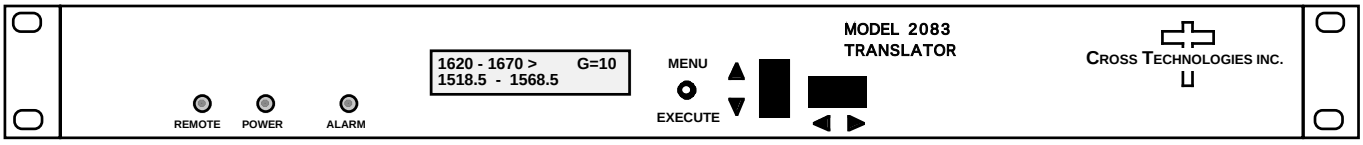
Instruction Manual

Model 2083-1615

Agile L to L Translator

September 2011, Rev. B



When ordering parts from Cross Technologies, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

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INSTRUCTION MANUAL

MODEL 2083-1615 Translator

TABLE OF CONTENTS **PAGE**

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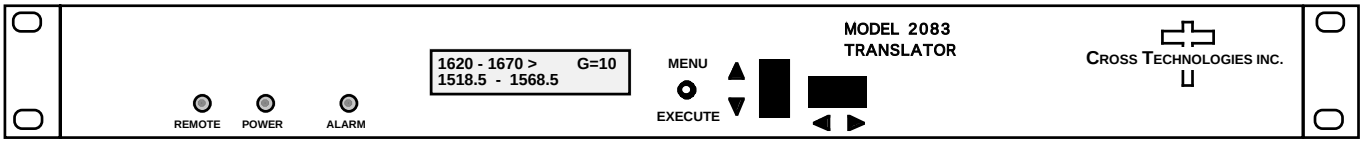
MODEL 2083-1615 Block L to L Translator

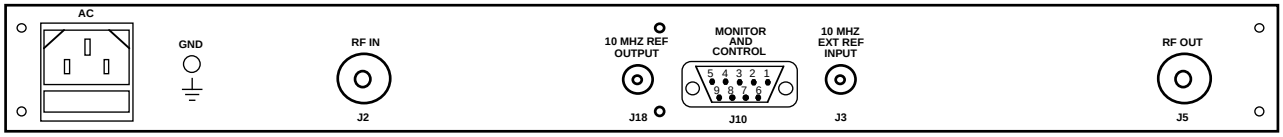
1.0 General

1.1 Equipment Description

2083-1615 Block L to L Translator - The 2083-1615 Block L to L Translator converts a 1620-1670 MHz block to 1518.5-1568.5 MHz block with no spectrum inversion, low group delay and flat frequency response. The 1620-1670 MHz input is mixed with synthesized local oscillator (LO) signals, first to 2400 MHz center frequency and finally to the 1518.5-1568.5 MHz block output. Multi-function switches select the gain. The input frequency band, output frequency band, and gain (0 to +20 dB, selectable in 1 dB steps) settings appear on the LCD display. Front panel LEDs provide indication of DC power (green), PLL Alarm (red), and Remote (yellow). Remote operation allows setting the overall gain and Mute. Connectors are BNC female for RF input and output and for (optional) external 10 MHz reference (+3± 3 dBm in). It is powered by a 100-240 ±10% VAC, 47-63 HZ input power supply and housed in a 1 3/4" X 19" X 16" rack mount chassis. Option -H provides a 0.01 ppm reference.



FRONT PANEL



REAR PANEL

FIGURE 1.1 2083-1615 Front and Rear Panels

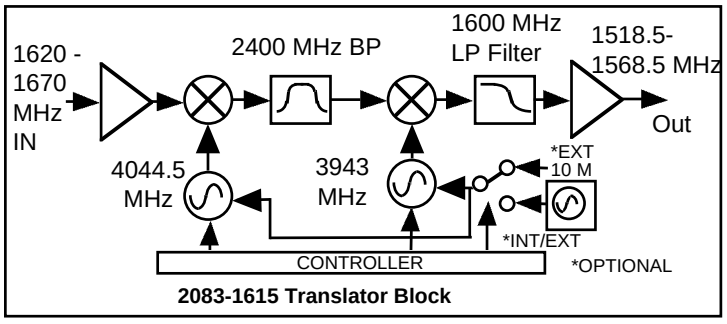


FIGURE 1.2 2083-1615 Block Diagram

1.2 Technical Characteristics

TABLE 1.0 2083-1615 Frequency Translator Specifications*

Input Characteristics	
Input Impedance/RL	50 Ω /12 dB
Frequency,	1620-1670 MHz
Input Level	-10 to -30 dBm
Input, max. no damage	+15 dBm
Output Characteristics	
Impedance/RL	50 Ω/12 dB
Frequency	1518.5-1568.5 MHz
Output Level, Range	-10 to -30 dBm
Output 1 dB compression	0 dBm
Mute	>60 dB at max. output level
Channel Characteristics	
Gain	0 to +20 ± 1 dB, selectable in 1 dB steps
Frequency Response	± 1.0 dB, 50 MHz bandwidth; ±0.5 dB, center any 36 MHz increment
Spurious Response	>45 dBC in band; signal dependent; <-50 dBm in band; signal independent, <-50 dBm out of band
Group Delay, max.	0.010ns/MHz2, parabolic, 0.03ns/MHz, linear, 1ns ripple center 36 MHz BW
Frequency Sense	Non-Inverting
Synthesizer Characteristics	
Frequency Accuracy	± 1 ppm max. over temp: Optional, High Stability, ± 0.01 ppm (-Option -H)
Reference	10 MHz Internal;Internal/External selectable (-Option -E)
Frequency Step	None, fixed frequency translation

Phase Noise @ Freq	100 Hz	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-65	-70	-78	-90	-100

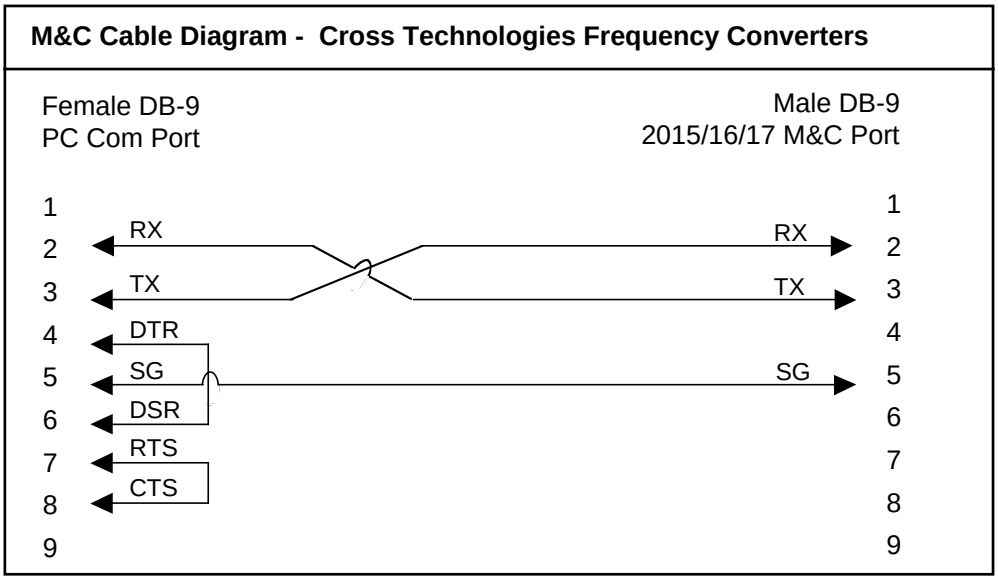
10 MHZ Level (In or Out)	3dBm, ±3dB, 75 ohms (option -E)
Controls, Indicators	
Frequency Translation	Setting shown on LCD display
Gain Selection/Mute	Direct readout LCD; manual or remote selection
DC Power; PLL Alarm, Remote	Green LED; Red LED; Yellow LED
Remote	RS-232C, 9600 Baud (RS-485, option -Q) Ethernet Interface (options -W8, -W18, -W28)
Other	
RF In/RF Out Connector	BNC (female)
10 MHz Conn. (In & Out)	BNC (female) (option-E)
Alarm/Remote Connector	DB9 (female) - NO or NC contact closure on Alarm
Size	19 inch standard chassis 1.75” high X 16.0” deep
Power	100-240 (±10%) VAC, 47-63 Hz, 30 watts max.
Available Options	
E -	External 10 MHz ref input & output
E1-	Ext.10 MHz ref input & output w/Auto Detect/Switching & Auto Return
H -	High Stability (±0.01ppm) internal reference M&C Interface RS-232 Std.
Q -	RS-485 Remote Interface
W8 -	Ethernet M&C Web Browser Interface
W18 -	Ethernet M&C Web Browser Interface and SNMP
W28 -	Allows direct TCP/IP and/or*Telnet*® addressability
Connector Options	See TABLE 2.2

*+10˚C to +40˚C; Specifications subject to change without notice

1.3 Monitor and Control Interface

A) Remote serial interface

Protocol: RS-232C, 9600 baud rate, no parity, 8 data bits, 1 start bit, and 1 stop bit.
(RS-232C, RS-422, or RS-485 - **option Q**



Connector: Rear panel, DB-9 male

J10 Pinouts (RS-232C/422/485)	
Pin	**Function**
1	Rx-
2	Rx+ (RS-232C)
3	Tx+ (RS-232C)
4	Tx-
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

B) <u>Status Requests</u> - Table 1.1 lists the status requests for the 2083-1615 and briefly describes them.

*** PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below, should be used ONLY when RS-485, (OPTION-Q), is selected.**

TABLE 1.1 2083-1615 Status Requests

Command	Syntax *	Description
Alarm & Reference State	{aaSA}	Returns {aaSAxy} where:
		• X = 0 if no summary alarm, X=1 summary alarm
		• Y = 0 if unit is using internal 10MHz reference,
		• Y = 1 if unit is using external 10MHz reference,
10 MHz Reference Status	{aaSE}	Returns {aaSEx} where:
(option -E1 only)		• X = 1 if Internal 10MHz reference is selected
		• X = 2 if External 10MHz reference is selected
		• X = 3 if Auto 10MHz reference is selected (option -E1 only)
IP Address (W8, W18, W28 only)	{aaSi}	Returns {aaSixx.xxx.xxx.xxx} where:
		• x...x is the IP address
Subnet mask(W8, W18, W28 only)	{aaSs}	Returns {aaSsxx.xxx.xxx.xxx} where:
		• x...x is the subnet mask volume
Unit ID	{aaSU}	Returns {aaSUx...x} where:
		• x...x is the unit ID character string
Product Info	{aaSV}	Returns {aaSU2083-xxxx ver y.yy} where:
		2083-xxxx is the model with options yyy is the firmware Rev.
Gain	{aaSG}	Returns {aaSGxx} where:
		xx = Gain (0 to 20 in 1 dB steps)

C) Commands

Table 1.2 lists the commands for the 2083-1615 and briefly describes them.
After a command is sent the 2083 sends a return ">" indicating the command has been received and executed.

General Command Format - The general command format is {CND...}, where:

{ = start byte
C = 1 character, either C (command) or S (status)
N = 1 character command or status request
D = 1 character or more of data (depends on command)
} = stop byte

*** PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below, should be used ONLY when RS-485, (OPTION-Q), is selected.**

Table 1.2 2083-1615 Commands

Command	Syntax*	Description
Set Gain	{aaCGxx}	where :
		• xx = 2 characters
		• Range: 00 to 20 (0 dB to 20 dB, in 1 dB steps)
Set Mute	{aaClxx}	where :
		• x = 1 to mute the output
		• x = 0 to unmute the output
Enable External 10MHz	{aaCEx}	where x = :
(option -E only)		• 1 to select Internal 10MHz reference
		• 2 to select External 10MHz referece
		• 3 to select Auto 10MHZ reference (option -E1 only)
Enable Remote	#	Just # sign
Disable Remote	{aaCR0}	{CR and zero}
Unit ID	{aaCU}x...x	Sets the unit ID character string to the value x...x (16 character max.)

2.0 Installation

2.1 Mechanical

The 2083-1615 consists of one RF/Controller PCB housed in a 1 RU (1 3/4 inch high) by 16 inch deep chassis. A switching, ± 12, +24, +5 VDC power supply provides power for the assemblies. The 2083-1615 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-1615 is assembled.

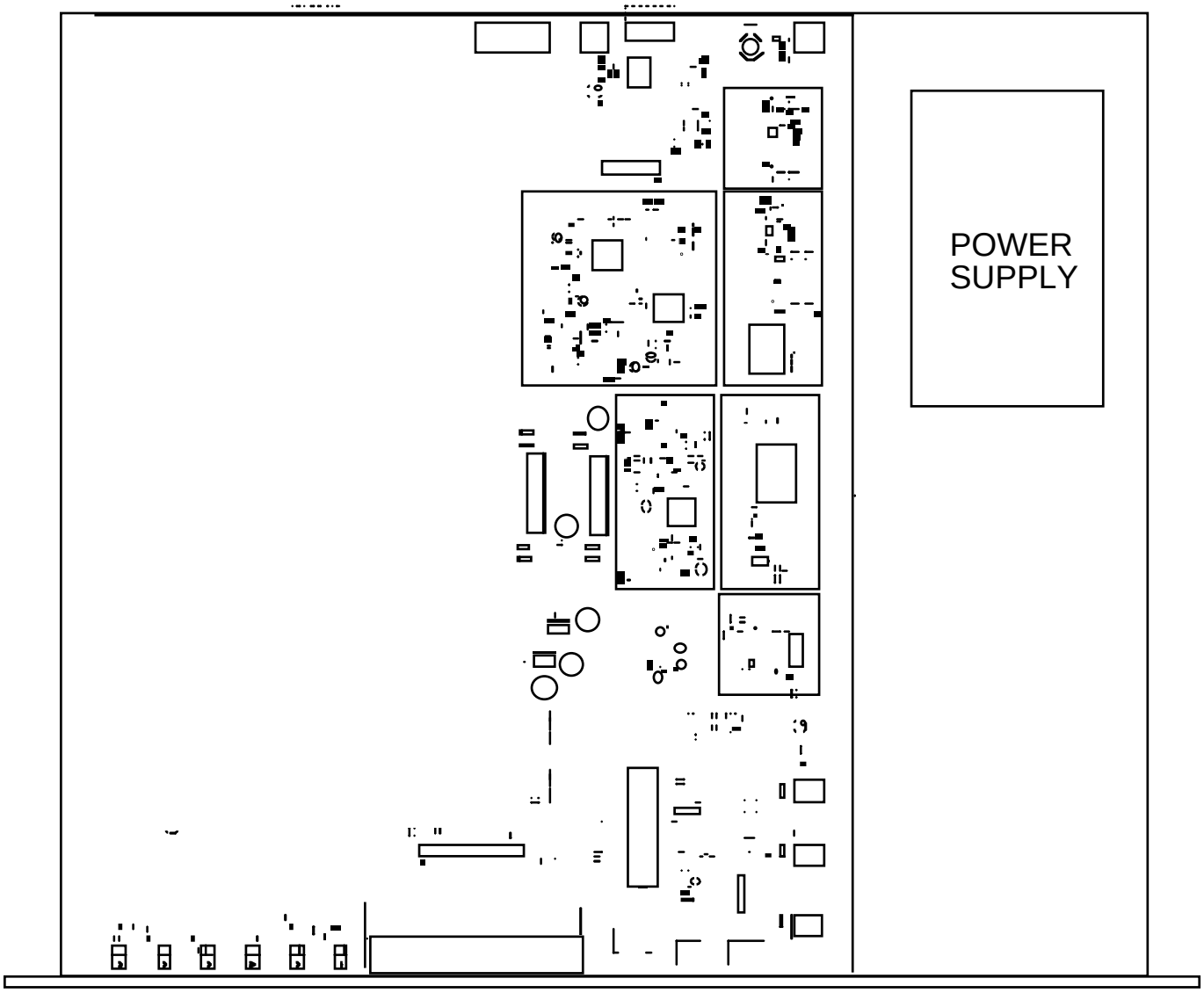


FIGURE 2.0 2083-1615 Mechanical Assembly

2.2 Rear Panel Input/Output Signals

Figure 2.1 shows the input and output connectors on the rear panel.

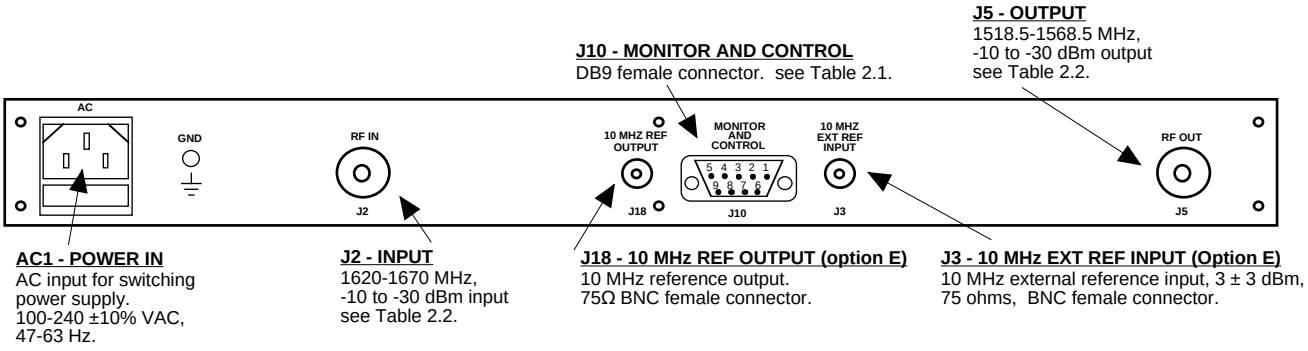


FIGURE 2.1 2083-1615 Rear Panel I/O's

TABLE 2.1 J10 Pinouts*

Pin	Function
1	Rx-
2	Rx+ (RS-232C)
3	Tx+ (RS-232C)
4	Tx-
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

TABLE 2.2 Input/Output Connector Options

Option	Input	Output
B	BNC, 75Ω	BNC, 75Ω
NN	N-type, 50Ω	N-type, 50Ω

***Remote Serial Interface**

Interface: DB-9 Male
Protocol: RS-232C (RS-232C/422/485, **option Q**), 9600 baud rate, no parity, 8 data bits, 1 start bit, 1 stop bit.

2.3 Front Panel Controls and Indicators

Figure 2.2 shows the front panel controls and indicators.

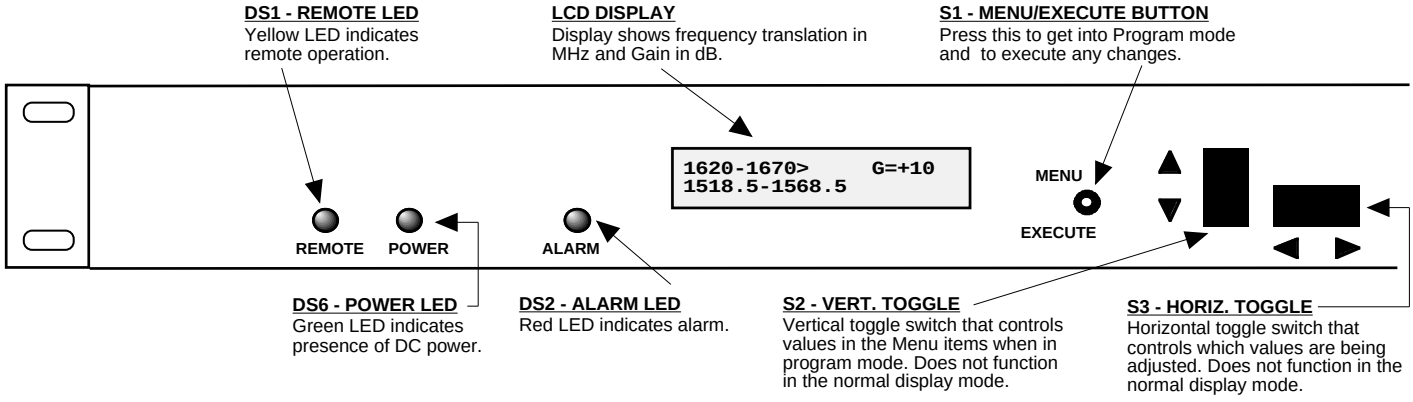


FIGURE 2.2 2083-1615 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2083-1615, Frequency Translator Section

1. Connect a -10 dBm to -30 dBm signal to RF IN, J2 (Figure 2.1)
2. Connect the RF OUT, J5, to the external equipment
3. Connect 100-240 ±10% VAC, 47 - 63 Hz to AC connector on the back panel.
4. Set the gain for 0 to +20 dB. Make sure the output stays within -10 to -30 dBm with the gain selected and the input level provided. (See Section 2.5 Menu Settings).
5. Be sure DS6 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).
6. AC Fuse - The fuse is a 5 mm X 20 mm, 2 amp slow blow (Type T) and is inserted in the far slot in the drawer below the AC input as shown in Figure 2.3. There is a spare fuse in the near slot.
   If a fuse continues to open, the power supply is most likely defective.

2.4.2 External 10 MHz Reference Operation

The External Reference Option is required if the unit is to synch to a 10 MHz reference from an *external* source. The unit will still have an internal 10 MHz reference as a 'back-up' should the external reference be removed or fail. Described below are the two (2), 10 MHz External Reference Options, Option E & E1.

Option E

Internal Reference Mode
When the internal reference mode is selected, the unit's internal 10 MHz reference will become the 'primary' source and the unit's synthesizers will lock to this internal 10 MHz reference. The unit will ignore any external 10 MHz signal present on the external reference input (J13). The unit will also buffer the internal 10 MHz signal and provide it on the Reference Out connector (J14) at +3 dBm, +/- 3 dB.

External Reference Mode
When the external reference mode is selected, the external 10 MHz reference (received on J13) will become the 'primary' source and the unit's synthesizers will lock to this external 10 MHz reference. The unit *must* have a 10 MHz signal connected to the external reference input (J13) on the rear panel. The external 10 MHz signal must be +3 dBm, +/- 3 dB. The unit will also buffer the external 10 MHz signal and provide it on the Reference Out connector (J14) at +3 dBm, +/- 3 dB.

NOTE: There is no "auto-detect" capability in Option E. [See Option E1 below if this capability is required.] If the External Reference Mode is selected and the external reference fails or is removed, the unit will ALARM, but it will NOT automatically switch to the internal reference. The user will be required to manually select Internal Reference Mode (via the front panel LCD or Remote M&C) for the *internal* 10 MHz reference to become the 'primary' source for the unit.

Once the external 10 MHz reference is restored (on J13), the user must again manually (via the front panel LCD or Remote M&C) reselect External Reference Mode for the *external* 10 MHz reference to become the 'primary' source.

L-band units with option E also have the ability to 'insert' the (internal or external) 10 MHz signal that has been buffered (as described above) on the center pin of the L-band (RF) connector(s).

Option E1

Units with option E1 operate as described above but also have an Auto mode. When in auto mode the unit will detect and select the external 10 MHz signal if it is present and at least +3 dBm. If the external 10 MHz signal falls below 1 dBm (+/- 1 dB) the unit will automatically switch to the internal 10 MHz reference. The reference out connector (J14) provides a buffered rendition of the selected 10 MHz signal at +3 dBm, +/- 3 dB.

Units with option E1 do not have the ability to insert a buffered rendition of the selected 10 MHz signal on the center pin of the (RF) connector.

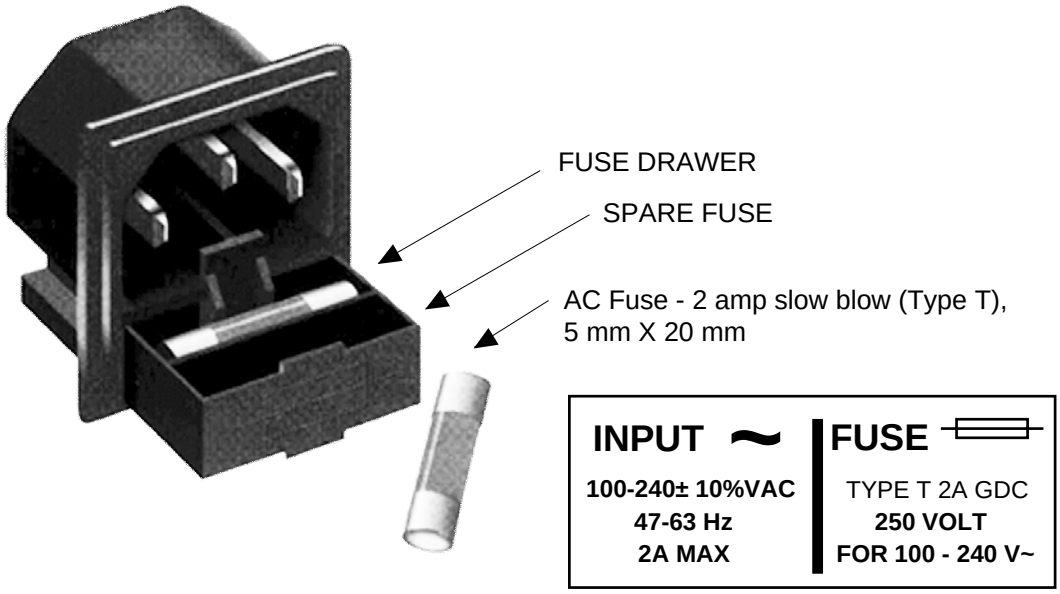


FIGURE 2.3 Fuse Location and Spare Fuse

2.5 Menu Settings

2.5.1 Functions

This section describes operation of the front panel controls. There are three operator switches, the LCD display and alarm indicator LEDs. All functions for the equipment are controlled by these components. The functions are (see Figure 2.4):

Power Up
Normal Display

Menu 1 Gain (0 to +20, 1dB steps)
Menu 2 Set Unit to Remote Operation
Menu 3 Set Remote Interface
Menu 4 Select 10 MHz Reference (option -E)

Save Menu When "R" is selected in any above menu, or when the end is reached (after Menu 8)

Alarm indications appear on the LEDs (see Figure 2.2).

All program changes must start with the operation of the Menu/Execute switch and must also end with the operation of the Menu/Execute switch verified by the "Save Settings?" Menu. If this sequence is not followed, none of the changes will take effect. If programming is initiated and no operator action takes place for approximately 30 seconds (before the final press of the Menu/Execute switch) the display will revert to its previous status and you will need to start over.

2.5.2. Power On Settings

<u>NOTE</u>: THE LAST STATUS OF A UNIT IS RETAINED EVEN WHEN POWER IS REMOVED. WHEN POWER IS RESTORED, THE UNIT WILL RETURN TO IT'S PREVIOUS SETTINGS.

When power is first applied, the LCD display goes through three steps.

1. The LCD goes black to show all segments are functioning.
2. The Model and Software version will be displayed.

```
2083-1615E1W8
Rev. 4.00
```

3. The present frequency and gain of the upconverter is shown.

```
1620-1670>      G=+10
1518.5-1568.5
```

The unit is now operational and ready for any changes the operator may desire.

2.5.3 Control Switches

1. <u>Menu/Execute</u> - Any change to the programming of the unit must be initiated by pressing the Menu/Execute switch and completed by pressing the Menu/Execute switch.
2. <u>Horizontal Switch</u> - This switch is mounted so its movement is horizontal and moves the cursor left or right.
3. <u>Vertical Switch</u> - This switch is mounted so its movement is vertical and has two functions:
   a. During gain changes, the vertical movement will raise or lower the number in the direction of the arrows.
   b. For other functions such Remote on/off, the vertical switch will alternately turn the function on or off regardless of the direction operated.

2.5.4 Gain Changes

When you get to this menu note that the gain changes will be made as you make them but if you do not wish to save the changes you have made, scroll to **"R"** and push the menu/Execute switch and select **"NO"** in the **"SAVE SETTINGS?"** window or **do not press the Menu/Execute switch**; simply do nothing for approximately 30 seconds, and the system will return to the normal operating mode.

NOTE: CHANGES TAKE PLACE ON GAIN IMMEDIATELY BUT DO NOT GET SAVED UNTIL YOU GO TO THE SAVE MENU AND INDICATE YOU WANT TO SAVE THE CHANGES.

Press the Up/Down switch to change the gain in 1 or 10 dB steps and then push the Menu/Execute switch to get to the Gain setting:

By using the horizontal rocker switch the cursor can be moved left or right.

Pressing the Up/Down switch down will toggle the display digit selected until you have the desired gain.

NOTE: THE GAIN WILL BE CHANGED AS YOU ADJUST THE NUMBERS. HOWEVER, THE VALUE WILL NOT BE STORED UNTIL YOU INDICATE YES IN THE SAVE SETTINGS WINDOW. DO NOT SET A GAIN THAT WOULD EXCEED -10 dBm OR HAVE LESS THAN -30 dBm OUTPUT LEVEL.

When the display indicates the value desired you can push the Menu/Execute switch to the next item OR you can scroll to "R", push the Menu/Execute switch to get to:

Selecting **Y** will save the new settings. Selecting **N** will revert to the previous settings.

Figure 2.4 gives the menu items and how to make changes

2.5.5 Alarm Indications

An alarm condition will occur if any local oscillator phase lock loop (PLL) comes out of lock.
The Remote LED will light when you select the Remote mode.

2.5.6 Menu Display & Sequences (Option E1)

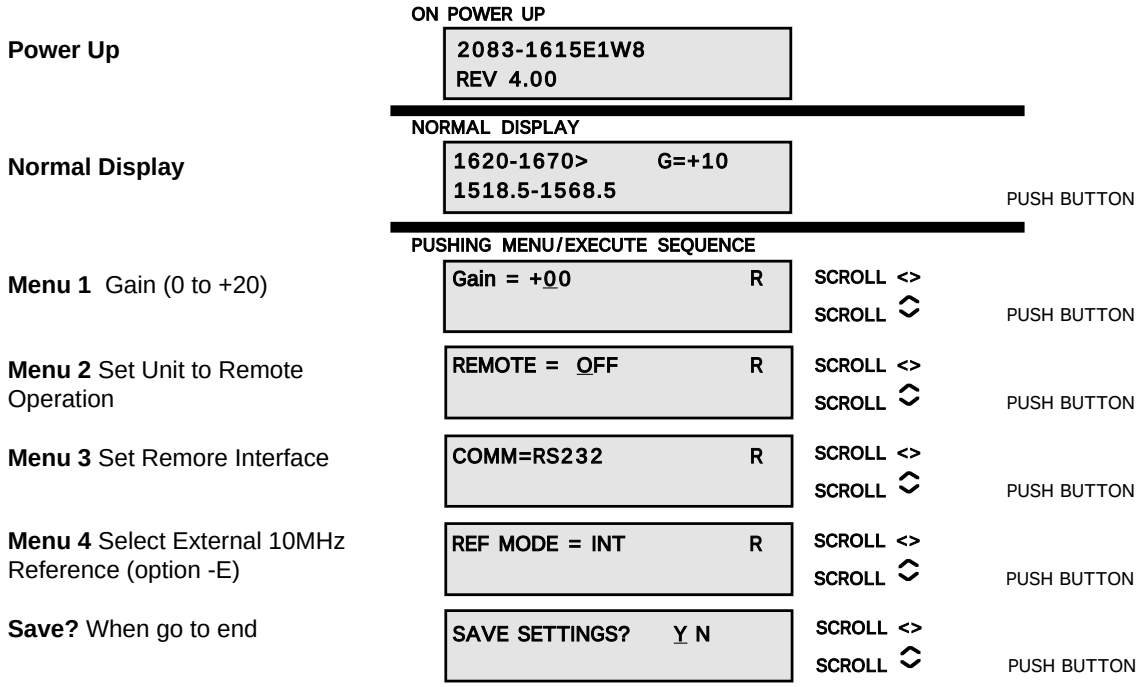


FIGURE 2.4 Menu Display and Sequences

3.0 Environmental Use Information

A. **Rack-Mounting** - To mount this equipment in a rack, please refer to the installation instructions located in the user manual furnished by the manufacturer of your equipment rack.

B. **Mechanical Loading** - Mounting of equipment in a rack should be such that a hazardous condition does not exist due to uneven weight distribution.

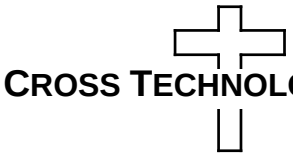
C. **Elevated Operating Ambient Temperature** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack may be greater than room ambient temperature. Therefore, consideration should be given to Tmra.

D. **Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Additional space between units may be required.

E. **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on over current protection and supply wiring. Appropriate consideration of equipment name plate rating should be used when addressing this concern.

F. **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connection to the Branch (use of power strips).

G. **Top Cover** - There are no serviceable parts inside the product so, the Top Cover should not be removed. If the Top Cover is removed the ground strap and associated screw MUST BE REINSTALLED prior to Top Cover screw replacement. FAILURE TO DO this may cause INGRESS and/or EGRESS emission problems.



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