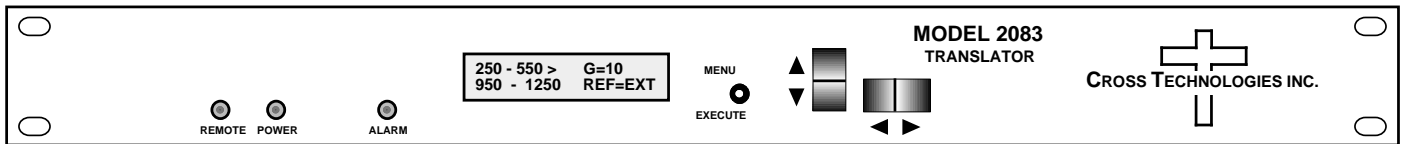


# Instruction Manual

# Model 2083-0512

## Block UHF to L Translator

April 2018, Rev. A



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# INSTRUCTION MANUAL

## MODEL 2083-0512 UHF-L Translator

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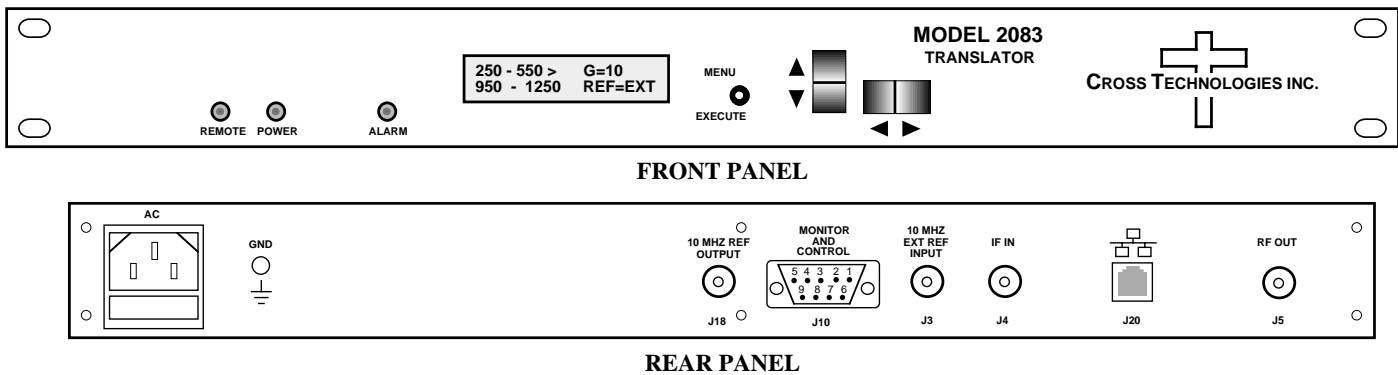
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# MODEL 2083-0512 UHF to L Translator

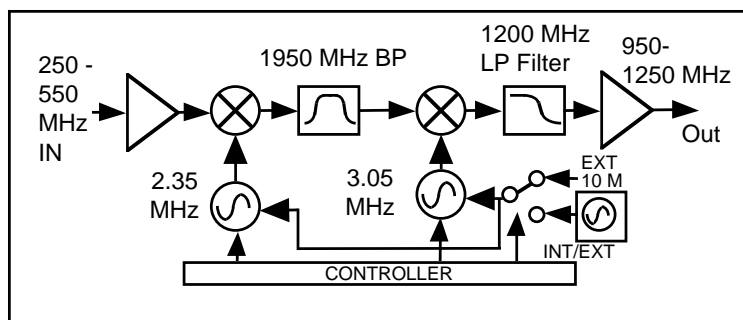
## 1.0 General

### 1.1 Equipment Description

**2083-0512 Block UHF to L Translator** - The 2083-0512 Block UHF to L Translator converts a 250-550 MHz block to 950-1250 MHz block with no spectrum inversion, low group delay and flat frequency response. The 250-550 MHz input is mixed with synthesized local oscillator (LO) signals, first to 1950 MHz center frequency and finally to the 950-1250 MHz block output. Multi-function switches select the gain and internal or external 10 MHz. The input frequency band, output frequency band, internal or external reference, 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 operation (yellow). Remote operation allows setting the overall gain and 10 MHz reference. Connectors are BNC female for RF input and output and for the external 10 MHz reference (+3± 3 dBm in). It is powered by a 100-240 ±10% VAC, 47-63 HZ input power supply and in a 1.75” X 19.0” X 16.0” rack mount chassis.



**FIGURE 1.1 2083-0512 Front and Rear Panels**



**FIGURE 1.2 2083-0512 Block Diagram**

## 1.2 Technical Characteristics

<b>TABLE 1.0 2083-0512 Translator Specifications*</b>					
<b>Input Characteristics</b>					
Input Impedance/RL	50Ω / 12 dB				
Frequency	250 - 550 MHz				
Input Level	-30 to -10 dBm				
Input, maximum no damage	+15 dBm				
<b>Output Characteristics</b>					
Impedance/RL	50Ω / 12 dB				
Frequency	950 - 1250 MHz				
Output Level, Range	-30 to -10 dBm				
Output 1 dB Compression	0 dBm				
<b>Channel Characteristics</b>					
Gain at F <sub>C</sub>	0 to +20 ±2 dB, Selectable in 1 ± 1 dB steps				
Frequency Response	±1.5 dB, 300 MHz bandwidth; ± 0.5 dB, any 40 MHz Increment				
Spurious, In Band	>45 dBC signal dependent or independent at -10 dBm out				
Spurious, Out of Band	<-50 dBm, 0.5 - 0.94 and 1.26 - 2.0 GHz				
Frequency Sense	Non-inverting				
<b>Synthesizer Characteristics</b>					
Frequency Accuracy	±1.0 ppm maximum over temperature (±0.01 ppm, Option H)				
Reference	10 MHz Internal; Internal/External				
Frequency Step	None, Fixed Frequency Translation				
10 MHz Level (In or Out)	3 dBm, ±3 dB, 75 ohms				
Phase Noise @ F(Hz) >	100 MHz	1 kHz	10 kHz	100 kHz	1 MHz
dBC/Hz	-65	-70	-80	-95	-110
<b>Controls, Indicators</b>					
Gain Selection	Direct Readout LCD; Manual or Remote Selection				
Power; Alarm; Remote	Green LED; Red LED; Yellow LED				
Remote	RS232C, 9600 baud (RS485, Ethernet Optional)				
<b>Other</b>					
RF In/RF Out Connector	BNC (Female), 50Ω				
10 MHz Connector (In & Out)	BNC (Female), 75Ω, works with 50 or 75 ohms				
Alarm / Remote Connector	DB9; No or NC contact closure on Alarm				
Size	19 inch, 1 RU Standard Chassis 1.75" high x 16.0" deep				
Power	100-240 ±10% VAC, 47- 63 Hz, 30 watts maximum				
*+10 to +40 degrees C; Specifications subject to change without notice				2016 Cross Technologies, Inc.	

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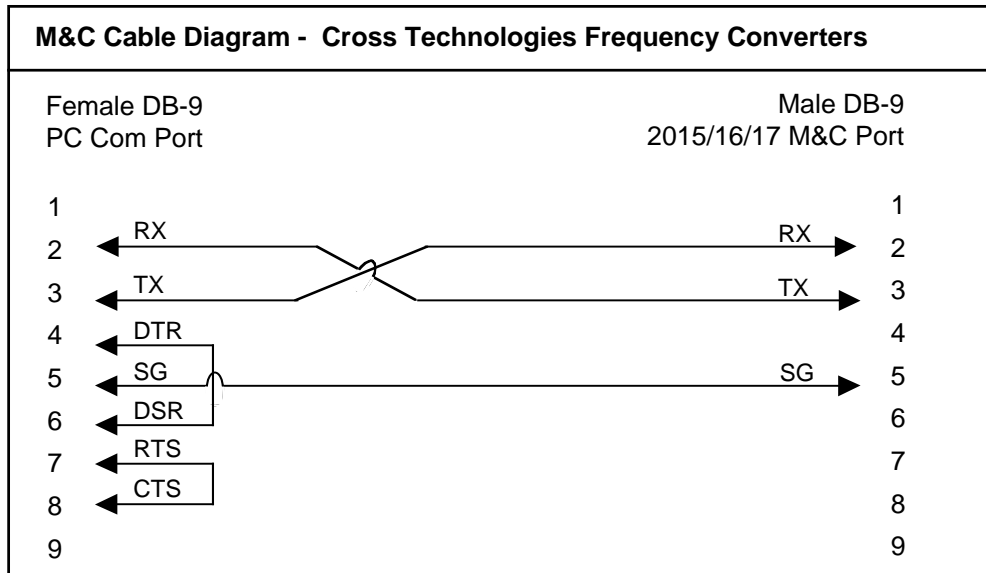
Continued from page 4...

Available Options	
H -	High Stability ( $\pm 0.01$ ppm) Internal Reference
Comm. Interface/Standard RS232	
Q -	RS485 Remote Interface
W8 -	Ethernet; with Web Browser
W18 -	Ethernet; with Web Browser and SNMP
W28 -	Ethernet; with TCP/IP, Telnet
Connectors / Impedance	
B -	75 $\Omega$ BNC (RF), 75 $\Omega$ BNC (IF)
C -	50 $\Omega$ BNC (RF), 75 $\Omega$ BNC (IF)
Contact Cross Technologies for other options.	
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### 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) Status Requests** - Table 1.1 lists the status requests for the 2083-0512 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 2083-0512 Status Requests		
Command	Syntax *	Description
IP Address (W8, W18, W28 only)	{aaSi}	Returns {aaSixx.xxx.xxx.xxx} where: <ul style="list-style-type: none"> <li>x...x is the IP address</li> </ul>
Subnet mask(W8, W18, W28 only)	{aaSs}	Returns {aaSsxx.xxx.xxx.xxx} where: <ul style="list-style-type: none"> <li>x...x is the subnet mask volume</li> </ul>
Unit ID	{aaSU}	Returns {aaSUx...x} where: <ul style="list-style-type: none"> <li>x...x is the unit ID character string</li> </ul>
Product Info	{aaSV}	Returns {aaSU2083-xxxx ver y.yy} where: 2083-xxxx is the model with options yy is the firmware Rev.
Get Gain Status	{aaSG}	Returns {aaSGxx} where: xx = Gain (0 to 20 in 1 dB steps)
Get External Reference Status	{aaSE}	Returns {aaSEx} where: <ul style="list-style-type: none"> <li>x = 0 if internal reference</li> <li>x = 1 if external reference</li> </ul>
Get Alarm Status	{aaSA}	Returns {aaSAx} where: <ul style="list-style-type: none"> <li>x = 0 if no alarm</li> <li>x = 1 if alarm</li> </ul>

## C) Commands

Table 1.2 lists the commands for the 2083-0512 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.

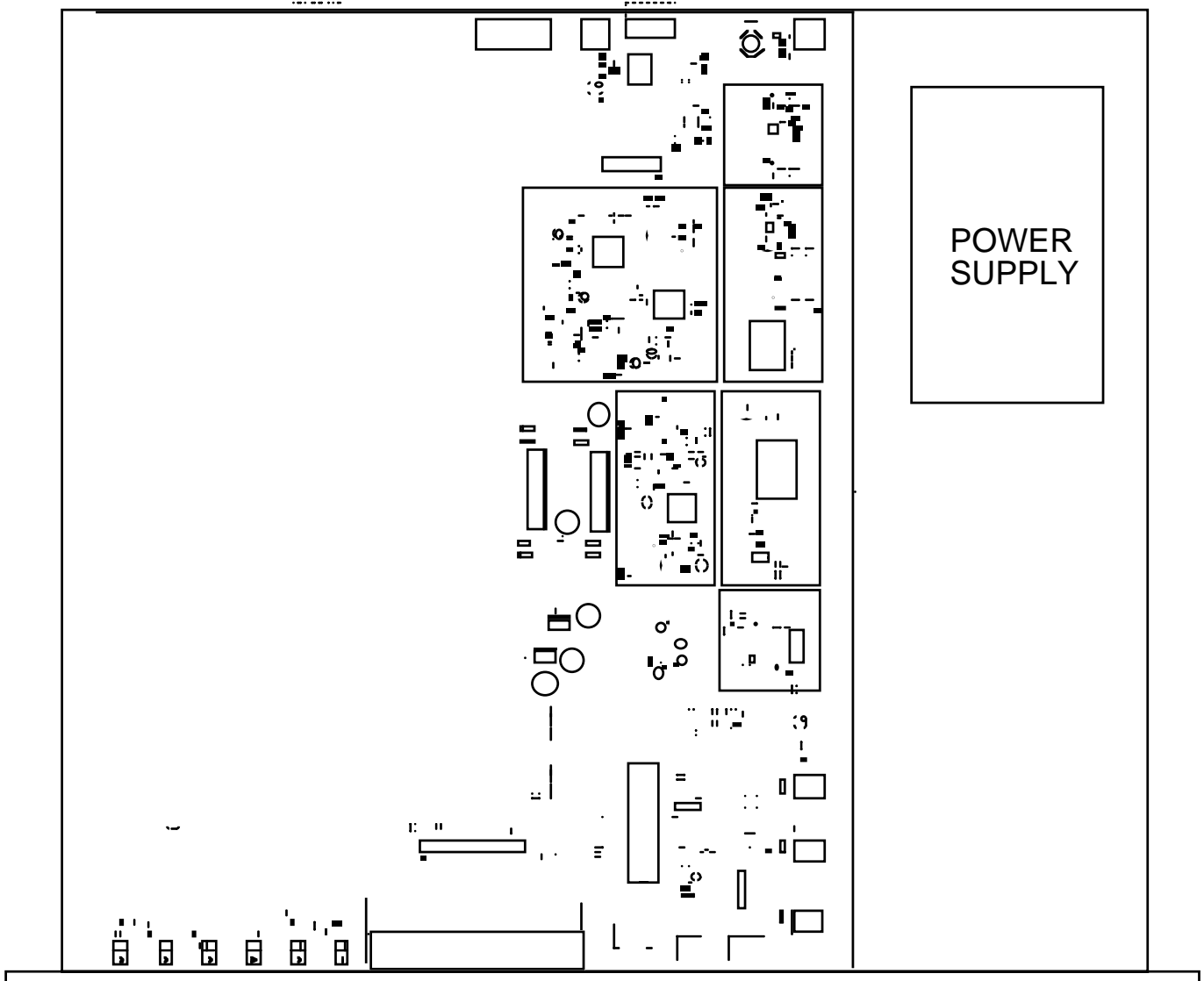
Table 1.2 2083-0512 Commands		
Command	Syntax*	Description
Set Gain	{aaCGxx}	where : • xx = 2 characters • Range: 00 to 20 (0 dB to 20 dB, in 1 dB steps)
Enable External 10MHz	{aaCEx}	where x = : • 0 to select Internal 10MHz reference • 1 to select External 10MHz referece
Enable Remote	#	Just # sign
Disable Remote	{aaCRO}	{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 2083-0512 consists of one RF/Controller PCB housed in a 1 RU (1 3/4 inch high) by 16 inch deep chassis. A switching,  $\pm 12$ , +24, +5 VDC power supply provides power for the assemblies. The 2083-0512 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-0512 is assembled.



**FIGURE 2.0 2083-0512 Mechanical Assembly**

## 2.2 Rear Panel Input/Output Signals

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

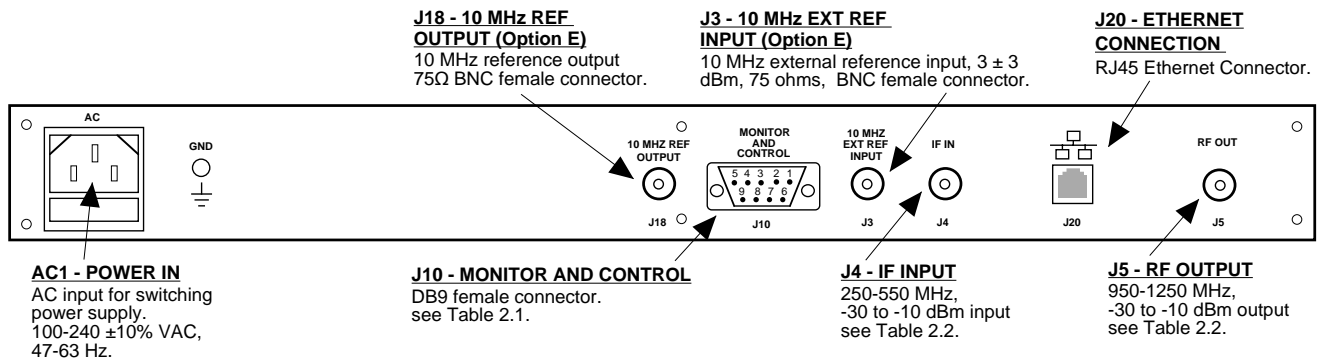


FIGURE 2.1 2083-0512 Rear Panel I/O's

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
C	BNC, 50Ω	BNC, 75Ω

### \*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.

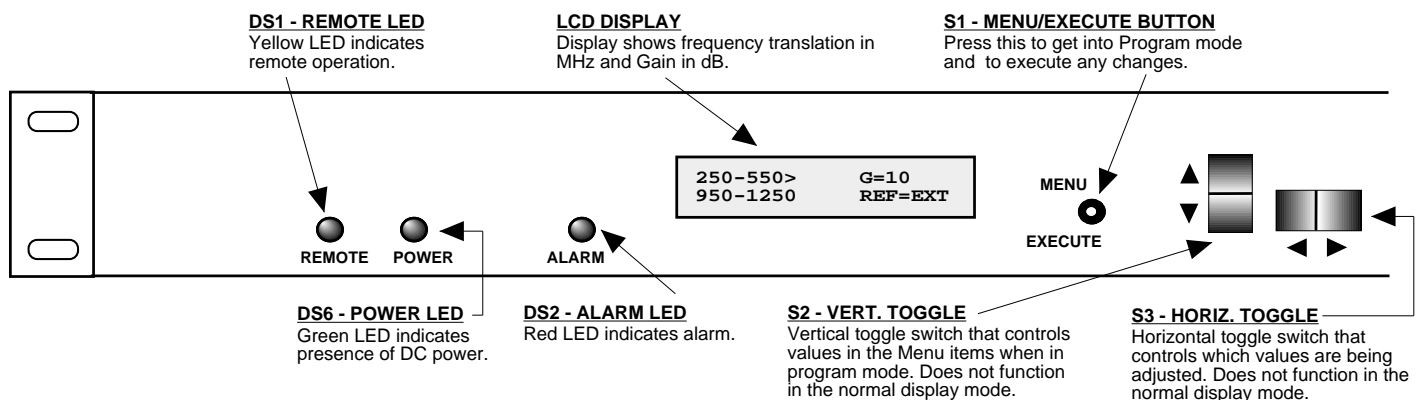


FIGURE 2.2 2083-0512 Front Panel Controls and Indicators

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2083-0512, Frequency Translator Section

1. Connect a -30 dBm to -10 dBm signal to IF IN, J4 (Figure 2.1)
2. Connect the RF OUT, J5, to the external equipment
3. Connect 100-240  $\pm$ 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 -30 to -10 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 (J3). The unit will also buffer the internal 10 MHz signal and provide it on the Reference Out connector (J18) at +3 dBm, +/- 3 dB.

##### **External Reference Mode**

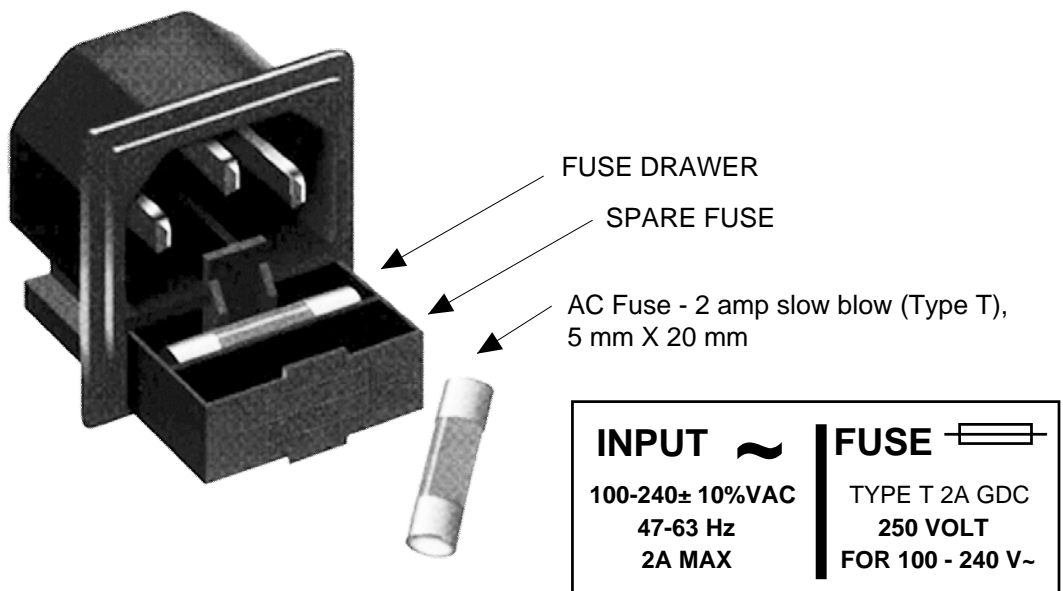
When the external reference mode is selected, the external 10 MHz reference (received on J3) will become the 'primary' source and the unit's synthesizers will lock to this external 10 MHz reference. The unit *must* have a 10 MHz signal connected to the external reference input (J3) on the rear panel. 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 (J18) 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 J3), 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.

## 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 (J18) provides a buffered rendition of the selected 10 MHz signal at +3 dBm, +/- 3 dB.



**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** Enable Remote Operation
- Menu 3** Set Remote Interface (Option Q, Option W8, Option W18, or Option W28)
- 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

**NOTE: 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.

2083-0512E1W8 Rev. 1.00
----------------------------

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

250 -550>	G=10
950-1250	REF=EXT

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

## 2.5.3 Control Switches

1. Menu/Execute - 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. Horizontal Switch - This switch is mounted so its movement is horizontal and moves the cursor left or right.
3. Vertical Switch - 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:

G= + <u>1</u> 0	R
-----------------	---

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

G= +1 <u>0</u>	R
----------------	---

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:

SAVE SETTINGS?	<u>Y</u> N
----------------	------------

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)

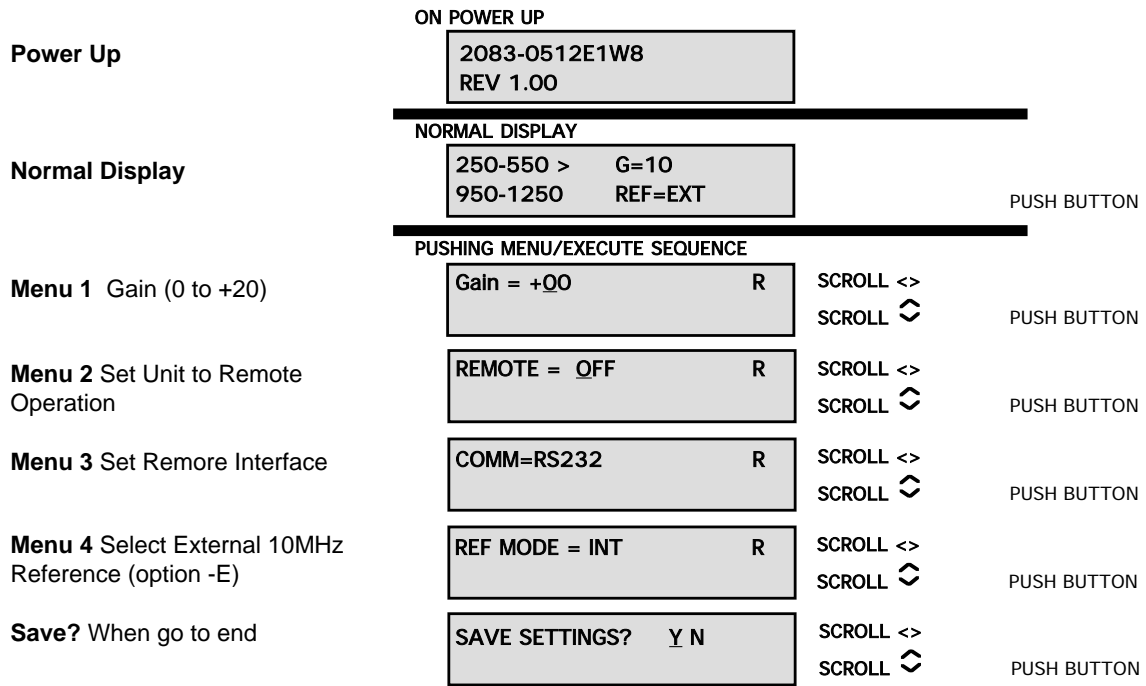
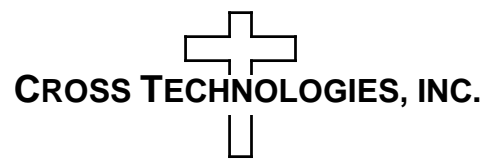


FIGURE 2.4 Menu Display and Sequences



### 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 (Maximum Recommended Ambient Temperature).
- 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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