAC Value

This command returns the DAC value in use for the unit's current configuration (Values of Frequency and Gain). The command is as follows:

@01/CURDAC<cr>

If successful, the converter will return the following string.:

<cr><lf>
DAC Value = dddd {dddd = DAC Value}
<cr><lf>
<cr><lf> {End of transmission}

A.18 Get DAC Value for Frequency and Gain

This command returns the DAC value to be used for the given values of frequency and gain. The command is as follows:

@01/DACFORffff.f gg.g<cr>

where:
ffff.f {f = frequency }
sgg.g {s = '+' or '-' : gg.g = Gain }

If successful, the converter will return the following string.:

<cr><lf>
DAC Value = dddd {dddd = DAC Value}
<cr><lf>
<cr><lf> {End of transmission}

A.19 Error Messages

Bad address

<cr><lf>
INVALID ADDRESS
<cr><lf>
<cr><lf> {End of transmission}

Bad command

<cr><lf>
ILLEGAL COMMAND
<cr><lf>
<cr><lf> {End of transmission}

Not in backup 1 to 1

<cr><lf>
Command is not valid for the backup converter
<cr><lf> {End of transmission}

Not in backup 1 - 8

<cr><lf>
Command is not valid for the backup converter
in a 1 for 8 configuration
<cr><lf> {End of transmission}

Only in backup 1 - 8

<cr><lf>
Command is ONLY valid for the backup converter
in a 1 for 8 configuration
<cr><lf> {End of transmission}

Only in backup 1 to 1

<cr><lf>
Command is ONLY valid in a 1 for 1 switch configuration
<cr><lf> {End of transmission}

Only in backup

<cr><lf>
Command is ONLY valid for the backup converter
<cr><lf> {End of transmission}

Bad channel

<cr><lf>
ILLEGAL CHANNEL (sb 01 to 30)
<cr><lf>
<cr><lf> {End of transmission}

Bad frequency

<cr><lf>
ILLEGAL FREQUENCY
(sb ffff.0 to ffff.0) {ffff.0 = frequency in MHz, low end to high end}
<cr><lf>
<cr><lf> {End of transmission}

Bad gain

<cr><lf>
ILLEGAL GAIN
(sb sgg.g to sgg.g) {s = ± and gg.g = gain in dB, low end to high end, were range is (– (Input Atten) + 10) to (– (Input Atten) + 30)}
<cr><lf>
<cr><lf> {End of transmission}

Converter is faulted

<cr><lf>
Unable to turn RF on. Check converter status
<cr><lf> {End of transmission}

Remote mode only

<cr><lf>
Command valid in REMOTE mode only
<cr><lf> {End of transmission}

Invalid Data

<cr><lf>
INVALID DATA FIELD
<cr><lf> {End of transmission}


RADYNE

Remote RLLP

B

CAUTION!!

When new features are added to Radyne Corporation equipment, the control parameters are appended to the end of the Non-Volatile Section of the Remote Communications Specification, and status of the features, if any, are added at the end of the Volatile Section. If a remote M&C queries two pieces of Radyne Corporation equipment with different revision software, they could respond with two different sized packets. The remote M&C MUST make use of the non-volatile count value to index to the start of the Volatile Section. If the remote M&C is not aware of the newly added features to the product, it should disregard the parameters at the end of the Non-Volatile Section and index to the start of the Volatile Section.

Before creating any software based on the information contained in this document, contact the Radyne Corporation Customer Service Department (602-437-9620) to find out if the software revision for that piece of equipment is current and that no new features have been added since the release of this document.

B.1 Converter Opcode Command Set

The converter opcode command set is listed below:

Command	Opcode
Query control mode	2404h
Query time	240Eh
Query date	240Fh
Query time and date	2410h
Query software revision number	3000h
Query firmware part number and release date	3001h
Query converter status	3002h
Query converter configuration	3003h
Query switch status	3010h
Query switch configuration	3011h
Command converter set control mode	2600h
Command converter clear latched alarms	2C03h

Command converter set time	2C04h
Command converter set date	2C05h
Command converter set time and date	2C06h
Command converter set terminal emulation	2C0Bh
Command converter set terminal baud rate	2C0Ch
Command converter set frequency for the current channel	3020h
Command converter set gain for the current channel	3021h
Command converter set frequency for the given channel	3022h
Command converter set gain for the given channel	3023h
Command converter set channel	3024h
Command converter set carrier control	3025h
Command converter set input attenuation	3026h
Command converter set alarm masks	3027h
Command switch set backup mode	3040h
Command switch force a manual backup	3041h
Command switch set learn configuration	3042h
Command switch backup test configuration	3043h
Command switch set compensation control	3044h
Command switch set converter compensation	3045h
Command switch set all converter compensations	3046h
Command switch set converter priority	3047h
Command switch set all converter priorities	3048h
Command switch set alarm masks	3049h
Command switch set fault delay	304Ah

B.2 Converter Queries

Opcode: <2404H> ***Query control mode***

Query Response		
<1>	Control Mode	0=Local, 1=Terminal, 2=Remote, 3=Ethernet

Opcode: <240EH> ***Query time***

Query Response		
<1>	Hour	0 – 23
<1>	Minute	0 – 59
<1>	Second	0 – 59

Opcode: <240FH> ***Query date***

Query Response		
<1>	Year	0 – 99
<1>	Month	0 – 11
<1>	Day	0 – 30

Opcode: <2410H> ***Query time and date***

Query Response

<1>	Year	0 – 99
<1>	Month	0 – 11
<1>	Day	0 – 30
<1>	Hour	0 – 23
<1>	Minute	0 – 59
<1>	Second	0 – 59

Opcode: <3000H> ***Query software revision number***

Query Response		
<2>	Revision Number	Binary value with implied decimal point, 120 means release 1.20

Opcode: <3001H> ***Query firmware part number and release date***

Query Response		
<9>	Part Number String	FW/4835xx, xx represents the release version, example –B
<9>	Release Date String	Release date in the ddMMMyyyy format, ex 19MAR2004

Opcode: <3002H> Query converter status

Query Response		
<4>	Signal strength	Reserved. Not implemented
<1>	Carrier Status	0=OFF, 1=ON
<1>	Converter Status	0=Standby, 1=Faulted, Offline, 2=Online, 3=Faulted, Online, 4=Setup
<1>	Switch Status	0=Backward Compatible Switch, 1=Prime Chain Switch, 2=Backup Chain Switch, 3=No Switch
<1>	Converter Config	0=Single Converter, 1=Primary1F1, 2=Backup1F1, 3=Primary1FN, 4=Baclup1FN
<1>	Converter Type	0=Down, 1=Up
<1>	Converter Band	0=C-Band, 1=Ku-Band, 2=Ka-Band
<1>	Frequency Type	0=70 MHz, 1=140 MHz
<1>	Reference Type	0=Internal, 1=External
<1>	Major Alarm Status	Bit 0 = LO Fault Bit 1 = Signal Fault Bits 2-7 = Spares
<1>	Minor Alarm Status	Bit 0 = RF Detect Fault Bit 1 = IF Detect Fault Bits 2-7 = Spares
<1>	Latched Major Alarm Status	Bit 0 = LO Fault Bit 1 = Signal Fault Bits 2-7 = Spares
<1>	Latched Minor Alarm Status	Bit 0 = RF Detect Fault Bit 1 = IF Detect Fault Bits 2-7 = Spares
<1>	Inter Converter Communication Address	
<1>	Reserved	

Opcode: <3003H> ***Query converter configuration***

Query Response		
<4>	Frequency	Binary value in 125 KHz steps
<4>	Gain	-20.0 dB to +30.0 dB depending on input attenuator setting
<1>	Input Attenuation	0 through 31, Up converter only
<1>	Channel	Current channel, 1 through 30
<1>	Carrier Control	0=Off, 1=On
<1>	Reference Type	0=Internal, 1=External
<1>	Major Alarm Mask	Bit 0 = LO Fault Bit 1 = Signal Fault Bits 2-7 = Spares
<1>	Minor Alarm Mask	Bit 0 = LO Fault Bit 1 = Signal Fault Bits 2-7 = Spares

B.3 Converter Commands

Opcode: <2600H> ***Command control mode***

<1>	Mode	0=Local, 1=Terminal, 2=Remote, 3=Ethernet

Opcode: <2C03H> ***Command clear latched alarms***

(No Command Data)

Opcode: <2C04H> ***Command set time***

<1>	Hour	0 – 23
<1>	Minute	0 – 59
<1>	Second	0 – 59

Opcode: <2C05H> ***Query set date***

<1>	Year	0 – 99
<1>	Month	0 – 11
<1>	Day	0 – 30

Opcode: <2C06H> ***Command set time and date***

<1>	Year	0 – 99
<1>	Month	0 – 11
<1>	Day	0 – 30
<1>	Hour	0 – 23
<1>	Minute	0 – 59
<1>	Second	0 – 59

Opcode: <2C0BH> ***Command set terminal emulation***

<1>	Emulation	0=AddsVP, 1=VT100, 2=WYSE50

Opcode: <2C0CH> ***Command set terminal baud rate***

<1>	Baud rate	0=Baud 2400, 1=Baud 9600, 2=Baud 19200

Opcode: <3020H> ***Command set frequency for the current channel***

<4>	Frequency	Binary value in 125 KHz steps

Opcode: <3021H> ***Command set gain for the current channel***

<4>	Gain	-20.0 dB to +30.0 dB depending on input attenuator setting

Opcode: <3022H> ***Command set frequency for the given channel***

<4>	Frequency	Binary value in 125 KHz steps
<1>	Channel	1 through 30

Opcode: <3023H> ***Command set gain for the given channel***

<4>	Gain	-20.0 dB to +30.0 dB depending on input attenuator setting
<1>	Channel	1 through 30

Opcode: <3024H> ***Command set channel***

<1>	Channel	1 through 30

Opcode: <3025H> ***Command set carrier control***

<1>	Carrier Control	0=Off, 1=On

Opcode: <3026H> ***Command set input attenuation***

<1>	Input Attenuation	0 through 31, Up converter only

Opcode: <3027H> ***Command set converter alarm masks***

<1>	Major Alarm Mask	Bit 0 = LO Fault Bit 1 = Signal Fault Bits 2-7 = Spares
<1>	Minor Alarm Mask	Bits 0-7 = Spares

SNMP MIB

C

```
CONVERTER-MIB DEFINITIONS ::= BEGIN

        IMPORTS
                enterprises
                        FROM RFC1155-SMI
                MODULE-IDENTITY, OBJECT-TYPE
                        FROM SNMPv2-SMI;

converter MODULE-IDENTITY
        LAST-UPDATED "200301081000Z"
        ORGANIZATION "Radyne  Inc."
        CONTACT-INFO
                        "Customer Service
                        Postal: Radyne Inc.  - Phoenix.
                        3138 E. Elwood Street
                        Phoenix, AZ 85034
                        USA

                        Tel: (602) 437-9620
                        Fax: (602) 437-4811

                        Email: xxxx@radn.com"

        DESCRIPTION
                        "Radyne  converter MIB module."

        REVISION      "200109051000Z"
                DESCRIPTION   "Initial version of the Radyne  Converter MIB module.  This is a document
                whose contents are subject to change without prior notice. Converter MIB Object Identifiers
                description. The private enterprise number 2591 is a unique identifier assigned to Radyne by
                the Internet Assigned Numbers Authority (IANA).  This number is used to uniquely define
                vendor specific information such as private MIBs."

        ::= { radyne 12 }


-- groups in Radyne specific MIB

        radyne                          OBJECT IDENTIFIER ::= { enterprises 2591 }

        converterMIBObjects             OBJECT IDENTIFIER ::= { converter 1 }

        radConverterNVStatus            OBJECT IDENTIFIER ::= { converterMIBObjects 1 }
        radConverterStatus              OBJECT IDENTIFIER ::= { converterMIBObjects 2 }

        radConverterSwitchNVStatus      OBJECT IDENTIFIER ::= { converterMIBObjects 3 }
        radConverterSwitchStatus        OBJECT IDENTIFIER ::= { converterMIBObjects 4 }

        radConverterCommonNVStatus      OBJECT IDENTIFIER ::= { converterMIBObjects 5 }
        radConverterCommonStatus        OBJECT IDENTIFIER ::= { converterMIBObjects 6 }

        radConverterMIBTraps            OBJECT IDENTIFIER ::= { converterMIBObjects 7 }

        raConverterMIBConformance       OBJECT IDENTIFIER ::= { converter 2 }
        raConverterGroups               OBJECT IDENTIFIER ::= { radConverterMIBConformance 1 }
        radConverterAgentCapabilities   OBJECT IDENTIFIER ::= { radConverterMIBConformance 2 }

-- ------------------------------------------------------------------------------------------------------------------
```

```
-- ------------------------------------------------------------------------------------------------------------
-- Textual Conventions

ControlType ::= TEXTUAL-CONVENTION
        STATUS          current
        DESCRIPTION     "Represents a boolean control value."
        SYNTAX          INTEGER { disable(1), enable(2) }

InversionType ::= TEXTUAL-CONVENTION
        STATUS          current
        DESCRIPTION     "Represents a boolean inversion value."
        SYNTAX          INTEGER { normal(1), inverted(2) }

AlarmByteType ::= TEXTUAL-CONVENTION
        STATUS          current
        DESCRIPTION     "Represents a one byte integer value. Limits are 0 to 255"
        SYNTAX          INTEGER (0..255)

PrimeStatusType ::= TEXTUAL-CONVENTION
        STATUS          current
        DESCRIPTION     "Represents a one byte integer value. Limits are 0 to 255
                                Bit0 = Prime1 status
                                Bit1 = Prime2 status
                                Bit2 = Prime3 status
                                Bit3 = Prime4 status
                                Bit4 = Prime5 status
                                Bit5 = Prime6 status
                                Bit6 = Prime7 status
                                Bit7 = Prime8 status "
        SYNTAX          INTEGER (0..255)

PrimeControlType ::= TEXTUAL-CONVENTION
        STATUS          current
        DESCRIPTION     "Represents a prime control setup. Limits are 1 to 9
                                1 = Prime1
                                2 = Prime2
                                3 = Prime3
                                4 = Prime4
                                5 = Prime5
                                6 = Prime6
                                7 = Prime7
                                8 = Prime8
                                9 = All Primes"
        SYNTAX          INTEGER (1..9)
-- ------------------------------------------------------------------------------------------------------------
-- ------------------------------------------------------------------------------------------------------------
-- Converter non-volatile status information.

radConverterFrequency OBJECT-TYPE
        SYNTAX          INTEGER (50000000..90000000)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Selects RF input frequency in 125 KHz steps.
                        3.62 GHz to 4.20 GHz SFC4200 Ka-Band Down Converter
                        5.845 GHz to 6.425 GHz SFC6400 Ka-Band Up Converter
                        10.95 GHz to 12.75 GHz SFC2100A 1275 Ku-Band Down Converter
                        14.00 GHz to 14.50 GHz SFC2100A 1450 Ku-Band Up Converter"
        ::= { radConverterNVStatus 1 }

radConverterChannelGain OBJECT-TYPE
        SYNTAX          INTEGER (-200..300)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Sets the Channel Gain in 0.1dB steps. -20.0 dB to 30.0 dB with an
                        implied decimal point. "
```

```
        ::= { radConverterNVStatus 2 }

radConverterCurrentChannel OBJECT-TYPE
        SYNTAX          INTEGER (1..30)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Channel number, 1 through 30. Selects the current channel of the unit.
                        Each channel allows entering of an independent set of parameters
(Frequency,
                        Gain, etc.).  For example, Channel 1 Frequency might be set to 3.8GHz and
                        Channel 2 could be set to 4.0GHz.  Any other parameters could be different
                        as well.  The advantage is that a completely different setup can be arrived
                        at by merely changing the Channel number."
        ::= { radConverterNVStatus 3 }

radConverterCarrierControl OBJECT-TYPE
        SYNTAX          INTEGER {
                        off(1),
                        on(2)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Turns carrier off and on."
        ::= { radConverterNVStatus 4 }

radConverterMajorAlarmMask OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Major Alarm mask:
                        Bit 0 = LO Fault
                        Bit 1 = Signal Fault
                        Bit 2-7 = Spares
                        0 = Mask, 1 = Allow"
        ::= { radConverterNVStatus 5 }

radConverterMinorAlarmMask OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Minor Alarm mask:
                        Bit 0 = RF Dtect Fault
                        Bit 1 = IF Dtect Fault
                        Bit 2-7 = Spares
                        0 = Mask, 1 = Allow"
        ::= { radConverterNVStatus 6 }


-- ------------------------------------------------------------------------------------------------------------
-- ------------------------------------------------------------------------------------------------------------
-- Converter status information.

radConverterCarrierStatus OBJECT-TYPE
        SYNTAX          INTEGER {
                        off(1),
                        on(2)
                        }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Shows status of the carrier, on or off"
        ::= { radConverterStatus 1 }
```

```
radConverterSystemStatus OBJECT-TYPE
        SYNTAX          INTEGER {
                                standby(1),
                                online(2),
                                faulted(3),
                                setup(4)
                                }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "Shows operating status of the converter"
        ::= { radConverterStatus 2 }

radConverterSwitchPresentStatus OBJECT-TYPE
        SYNTAX          INTEGER {
                                not_present(1),
                                present(2)
                                }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
"Shows switch status"
        ::= { radConverterStatus 3 }

radConverterConfiguration OBJECT-TYPE
        SYNTAX          INTEGER {
                                single_converter(1),
                                primary_1f1_converter(2),
                                backup_1f1_converter(3),
                                primary_1fn_converter(4),
                                backup_1fn_converter(5)
                                }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "Shows converter configuration"
        ::= { radConverterStatus 4 }

radConverterType OBJECT-TYPE
        SYNTAX          INTEGER {
                                down(1),
                                up(2)
                                }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "Shows converter type"
        ::= { radConverterStatus 5 }

radConverterBand OBJECT-TYPE
        SYNTAX          INTEGER {
                                c_band(1),
                                ku_band(2)
                                }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "Shows converter band"
        ::= { radConverterStatus 6 }

radConverterFrequencyType OBJECT-TYPE
        SYNTAX          INTEGER {
                                freq_70mhz(1),
                                freq_140mhz(2)
                                }
        MAX-ACCESS      read-only
        STATUS          current
```

```
        DESCRIPTION
                        "Shows converter frequency type"
        ::= { radConverterStatus 7 }

radConverterReferenceType OBJECT-TYPE
        SYNTAX          INTEGER {
                        internal(1),
                        external(2)
                        }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Shows converter reference type"
        ::= { radConverterStatus 8 }

radConverterMajorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this
                        to the value '00000000'B
                        Bit 0 = LO Fault
                        Bit 1 = Signal Fault
                        Bit 2-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterStatus 9 }

radConverterMinorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this to
                        the value '00000000'B
                        Bit 0 = RF Dtect Fault
                        Bit 1 = IF Dtect Fault
                        Bit 2-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterStatus 10 }

radConverterLatchedMajorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this
                        to the value '00000000'B.
                        Bit 0 = LO Fault
                        Bit 1 = Signal Fault
                        Bit 2-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterStatus 11 }

radConverterLatchedMinorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this to
                        the value '00000000'B.
                        Bit 0 = RF Dtect Fault
                        Bit 1 = IF Dtect Fault
                        Bit 2-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterStatus 12 }
```

```
radConverterICCAddress OBJECT-TYPE
        SYNTAX          INTEGER (1..255)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "  "
        ::= { radConverterStatus 13 }

radConverterICCType OBJECT-TYPE
        SYNTAX          INTEGER (0..255)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field that shows converter ICC type.  On startup, the agent
                        initializes this to the value '00000000'B.
                        Bit 0-3 = Band
                                Down-Band: 0 through 5
                                        0=Normal Ka-Band, 1=Extended Ka-Band, 2=Normal Ku-
Band,
                                        3=Normal American Ku-Band, 4=India High Ka-Band,
5=European Ku-Band
                                Up-Band: 0 through 4
                                        0=Normal Ka-Band, 1=Extended Ka-Band, 2=Normal Ku-
Band,
                                        3=Normal Ku-Band, 4=India High Ka-Band
                        Bit 4-5 = Spare             Not Used
                        Bit 6 = Normal_Custom       0=Normal, 1=Custom
                        Bit 7 = Down_Up             0=Down,   1=Up"
        ::= { radConverterStatus 14 }


-- ---------------------------------------------------------------------------------------------------------------
-- ---------------------------------------------------------------------------------------------------------------
-- Converter Switch non-volatile status information.

radConverterSwitchBackupMode OBJECT-TYPE
        SYNTAX          INTEGER {
                        manual(1),
                        auto_nonrevertive(2),
                        auto_revertive(3)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Selects MANUAL or AUTOMATIC backup modes.
                        Manual:  A Prime Converter can be backed up through manual control only.
                        Auto-Nonrevertive:  A Prime Converter will be backed up if it fails.
                                It will remain backed up until it is manually unbacked.
                        Auto-Revertive:  A Prime Converter will be backed up if it fails.
                                If a second Converter of a higher priority (see 7. below) fails, the
                                Switch will unback the first and backup the second Converter.  Also,
                                if the first Converter recovers after it has been backed up (i.e., no
                                longer has a fault), the Switch will unback it and place it online again."
        ::= { radConverterSwitchNVStatus 1 }

radConverterSwitchLearn OBJECT-TYPE
        SYNTAX          PrimeControlType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Learn Prime converter or learn All. Causes the Backup unit to 'Learn'
                        all the settings of the selected Primes.  The Backup can only backup a
                        Prime that it has learned."
        ::= { radConverterSwitchNVStatus 2 }

radConverterSwitchBackupTest OBJECT-TYPE
        SYNTAX          PrimeControlType
```

```
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Checks if Prime can be backed up."
        ::= { radConverterSwitchNVStatus 3 }

radConverterSwitchForceBackup OBJECT-TYPE
        SYNTAX          INTEGER (0..8)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Force a manual backup (select 1..8), or unback of a Prime (select 0).
                        When in Manual Backup Mode, this selection will force the selected Prime
                        to be backed up.  Unback will release any Prime that is currently backed
                        up."
        ::= { radConverterSwitchNVStatus 4 }

radConverterSwitchPriority OBJECT-TYPE
        SYNTAX          INTEGER (0..8)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Prime converter priority. Sets the switching priority of a Prime unit.
                        If more than one unit fails at the same time, the higher priority unit
                        will be backed up.  Also, if one unit is currently backed up and a second
                        unit with a higher priority fails, the first unit will be unbacked and
                        the second unit will be backed up (but only if Backup Mode is
                        Auto-Revertive, see 1. above).  The priority is set as follows.
                        0 = No priority (the Switch will ignore the Downconverter).
                        1 = Highest priority.
                        8 = Lowest priority."
        ::= { radConverterSwitchNVStatus 5 }

radConverterSwitchCompensationControl OBJECT-TYPE
        SYNTAX          INTEGER {
                        disable(1),
                        enable(2)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Controls the Prime converter compensation, ENABLE/DISABLE."
        ::= { radConverterSwitchNVStatus 6 }

radConverterSwitchCompensation OBJECT-TYPE
        SYNTAX          INTEGER (-50..+50)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Prime converter compensation of -5.0 dB to +5.0 dB (Implied decimal
point).
                        Offsets the gain of the Backup unit to account for variations in loss
                        through the system.
                        This allows the user to ensure that the signal path of a particular Prime
                        Converter maintains the same output power when backed up."
        ::= { radConverterSwitchNVStatus 7 }

radConverterSwitchFaultDelay OBJECT-TYPE
        SYNTAX          INTEGER (50..10000 )
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Sets the delay between the time a Fault occurs in a Prime unit and the
                        time it is acknowledged by the Backup. This only used in automatic backup
                        modes."
        ::= { radConverterSwitchNVStatus 8 }
```

```
radConverterSwitchNoFaultDelay OBJECT-TYPE
        SYNTAX          INTEGER (50..10000 )
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Sets the delay between the time a Fault goes away in a Prime unit and
                        the time it is acknowledged as gone by the Backup. This only used in
                        automatic backup modes. Not yet implemented."
        ::= { radConverterSwitchNVStatus 9 }

radConverterSwitchMajorAlarmMask OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Major Alarm mask:
                        Bit 0 = RelayFault
                        Bit 1 = Backup Fault
                        Bit 2 = NoBackup
                        Bit 3 = PollingFault
                        Bit 4-7 = Spares
                        0 = Mask, 1 = Allow"
        ::= { radConverterSwitchNVStatus 10 }

radConverterSwitchMinorAlarmMask OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Minor Alarm mask:
                        Bit 0 = LearnedFault
                        Bit 1 = BackupTestFault
                        Bit 2 = ConfigChangedFault
                        Bit 3-7 = Spares
                        0 = Mask, 1 = Allow"
        ::= { radConverterSwitchNVStatus 11 }

-- ------------------------------------------------------------------------------------------------------------
-- ------------------------------------------------------------------------------------------------------------
-- Converter Switch status information.

radConverterSwitchMajorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this
                        to the value '00000000'B.
                        Bit 0 = RelayFault
                        Bit 1 = Backup Fault
                        Bit 2 = NoBackup
                        Bit 3 = PollingFault
                        Bit 4-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterSwitchStatus 1 }

radConverterSwitchMinorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this to
                        the value '00000000'B.
                        Bit 0 = LearnedFault
                        Bit 1 = BackupTestFault
                        Bit 2 = ConfigChangedFault
                        Bit 3-7 = Spares
```

```
                                        0 = Pass, 1 = Fail"
        ::= { radConverterSwitchStatus 2 }

radConverterSwitchLatchedMajorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this
                        to the value '00000000'B.
                        Bit 0 = RelayFault
                        Bit 1 = Backup Fault
                        Bit 2 = NoBackup
                        Bit 3 = PollingFault
                        Bit 4-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterSwitchStatus 3 }

radConverterSwitchLatchedMinorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "A bit field.  On startup, the agent initializes this to
                        the value '00000000'B.
                        Bit 0 = LearnedFault
                        Bit 1 = BackupTestFault
                        Bit 2 = ConfigChangedFault
                        Bit 3-7 = Spares
                        0 = Pass, 1 = Fail"
        ::= { radConverterSwitchStatus 4 }

radConverterSwitchFaultStatus OBJECT-TYPE
        SYNTAX          PrimeStatusType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Prime converter fault status:
                        Bit 0 = Prime 1
                        Bit 1 = Prime 2
                        Bit 2 = Prime 3
                        Bit 3 = Prime 4
                        Bit 4 = Prime 5
                        Bit 5 = Prime 6
                        Bit 6 = Prime 7
                        Bit 7 = Prime 8
                        0 = No Fault, 1 = Fault"
::= { radConverterSwitchStatus 5 }

radConverterSwitchRelayStatus OBJECT-TYPE
        SYNTAX          PrimeStatusType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Prime converter relay status:
                        Bit 0 = Prime 1
                        Bit 1 = Prime 2
                        Bit 2 = Prime 3
                        Bit 3 = Prime 4
                        Bit 4 = Prime 5
                        Bit 5 = Prime 6
                        Bit 6 = Prime 7
                        Bit 7 = Prime 8
                        0 = Off, 1 = On (Fault Condition)"
        ::= { radConverterSwitchStatus 6 }

radConverterSwitchConfigChangedStatus OBJECT-TYPE
```

```
        SYNTAX          PrimeStatusType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Prime converter configuration status:
                        Bit 0 = Prime 1
                        Bit 1 = Prime 2
                        Bit 2 = Prime 3
                        Bit 3 = Prime 4
                        Bit 4 = Prime 5
                        Bit 5 = Prime 6
                        Bit 6 = Prime 7
                        Bit 7 = Prime 8
                        0 = No change, 1 = Changed"
        ::= { radConverterSwitchStatus 7 }

radConverterSwitchLearnStatus OBJECT-TYPE
        SYNTAX          PrimeStatusType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Prime converter learn status:
                        Bit 0 = Prime 1
                        Bit 1 = Prime 2
                        Bit 2 = Prime 3
                        Bit 3 = Prime 4
                        Bit 4 = Prime 5
                        Bit 5 = Prime 6
                        Bit 6 = Prime 7
                        Bit 7 = Prime 8
                        0 = Not Learned, 1 = Learned"
        ::= { radConverterSwitchStatus 8 }

radConverterSwitchBackupTestStatus OBJECT-TYPE
        SYNTAX          PrimeStatusType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Prime converter backup test status:
                        Bit 0 = Prime 1
                        Bit 1 = Prime 2
                        Bit 2 = Prime 3
                        Bit 3 = Prime 4
                        Bit 4 = Prime 5
                        Bit 5 = Prime 6
                        Bit 6 = Prime 7
                        Bit 7 = Prime 8
                        0 = Fail, 1 = Pass"
        ::= { radConverterSwitchStatus 9 }

radConverterSwitchPowerSenseStatus OBJECT-TYPE
        SYNTAX          PrimeStatusType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Prime converter power sense status:
                        Bit 0 = Prime 1
                        Bit 1 = Prime 2
                        Bit 2 = Prime 3
                        Bit 3 = Prime 4
                        Bit 4 = Prime 5
                        Bit 5 = Prime 6
                        Bit 6 = Prime 7
                        Bit 7 = Prime 8
                        0 = No Power Present, 1 = Power Present"
        ::= { radConverterSwitchStatus 10 }
```

```
radConverterSwitchBackedupPrime OBJECT-TYPE
        SYNTAX          INTEGER (0..8)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Shows the currently backed up prime. 0 means no converters are
                        currently backed up."
        ::= { radConverterSwitchStatus 11}

radConverterSwitchHotStandbyPrime OBJECT-TYPE
        SYNTAX          INTEGER (0..8)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                        "Shows the current prime converter in hot standby. 0 means no converter
                        is currently in hot standby. This is valid only in automatic backup modes."
        ::= { radConverterSwitchStatus 12 }

-- ---------------------------------------------------------------------------------------------------------
-- ---------------------------------------------------------------------------------------------------------
-- Converter common non-volatile status information.

radConverterCommonControlMode OBJECT-TYPE
        SYNTAX          INTEGER {
                        front_panel(1),
                        terminal(2),
                        remote(3),
                        ethernet(4),
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        ""
        ::= { radConverterCommonNVStatus 1 }

radConverterCommonTerminalBaudRate OBJECT-TYPE
        SYNTAX          INTEGER {
                        baud_2400(1),
                        baud_9600(2),
                        baud_19200(3)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Selects terminal baud rate."
        ::= { radConverterCommonNVStatus 2 }

radConverterCommonTerminalEmulation OBJECT-TYPE
        SYNTAX          INTEGER {
                        vt100(1),
                        wyse50(2),
                        addsvp(3)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                        "Selects terminal emulation."
        ::= { radConverterCommonNVStatus 3 }

radConverterCommonTerminalEchoMode OBJECT-TYPE
        SYNTAX          INTEGER {
                        on(1),
                        off(2)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
```

```
                                    "Selects terminal echo mode. Not currently in use."
        ::= { radConverterCommonNVStatus 4 }

radConverterCommonRemoteProtocol OBJECT-TYPE
        SYNTAX          INTEGER {
                                    ascii(1),
                                    rllp(2)
                                    }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                    "Selects remote port protocol."
        ::= { radConverterCommonNVStatus 5 }

radConverterCommonRemoteAddress OBJECT-TYPE
        SYNTAX          INTEGER (1..255)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                    "Remote port address, 1 through 255."
        ::= { radConverterCommonNVStatus 6 }

radConverterCommonRemoteBaudRate OBJECT-TYPE
        SYNTAX          INTEGER {
                                    baud_2400(1),
                                    baud_9600(2),
                                    baud_19200(3)
                                    }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                    "Selects remote port Baud Rate."
        ::= { radConverterCommonNVStatus 7 }

radConverterCommonRemoteLineControl OBJECT-TYPE
        SYNTAX          INTEGER {
                                    rs232(1),
                                    rs485(2)
                                    }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                    "Selects RS232 or RS485."
        ::= { radConverterCommonNVStatus 8 }

radConverterCommonRemoteEchoMode OBJECT-TYPE
        SYNTAX          INTEGER {
                                    on(1),
                                    off(2)
                                    }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                    "Sets Echo mode to on or off. Valid only for ASCII protocol remote
                                    serial interface"
        ::= { radConverterCommonNVStatus 9 }

radConverterCommonMajorAlarmMask OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                    "Major Alarm mask:
                                    Bit 0 = CPLD test fault
                                    Bit 1 = FPGA test fault
                                    Bit 2 = Eeprom test fault
                                    Bit 3-7 = Spares
```

```
                                        0 = Mask, 1 = Allow"
        ::= { radConverterCommonNVStatus 10 }

radConverterCommonMinorAlarmMask OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                        "Minor Alarm mask:
                                        Bit 0 = VCC1 fault
                                        Bit 1 = +9V fault
                                        Bit 2 = +15V fault
                                        Bit 3 = -15V fault
                                        Bit 4 = Reference activity fault
                                        Bit 5-7 = Spares
                                        0 = Mask, 1 = Allow"
        ::= { radConverterCommonNVStatus 11 }

-- ------------------------------------------------------------------------------------------------------------
-- ------------------------------------------------------------------------------------------------------------
-- Converter common status information.

radConverterCommonMajorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                        "A bit field.  On startup, the agent initializes this
                                        to the value '00000000'B.
                                        Bit 0 = CPLD test fault
                                        Bit 1 = FPGA test fault
                                        Bit 2 = Eeprom test fault
                                        Bit 3-7 = Spares
                                        0 = Pass, 1 = Fail"
        ::= { radConverterCommonStatus 1 }

radConverterCommonMinorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                        "A bit field.  On startup, the agent initializes this to
                                        the value '00000000'B.
                                        Bit 0 = VCC1 fault
                                        Bit 1 = +9V fault
                                        Bit 2 = +15V fault
                                        Bit 3 = -15V fault
                                        Bit 4 = Reference activity fault
                                        Bit 5-7 = Spares
                                        0 = Pass, 1 = Fail"
        ::= { radConverterCommonStatus 2 }

radConverterCommonLatchedMajorAlarmStatus OBJECT-TYPE
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                        "A bit field.  On startup, the agent initializes this
                                        to the value '00000000'B.
                                        Bit 0 = CPLD test fault
                                        Bit 1 = FPGA test fault
                                        Bit 2 = Eeprom test fault
                                        Bit 3-7 = Spares
                                        0 = Pass, 1 = Fail"
        ::= { radConverterCommonStatus 3 }

radConverterCommonLatchedMinorAlarmStatus OBJECT-TYPE
```

```
        SYNTAX          AlarmByteType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "A bit field.  On startup, the agent initializes this to
                                the value '00000000'B.
                                Bit 0 = VCC1 fault
                                Bit 1 = +9V fault
                                Bit 2 = +15V fault
                                Bit 3 = -15V fault
                                Bit 4 = Reference activity fault
                                Bit 5-7 = Spares
                                0 = Pass, 1 = Fail"
        ::= { radConverterCommonStatus 4 }

radConverterCommonUserMinFrequency OBJECT-TYPE
        SYNTAX          INTEGER (3620000..14750000)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "User minimum frequency."
        ::= { radConverterCommonStatus 5 }

radConverterCommonUserMaxFrequency OBJECT-TYPE
        SYNTAX          INTEGER (3620000..14750000)
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                                "User maximum frequency."
        ::= { radConverterCommonStatus 6 }

radConverterCommonSynthesizerType OBJECT-TYPE
        SYNTAX          INTEGER {
                                mfs1191(1),
                                mfs448(2),
                                mfs459(3),
                                mfs544(3),
                                mfs881(4),
                                mfs474(5),
                                mfs4_47(6),
                                mfs4_59(7)
                                }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                "Shows the currently used synthesizer:
                                MFS 1191:IF LO= 2420 MHz, Low range = 7600 GHz, High range = 8150 GHz
                                MFS 448:IF LO= 2420 MHz, Low range = 8150 GHz, High range = 8400 GHz
                                MFS 459:IF LO= 2420 MHz, Low range = 8350 GHz, High range = 8650 GHz
                                MFS 544:IF LO= 1.1125 GHz, Low range = 8750 GHz, High range = 9350 GHz
                                MFS 1191:IF LO= 1.7 GHz,    Low range = 11.91GHz, High range = 12.73 GHz
                                MFS 448:IF LO= 1.225 GHz, Low range = 4.48 GHz, High range = 5.355 GHz
                                MFS 459:IF LO= 1.1125 GHz, Low range = 4.5925 GHz, High range = 5.2425 GHz
                                MFS 544:IF LO= 1.1125 GHz, Low range = 5.4475 GHz, High range = 5.8675 GHz
                                MFS 881:IF LO= 2.0 GHz, Low range = 8.81 GHz, High range = 10.68 GHz
                                MFS 474:IF LO= 1.1125 GHz, Low range = 4.74 GHz, High range = 5.54 GHz
                                MFS 4_47:IF LO= 1.1125 GHz, Low range = 4.47 GHz, High range = 5.34 GHz
                                MFS 4_59:IF LO= 1.1125 GHz, Low range = 4.59 GHz, High range = 5.54 GHz"
                                MFS 474:IF LO= 2430 MHz, Low range = 12.75 GHz, High range = 13.30 GHz
                                MFS 4_47:IF LO= 2430 MHz, Low range = 13.25 GHz, High range = 13.875 GHz
                                MFS 4_59:IF LO= 2430 MHz, Low range = 13.75 GHz, High range = 14.25 GHz"
        ::= { radConverterCommonStatus 7 }

radConverterCommonDCGainOffset OBJECT-TYPE
        SYNTAX          INTEGER (0..300)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
```

```
                                        "DC Gain offset. Implied decimal point, 0 through 30.0 dB"
        ::= { radConverterCommonStatus 8 }

radConverterCommonFirmwareVersion OBJECT-TYPE
        SYNTAX          INTEGER (10..255)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                                        "Firmware version."
        ::= { radConverterCommonStatus 9 }

-- ------------------------------------------------------------------------------------------------------------------
-- ------------------------------------------------------------------------------------------------------------------

-- Converter Trap definitions.

-- Include Prefix for compatibility with SNMPv1 traps and procedures
-- employed by multi-lingual and proxy forwarding systems

radConverterMIBTrapPrefix   OBJECT IDENTIFIER ::= { radConverterMIBTraps 0 }

radConverterColdStartTrap  NOTIFICATION-TYPE
        STATUS          current
        DESCRIPTION     "Unexpected restart."
        ::= { radConverterMIBTrapPrefix 1 }

radConverterAuthenticationFailureTrap NOTIFICATION-TYPE
        STATUS          current
        DESCRIPTION     "Received a message that has failed authentication."
        ::= { radConverterMIBTrapPrefix 2 }

radConverterMajorAlarmTrap NOTIFICATION-TYPE
        STATUS          current
        DESCRIPTION     "Major alarm trap."
        ::= { radConverterMIBTrapPrefix 3 }

radConverterMinorAlarmTrap NOTIFICATION-TYPE
        STATUS          current
        DESCRIPTION     "Minor alarm trap."
        ::= { radConverterMIBTrapPrefix 4 }

radConverterCommonAlarmTrap NOTIFICATION-TYPE
        STATUS          current
        DESCRIPTION     "Common alarm trap."
        ::= { radConverterMIBTrapPrefix 5 }


-- ------------------------------------------------------------------------------------------------------------------
-- ------------------------------------------------------------------------------------------------------------------
-- Converter MIB conformance

radConverterNVStatusGroup OBJECT-GROUP
        OBJECTS                 {
                                radConverterFrequency,
                                radConverterChannelGain,
                                radConverterCurrentChannel,
                                radConverterCarrierControl,
                                radConverterMajorAlarmMask,
                                radConverterMinorAlarmMask
                                }
        STATUS          current
        DESCRIPTION     "Non-volatile status group."
        ::= { radConverterGroups 1 }

radConverterStatusGroup OBJECT-GROUP
        OBJECTS                 {
                                radConverterCarrierStatus,
```

```
                                    radConverterStatus,
                                    radConverterSwitchStatus,
                                    radConverteConfiguration,
                                    radConverterType,
                                    radConverterBand,
                                    radConverterFrequencyType,
                                    radConverterReferenceType,
                                    radConverterMajorAlarmStatus,
                                    radConverterMinorAlarmStatus,
                                    radConverterLatchedMajorAlarmStatus,
                                    radConverterLatchedMinorAlarmStatus,
                                    radConverterICCAddress,
                                    radConverterICCType}
        STATUS          current
        DESCRIPTION     "Volatile status group."
        ::= { radConverterGroups 2 }

radConverterSwitchNVStatusGroup OBJECT-GROUP
        OBJECTS                 {
                                    radConverterSwitchBackupMode,
                                    radConverterSwitchLearn,
                                    radConverterSwitchBackupTest,
                                    radConverterSwitchForceBackup,
                                    radConverterSwitchPriority,
                                    radConverterSwitchCompensationControl,
                                    radConverterSwitchCompensation,
                                    radConverterSwitchFaultDelay,
                                    radConverterSwitchNoFaultDelay,
                                    radConverterSwitchMajorAlarmMask,
                                    radConverterSwitchMinorAlarmMask
                                    }
        STATUS          current
        DESCRIPTION     "Switch non-volatile status group."
        ::= { radConverterGroups 3 }

radConverterSwitchStatusGroup OBJECT-GROUP
        OBJECTS                 {
                                    radConverterSwitchMajorAlarmStatus,
                                    radConverterSwitchMinorAlarmStatus,
                                    radConverterSwitchLatchedMajorAlarmStatus,
                                    radConverterSwitchLatchedMinorAlarmStatus,
                                    radConverterSwitchFaultStatus,
                                    radConverterSwitchRelayStatus,
                                    radConverterSwitchConfigChangedStatus,
                                    radConverterSwitchLearnStatus,
                                    radConverterSwitchBackupTestStatus,
                                    radConverterSwitchPowerSenseStatus,
                                    radConverterSwitchBackedupPrime,
                                    radConverterSwitchHotStandbyPrime
                                    }
        STATUS          current
        DESCRIPTION     "Switch volatile status group."
        ::= { radConverterGroups 4 }

radConverterCommonNVStatusGroup OBJECT-GROUP
        OBJECTS                 {
                                    radConverterCommonControlMode,
                                    radConverterCommonTerminalBaudRate,
                                    radConverterCommonTerminalEmulation,
                                    radConverterCommonTerminalEchoMode,
                                    radConverterCommonRemoteProtocol,
                                    radConverterCommonRemoteAddress,
                                    radConverterCommonRemoteBaudRate,
                                    radConverterCommonRemoteLineControl,
                                    radConverterCommonRemoteEchoMode,
                                    radConverterCommonMajorAlarmMask,
                                    radConverterCommonMinorAlarmMask
```

```
                                        }
        STATUS          current
        DESCRIPTION     "Common non-volatile status group."
        ::= { radConverterGroups 5 }

radConverterCommonStatusGroup OBJECT-GROUP
        OBJECTS                 {
                                radConverterCommonMajorAlarmStatus,
                                radConverterCommonMinorAlarmStatus,
                                radConverterCommonLatchedMajorAlarmStatus,
                                radConverterCommonLatchedMinorAlarmStatus,
                                radConverterCommonUserMinFrequency,
                                radConverterCommonUserMaxFrequency,
                                radConverterCommonSynthesizerType,
                                radConverterCommonDCGainOffset,
                                radConverterCommonFirmwareVersion
                                }
        STATUS          current
        DESCRIPTION     "Common volatile status group."
        ::= { radConverterGroups 6 }

radConverterCommonNotificationsGroup NOTIFICATION-GROUP
        NOTIFICATIONS   {
                                radConverterColdStartTrap,
                                radConverterAuthenticationFailureTrap
                                }
        STATUS          current
        DESCRIPTION
                                "The two notifications which an SNMPv2 entity is required to
                                implement."
        ::= { radConverterGroups 7 }

radConverterNotificationsGroup NOTIFICATION-GROUP
        NOTIFICATIONS    {
                                radConverterMajorAlarmTrap,
                                radConverterMinorAlarmTrap,
                                radConverterCommonAlarmTrap
                                }
        STATUS          current
        DESCRIPTION
                                "Traps group."
        ::= { radConverterGroups 8 }

END
```


RADYNE

Glossary

G

A	
A	Ampere
AC	Alternating Current
ADC	Analog to Digital Converter
AGC	Automatic Gain Control
AIS	Alarm Indication System. A signal comprised of all binary 1s.
AMSL	Above Mean Sea Level
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASIC	Application Specific Integrated Circuit
ATE	Automatic Test Equipment
B	
BER	Bit Error Rate
BERT	Bit Error Rate Test
Bit/BIT	Binary Digit or Built-In Test
BITE	Built-In Test Equipment
bps	Bits Per Second
BPSK	Binary Phase Shift Keying
Byte	8 Binary Digits
C	
C	Celsius
CATS	Computer Aided Test Software
CA/xxxx	Cable Assembly
CD-ROM	Compact Disk – Read Only Memory
CLK	Clock
cm	Centimeter
COM	Common
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check. A system of error checking performed at the transmitting and receiving stations.
CW	Continuous Wave
C/N	Carrier to Noise Ratio

D	
DAC	Digital to Analog Converter
dB	Decibels
dBc	Decibels Referred to Carrier
dBm	Decibels Referred to 1.0 milliwatt
DC	Direct Current
DCE	Data Communications Equipment
Demod	Demodulator or Demodulated
DPLL	Digital Phase Locked Loop
DTE	Data Terminal Equipment
DVB	Digital Video Broadcast
D&I	Drop and Insert
E	
E_b/N_0	Ratio of Energy per bit to Noise Power Density in a 1 Hz Bandwidth.
EEPROM	Electrically Erasable Programmable Read Only Memory
EIA	Electronic Industries Association
EMI	Electromagnetic Interference
ESC	Engineering Service Circuits
ET	Earth Terminal
F	
F	Fahrenheit
FAS	Frame Acquisition Sync. A repeating series bits which allow acquisition of a frame.
FCC	Federal Communications Commission
FEC	Forward Error Correction
FIFO	First In, First Out
FPGA	Field Programmable Gate Arrays
FW	Firmware
G	
g	Force of Gravity
GHz	Gigahertz
GND	Ground

H	
HSSI	High Speed Serial Interface
HW	Hardware
Hz	Hertz (Unit of Frequency)
I	
IBS	Intelsat Business Services
IDR	Intermediate Data Rate
I/O	Input/Output
IEEE	International Electrical and Electronic Engineers
IESS	INTELSAT Earth Station Standards
IF	Intermediate Frequency
INTELSAT	International Telecommunication Satellite Organization
ISO	International Standards Organization
J	
J	Joule
K	
Kbps	Kilobits per Second
Kbps	Kilobytes per Second
kg	Kilogram
kHz	Kilohertz
Ksps	Kilosymbols per Second
L	
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LO	Local Oscillator
M	
mA	Milliampere
Mbps	Megabits per Second
MFAS	Multi-Frame Acquisition Sync. See FAS.
MHz	Megahertz
MIB	Management Information Base
Mod	Modulator or Modulated
ms	Millisecond
M&C	Monitor and Control

N	
NC	Normally Closed
NO	Normally Open
ns	Nanoseconds
NVRAM	Non-Volatile Random Access Memory
N/C	No Connection or Not Connected
O	
OQPSK	Offset Quadrature Phase Shift Keying
P	
PC	Personal Computer
PLL	Phase Locked Loop
ppb	Parts per Billion
ppm	Parts per Million
P/N	Part Number
Q	
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
R	
RAM	Random Access Memory
RF	Radio Frequency
ROM	Read Only Memory
rms	Root Mean Square
RU	Rack Unit. 1 RU = 1.75”
Rx	Receive (Receiver)
RxD	Receive Data
R-S	Reed-Solomon Coding. Reed-Solomon codes are block-based error correcting codes with a wide range of applications in digital communications and storage.
S	
SEQ	Sequential
SYNC	Synchronize

T	
TBD	To Be Designed or To Be Determined
TM	Technical Manual
TPC	Turbo Product Codes
TRE	Trellis
Tx	Transmit (Transmitter)
TxD	Transmit Data
U	
UART	Universal Asynchronous Receiver/Transmitter
UUT	Unit Under Test
V	
V	Volts
VAC	Volts, Alternating Current
VCO	Voltage Controlled Oscillator
VDC	Volts, Direct Current
VIT	Viterbi Decoding
W X Y Z	
W	Watt
Misc.	
µs	Microsecond
Ohms	Ohms
16QAM	16 Quadrature Amplitude Modulation
8PSK	8 Phase Shift Keying


RADYNE
COMSTREAM