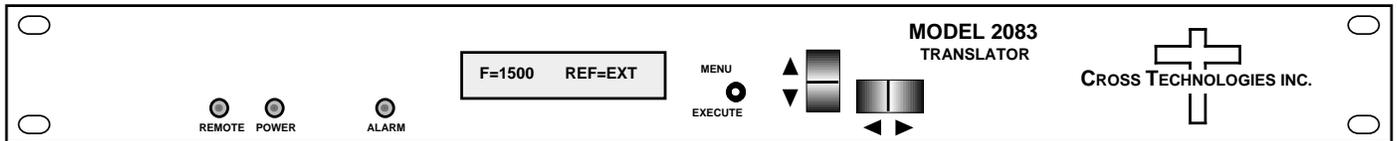


# Instruction Manual

# Model 2083-1515

## Channel Translator

October 2018, Rev. A



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# INSTRUCTION MANUAL

## MODEL 2083-1515 Channel Translator

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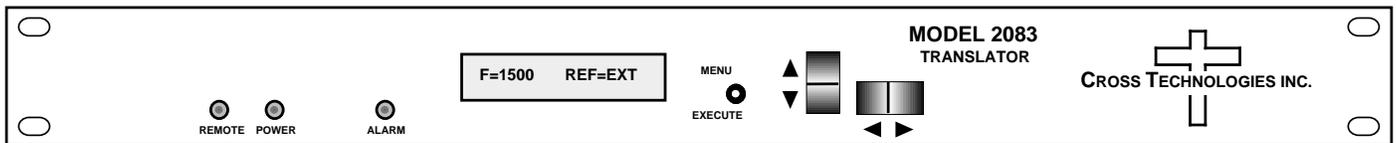
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# MODEL 2083-1515 Channel Translator

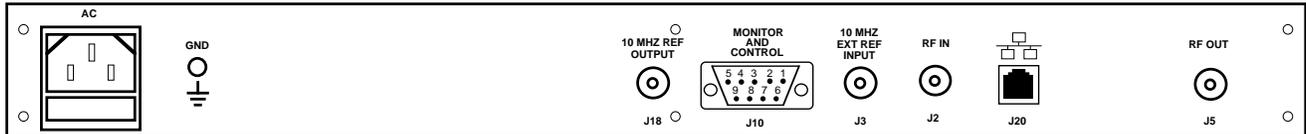
## 1.0 General

### 1.1 Equipment Description

The 2083-1515 Channel Translator converts a 10 MHz Channel in the 950 to 1500 MHz input band at the same center frequency in the 950 to 1500 MHz output band in 1 MHz steps which functions as a tunable bandpass filter. A synthesized local oscillator (LO) provides the frequency selection. Push button switches select the RF frequency and other parameters. Front panel LEDs provide indication of DC power (green), PLL alarm (red), and remote operation (yellow). The gain is +0 dB. Remote operation allows selection of the frequency. Parameter selection and frequency settings appear on the LCD display. Connectors are BNC female for the RF In and RF Out and the optional external reference input and output. The external 10 MHz option E includes a 10 MHz output connector which contains either the internal or external 10 MHz reference signal. A high stability option H ( $\pm 0.01$ ppm) is also available. The unit is powered by a 100-240  $\pm$  10% VAC power supply, and housed in a 1 3/4" X 19" X 16" rack mount chassis.



FRONT PANEL - 2083-1515



REAR PANEL - 2083-1515 (From SN 116 and UP)

FIGURE 1.1 2083-1515 Front and Rear Panels

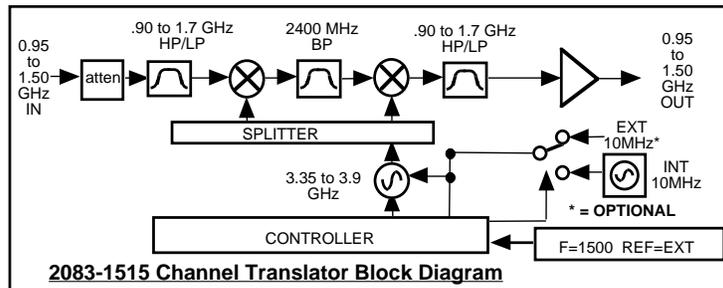


FIGURE 1.2 2083-1515 Block Diagram

## 1.2 Technical Characteristics

<b>TABLE 1.0 2083-1515 Channel Translator Specifications**</b>						
<b>Input Characteristics (IF)</b>						
Input Impedance/Return Loss	50Ω/12 dB					
Frequency	950 to 1500 MHz					
Noise Figure	25 dB maximum					
Input Level	-55 to -15 dBm, -65 goal					
Input 1 dB Compression	-5 dBm					
<b>Output Characteristics (RF)</b>						
Impedance/Return Loss	50Ω / 12 dB					
Frequency	950 to 1500 MHz					
AGC'd Compression Level	-55 to -15 dBm					
Output 1 dB Compression	-5 dBm					
<b>Channel Characteristics</b>						
Gain, Fixed	0.0 ± 2 dB at 1.2 GHz					
Frequency Response	±1.5 dB, 950 - 1500 MHz; ± 0.5 dB, 10 MHz BW; ±1.5 dB, 20 MHz BW; <40 dBC, at ±50 MHz					
Spurious, In band	< -45 dBC, in band; <-40 dBC of the 950-1500 input band to the output					
Spurious, Out of Band	<-50 dBm (.25-.94 GHz and 1.51-2.2 GHz Out)					
Group Delay, Maximum	0.03 ns/MHz <sup>2</sup> parabolic; 0.1 ns/MHz linear; 1 ns ripple, 10 MHz Bandwidth					
Frequency Sense	Non-inverting					
<b>Synthesizer Characteristics</b>						
Frequency Accuracy	± 1.0 ppm maximum over temp (±0.01 ppm, option <b>H</b> )					
Frequency Step	1.0 MHz (125 kHz to 1 kHz step options available)					
10 MHz Level (In or Out)	3 dBm, ± 3 dB, 75 ohms (option <b>E</b> )					
Phase Noise @ F(Hz)	10 MHz	100 MHz	1kHz	10kHz	100kHz	1MHz
Standard 1MHz Steps dBC/Hz	-55	-70	-70	-80	-90	-110
<b>Controls, Indicators</b>						
Frequency Selection	Direct Readout LCD; Manual or Remote Selection					
Power, Alarm, Remote	Green LED; Red LED; Yellow LED					
Remote	RS232C, 9600 baud (RS485, Ethernet Optional)					

Channel Translator Specifications (continued on page 5)

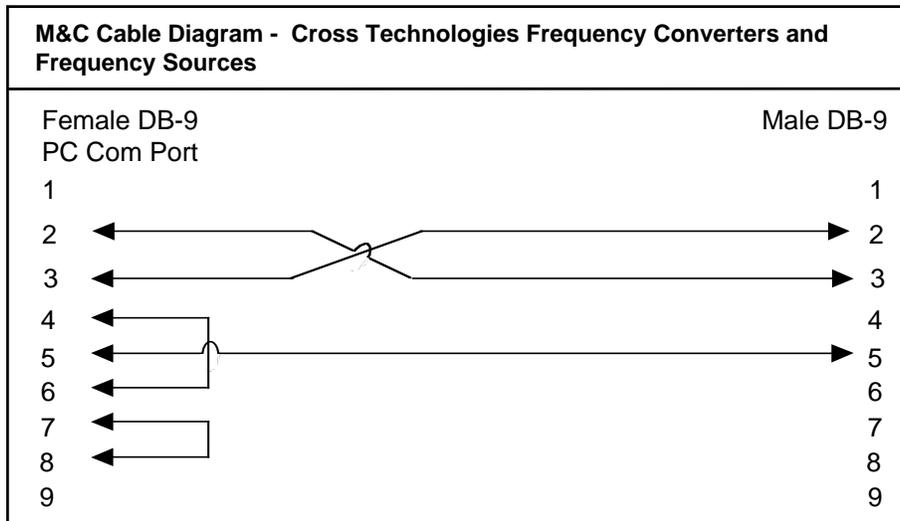
## 1.2 Technical Characteristics (continued from page 4)

<b>Other</b>	
RF Connectors	BNC (female)
10 MHz Connectors	BNC (female), 75Ω, works with 50 or 75 ohms (Option E)
Alarm/Remote Connector	DB9 (female) - 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, 25 watts maximum (24, 48 VDC Optional)
<b>Available Options</b>	
E -	External 10 MHz Reference Input and Output
H -	High Stability (±0.01ppm) Internal Reference
X or X1	125 kHz or 100 kHz Step Size
<b>Communication Interface/Standard RS232</b>	
Q -	RS485 Remote Interface
W8 -	Ethernet with Web Browser Interface
W18 -	Ethernet with Web Browser & SNMP
W28 -	Ethernet with TCP/IP, Telnet®
<b>Connectors / Impedance (In &amp; Out)</b>	
Standard	50Ω BNC
B -	75Ω BNC
F -	75Ω, Type F
NN -	50Ω, N-Type
<b>Contact Cross for Other Options</b>	
**+10°C to +40°C; Specifications subject to change without notice.	
Cross Technologies, Inc.	

### 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) Commands

Table 1.2 lists the commands for the 2083-1515 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 2083-1515 Commands		
Command	Syntax*	Description
Set Frequency	{aaCFxxxx}	where : • xxxx = 950 - 1500, 1 MHz Steps
Set Remote On	#	Just # sign
Set Remote Off	{aaCRO}	
Option E:		
Set 10 MHz Reference Mode	{aaCEx}	where : • x = 0 to Select Internal Reference Mode • x = 1 to Select External Reference Mode

C) **Status Requests** - Table 1.1 lists the status requests for the 2083-1515 and briefly describes them.

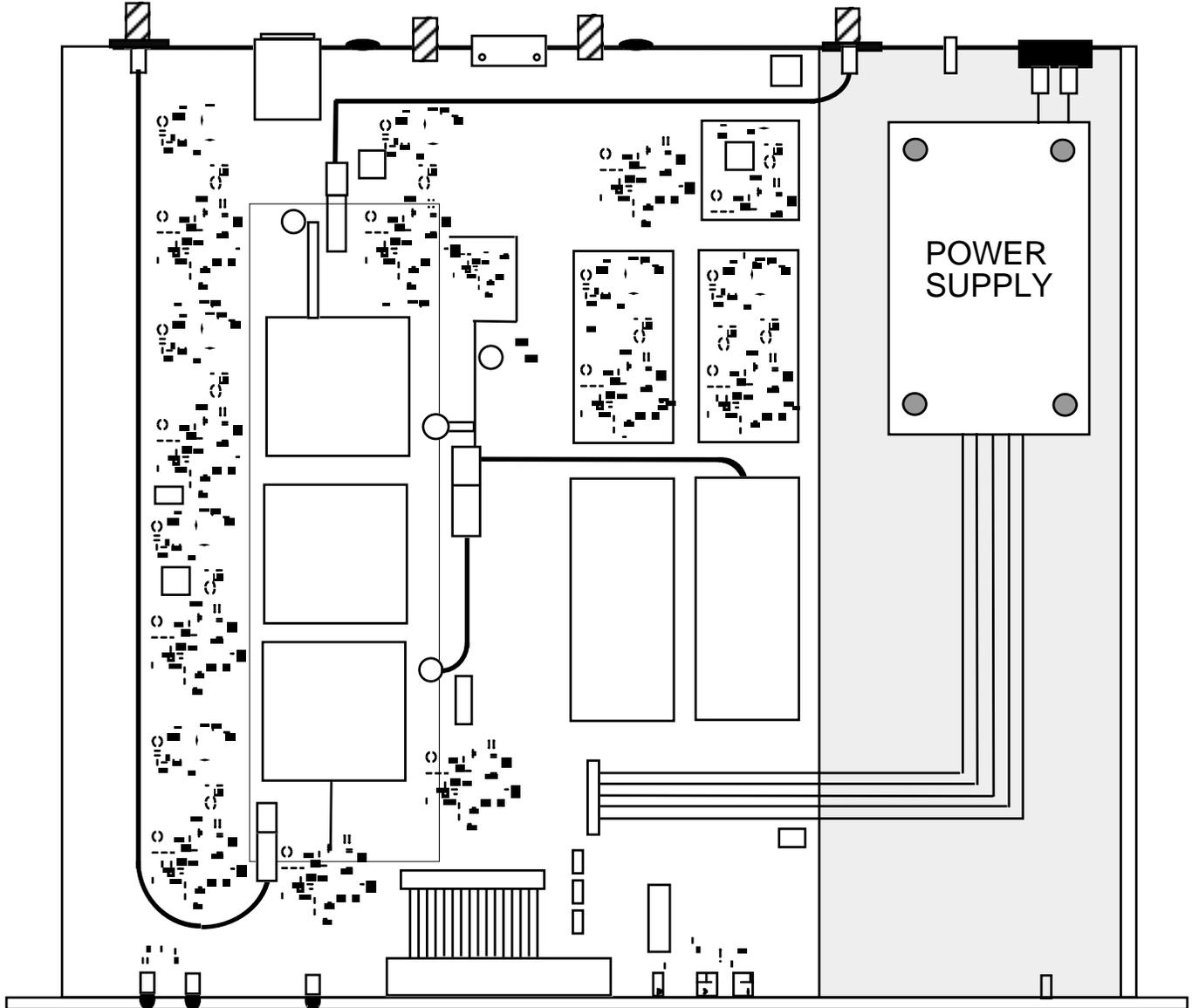
\* PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below, should be used ONLY when RS-485, (OPTION-Q), is selected.

TABLE 1.1 2083-1515 Status Requests		
Command	Syntax *	Description
Unit Status	{aaS1}	Returns {aaS1ffffra} where: • ffff = the frequency in MHz • r = the current reference mode: 0 = Internal, 1 = External • a = the summary alarm status: 0 = normal (no alarm), 1 = summary alarm on

## 2.0 Installation

### 2.1 Mechanical

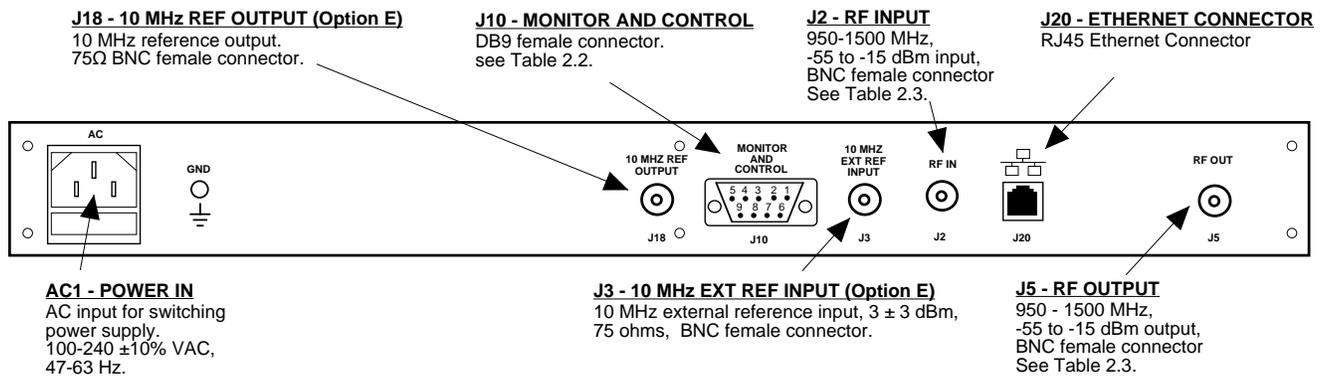
The 2083-1515 consists of one RF/Controller PCB housed in a 1 RU (1 3/4 inch high) by 16 inch deep chassis. A switching,  $\pm 12$ , +24, +5 VDC power supply provides power for the assemblies. The 2083-1515 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-1515 is assembled.



**FIGURE 2.0 2083-1515 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 2083-1515 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

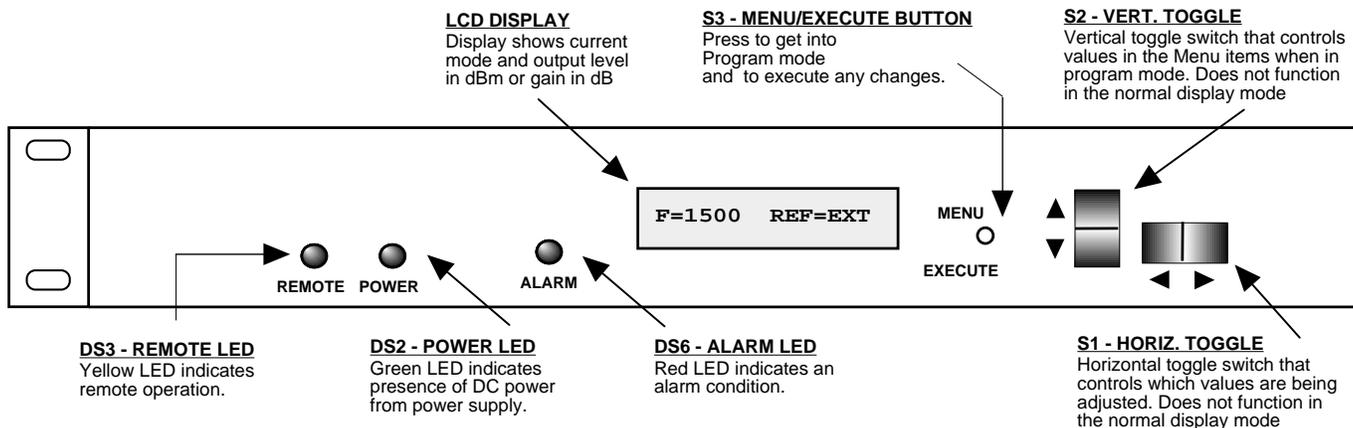
TABLE 2.2 Input/Output Connector Options		
Option	Input	Output
Std.	BNC, 50Ω	BNC, 50Ω
B	BNC, 75Ω	BNC, 75Ω
F	Type F, 75Ω	Type F, 75Ω
NN	N-type, 50Ω	N-type, 50Ω

### \*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.

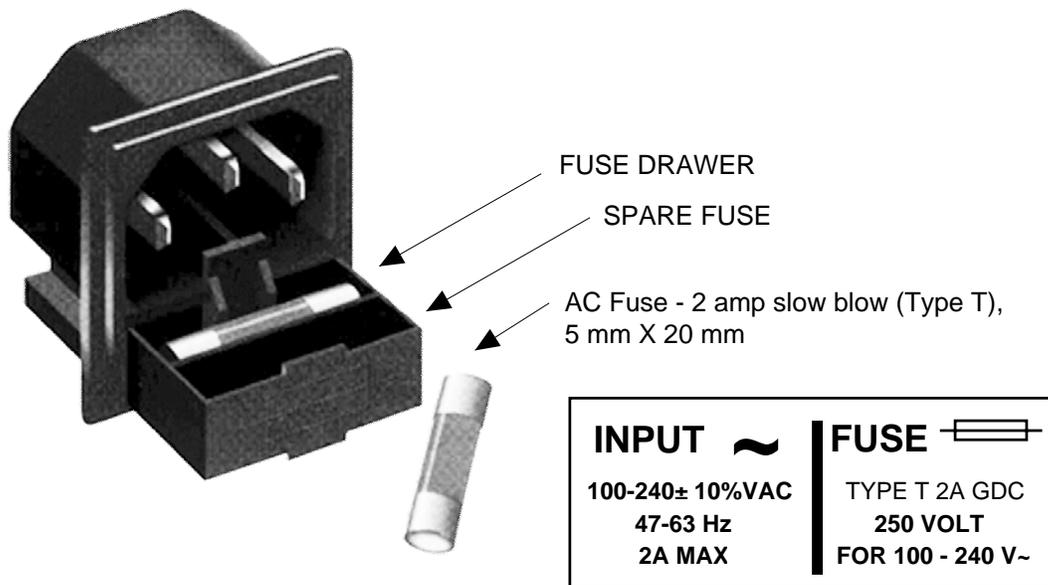


**FIGURE 2.2 2083-1515 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2083-1515, Channel Translator

1. Connect a -55 dBm to -15 dBm signal to RF IN, J2 (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 00  $\pm$  2 dB. Make sure the output stays within -55 to -15 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.



**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** Set Center Frequency
- Menu 2** Set 10 MHz Reference Mode (Option E only)
- Menu 3** Set Remote
- Menu 4** Set Remote Interface (Options Q, W8, W18, and W28 only)
- Menu 5** Set RS-485 Address (Option Q only)

**Save Menu** When “R” is selected from any above menu or at the end.

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 OPERATING PARAMETERS OF A UNIT ARE RETAINED EVEN WHEN POWER IS REMOVED. WHEN POWER IS RESTORED, THE UNIT WILL RETURN TO IT'S PREVIOUS SETTINGS.**

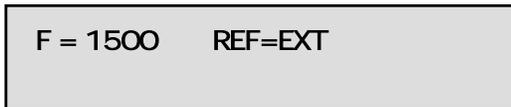
When power is first applied, the LCD display goes through three steps.

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



2083-1515EW28  
Rev. 1.00

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



F = 1500    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 display 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 Frequency Changes

At any time during the modification process, if you have made a mistake and do not wish to save the changes you have made, **do not press the Menu/Execute switch**; simply do nothing for approximately 30 seconds, and the system will return to the normal operating mode or scroll to “**R**” and push the menu/Execute switch and select “**NO**” in the “**SAVE SETTINGS?**” window.

To change the FREQUENCY:

Operate the Menu/Execute switch until you get to the menu item you want to change see Figure 2.5 for the sequence of menu options. The following display is for changing the downconverter frequency:

F = 1 <u>3</u> 50	R
-------------------	---

Pressing the Up/Down switch down will toggle the display to:

F = 1 <u>4</u> 50	R
-------------------	---

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

F = 14 <u>5</u> 0	R
-------------------	---

**NOTE: CHANGES DO NOT TAKE PLACE ON FREQUENCY UNTIL YOU GO TO THE SAVE MENU AND INDICATE YOU WANT TO SAVE THE CHANGES.**

When the display indicates the value desired you can push the Menu/Execute switch to get to the next item:

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

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.

Pushing the Menu/Execute switch then takes you to this:

F=1450    G=+10
-----------------

Figure 2.5 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 10 MHz Reference Mode Operation

**Internal Mode:** The unit uses its own built-in 10 MHz TCXO. The Internal Reference is present on the Reference Output Connector, J18. REF = INT appears on the front panel display.

**External Mode:** The unit uses a 10 MHz Reference that is connected to the External Reference Input, J3. REF = EXT appears on the front panel display. The External 10 MHz Reference level must be +3dBm,  $\pm 3$ dB. If the External 10 MHz signal does not meet the unit's specified parameters then the unit will not function properly. The External Reference is present on the Reference Output connector, J18.

**Auto Mode:**

### **(option E1 only)**

The unit defaults to the External 10 MHz Reference as long as the level meets the +3dBm,  $\pm 3$ dB specification. REF = AUTO - E appears on the front panel display where the -E indicates that the unit is using the External 10 MHz Reference. The External Reference is present on the Reference Output connector, J8.

If the external 10 MHz Reference signal level is less than -1dBm, the unit switches to Internal 10 MHz Reference. REF = AUTO -I appears on the front panel display where -I indicates that the unit is using the Internal 10 MHz Reference. The Internal 10 MHz Reference is present on the reference output connector, J8.



### 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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