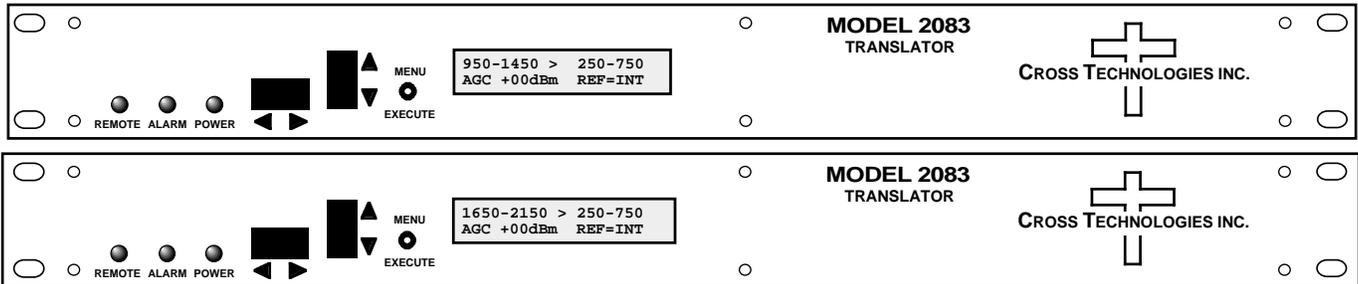


Instruction Manual

Model 2083-158/228

Block Translator

February 2015, Rev. B



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INSTRUCTION MANUAL

MODEL 2083-158/228 Block Translator

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MODEL 2083-158/228 Block Translator

1.0 General

1.1 Equipment Description

2083-158/228 Block Translator - The 2083-158 Block Translator converts a 950-1450 MHz block (2083-228 Block Translator converts a 1650-2150 MHz block), out of a 250-2150 MHz composite spectrum, to 250-750 MHz block with no spectrum inversion, low group delay and flat frequency response. The 950-1450 MHz input is filtered and translated to the 250-750 MHz block output using dual conversion. The 250-750 MHz block output is AGC'd to a composite output level that can be set for 0 to -10 dBm (AGC to ± 2 dB of setting) in 1 dB increments. The output translation can be adjusted by ± 10 MHz in 1 MHz increments. In Manual Gain, the gain can be set for +15 to +45 dB, ± 2 dB. Multifunction switches select the AGC'd output level, MGC Gain and the translation frequency which appear on the LCD display and can be adjusted remotely. Front panel LEDs provide indication of DC power (green), PLL alarm (red), and remote operation (yellow). Connectors are Type F female for RF input and output. The unit is powered by a 100-240 $\pm 10\%$ VAC, 47-63 HZ input power supply and housed in a 1 3/4" X 19" X 16" rack mount chassis.

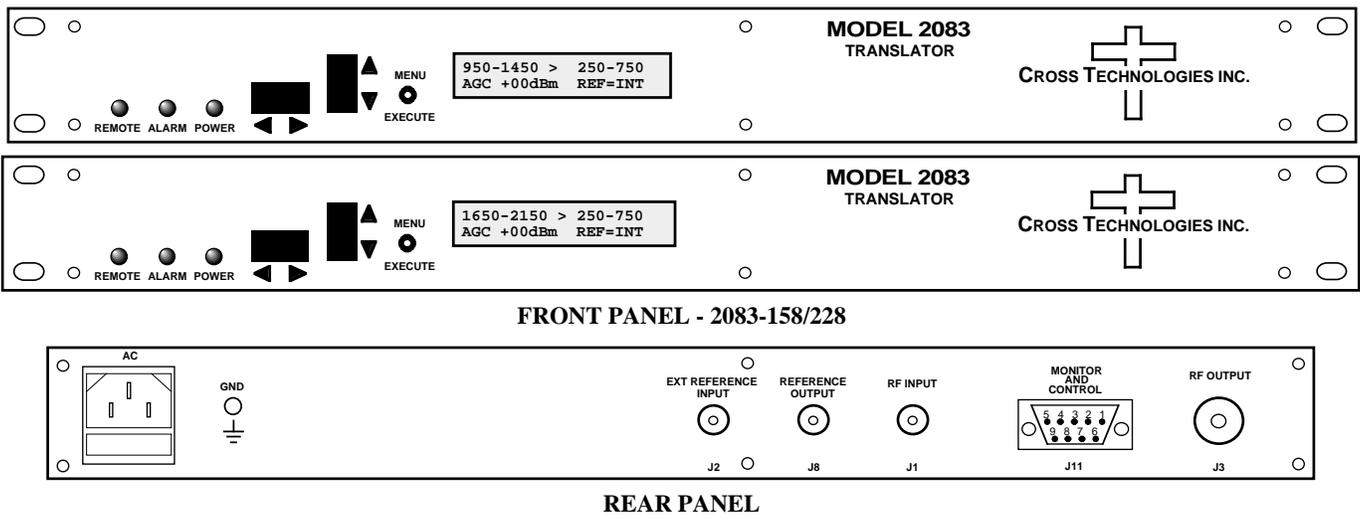


FIGURE 1.1 2083-158/228 Front and Rear Panels

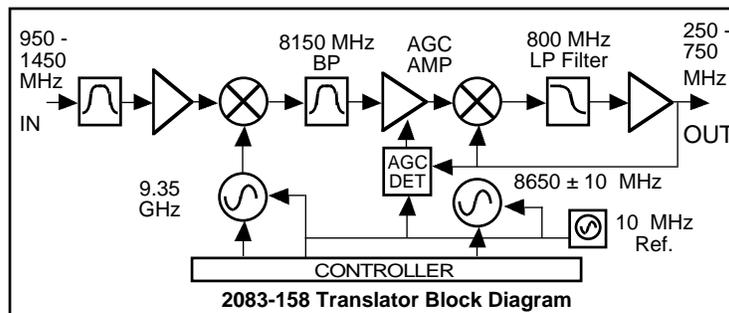


FIGURE 1.2 2083-158 Block Diagram

1.2 Technical Characteristics

TABLE 1.0 2083-158/228 Block Translator Specifications*

Input Characteristics

Input Impedance/RL 75 Ω /12 dB
 Frequency Model 2083-158: 950-1450 MHz
 Model 2083-228: 1650-2150 MHz

Input Composite Level -25 to -45 dBm
 Input, max. no damage +15 dBm

Output Characteristics

Impedance/RL 75 Ω/12 dB
 Frequency 250-750 MHz
 AGC'd Comp. Level 0 to -10 dBm
 Output 1 dB compression +10 dBm

Channel Characteristics

AGC Set; MGC Gain Output Level, AGC Mode: 0 to -10 dBm
 Gain, MGC Mode: +15 to +45 dB
 AGC Response 5 ± 2 seconds for 10 dB input level change
 Frequency Response ±2.0 dB, 500 MHz bandwidth; ±0.5, 36 MHz increment
 Spurious Inband < -50 dBc in band, signal dependent;
 < -50 dBm signal independent; **See NOTE 1**
 Spurious, 0.2 - 2.2 GHz < -50 dBm; < -50 dBc, 0.25-2.2 GHz feed through rejection; **See NOTE 1**
 Group Delay, max. 0.015 ns/MHz², parabolic, 0.03ns/MHz, linear, 1 ns ripple, 36 MHz BW

Frequency Sense Non-Inverting

NOTE 1: dBc is relative to the COMPOSITE Output Level

Synthesizer Characteristics

Frequency Accuracy ± 0.01 ppm
 Reference 10 MHz Internal
 Frequency Step 1 MHz; ±10 MHz Translation adjustment

Phase Noise @ Freq	100 Hz	1kHz	10kHz	100kHz	1MHz
dBc/Hz	-70	-75	-85	-95	-105

Controls, Indicators

Frequency Translation Setting Shown on LCD Display
 Level (AGC), Gain (MGC) Direct readout LCD; manual or remote selection
 Power; Alarm; Remote Green LED; Red LED; Yellow LED
 Remote RS-232C, 9600 Baud

Other

RF In / RF Out Connector Type F (female)
 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 Reference input & output
 M&C Interface RS-232 Standard
 Q - RS-485 Remote Interface
 W8 - Ethernet M&C Web Browser Interface
 W18 - Ethernet M&C Web Browser Interface & SNMP

Connector/Impedance

B - 75Ω BNC (RF in), 75Ω BNC (RF Out)

*+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) Status Requests - Table 1.1 lists the status requests for the 2083-158 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 2083-158/228 Status Requests		
Command	Syntax *	Description
Output Frequency	{aaSF}	Returns {aaSFxxx} where: <ul style="list-style-type: none"> • xxx is the lower boundry of the output frequency band. Example: If xxx is 242, then the output frequency band is 242-742 MHz.
Gain Mode	{aaSM}	Returns {aaSMx} where: <ul style="list-style-type: none"> • X = 0 if AGC mode is selected • X = 1 if MGC mode is selected
Output Level	{aaSL}	Returns {aaSLxxx} where: <ul style="list-style-type: none"> • xxx = output level in dBm range: 00 to -10 Note: This value is valid when the unit's Gain Mode is set to AGC.
Output Gain	{aaSG}	Returns {aaSGxxx} where: <ul style="list-style-type: none"> • xxx = RF gain in dB range: +15 to +45 Note: This value is valid when the unit's Gain Mode is set to MGC.
Alarm Status	{aaSA}	Returns {aaSAxyz} where: <ul style="list-style-type: none"> • x = 1 if PLL-1 is alarmed, 0 if normal • y = 1 if PLL-2 is alarmed, 0 if normal • z = 1 if summary alarm, 0 if no alarm
Model Number & Rev.	{aaSV}	Returns {aaSV2083-158x.xx} or {aaSV2083-228x.xx} where: <ul style="list-style-type: none"> • x.xx is the unit's firmware version.
Option E:		
10 MHz Reference Mode	{aaSE}	Returns {aaSEx} where: <ul style="list-style-type: none"> • x = 0 if Internal Reference Mode is selected • x = 1 if External Reference Mode is selected • x = 2 if Auto Reference Mode is selected
10 MHz Reference Status	{aaSI}	Returns {aaSIx} where: <ul style="list-style-type: none"> • x = 0 if Internal Reference is active • x = 1 if External Reference is active

C) Commands

Table 1.2 lists the commands for the 2083-158 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 2083-158/228 Commands		
Command	Syntax*	Description
Set Output Frequency	{aaCFxxx}	where : • xxx = 240 - 260, 1 MHz Steps (if 240, output band = 240-740 MHz) (if 260, output band = 260-760 MHz)
Set Gain Mode	{aaCMx}	where : • x = 0 for AGC Mode • x = 1 for MGC Mode
Set Output Level	{aaCLxxx}	where : • xxx = +00 to -10 dBm
Set Output Gain	{aaCGxxx}	where : • xxx = +15 to +45 dB
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 • x = 2 to Select Auto Reference Mode

2.0 Installation

2.1 Mechanical

The 2083-158/228 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 2083-158/228 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-158/228 is assembled.

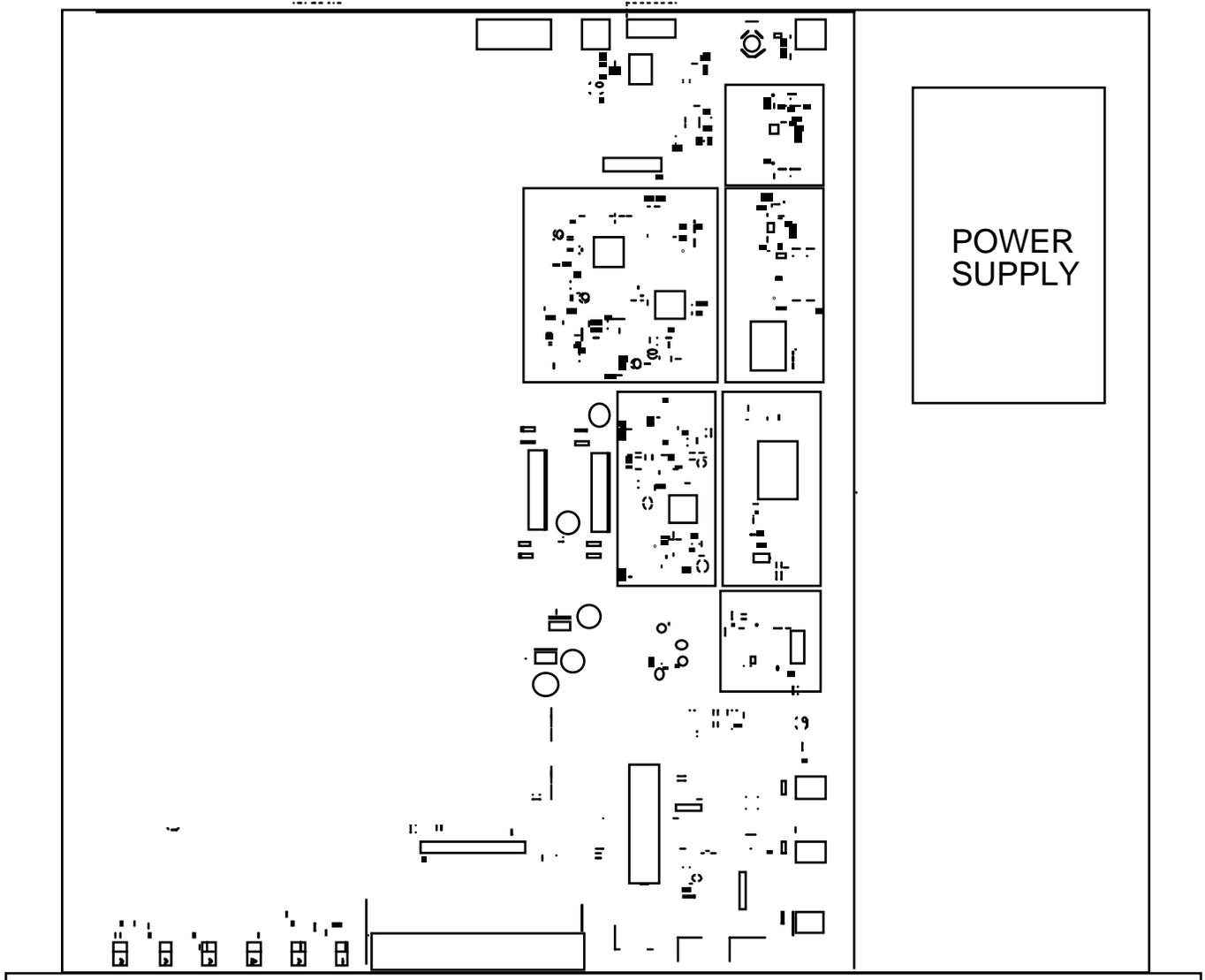


FIGURE 2.0 2083-158/228 Mechanical Assembly

2.2 Rear Panel Input/Output Signals

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

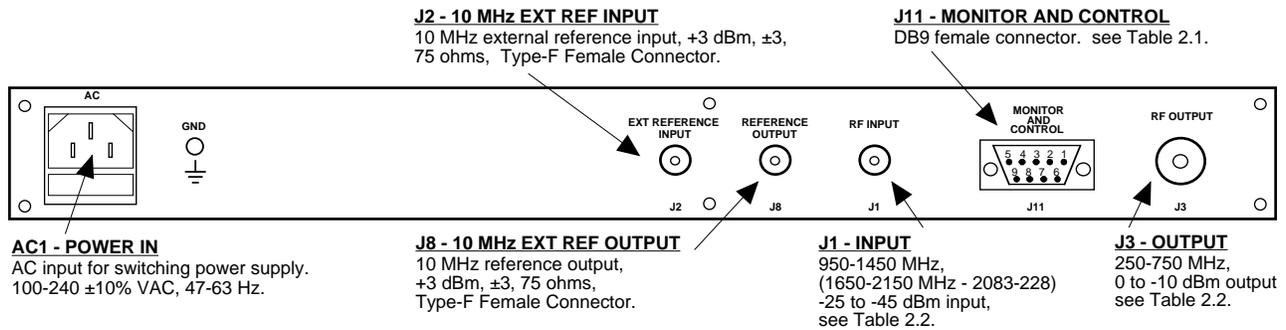


FIGURE 2.1 2083-158 Rear Panel I/O's

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, 75 Ω	BNC, 75 Ω
S	BNC, 50 Ω	BNC, 50 Ω

*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.

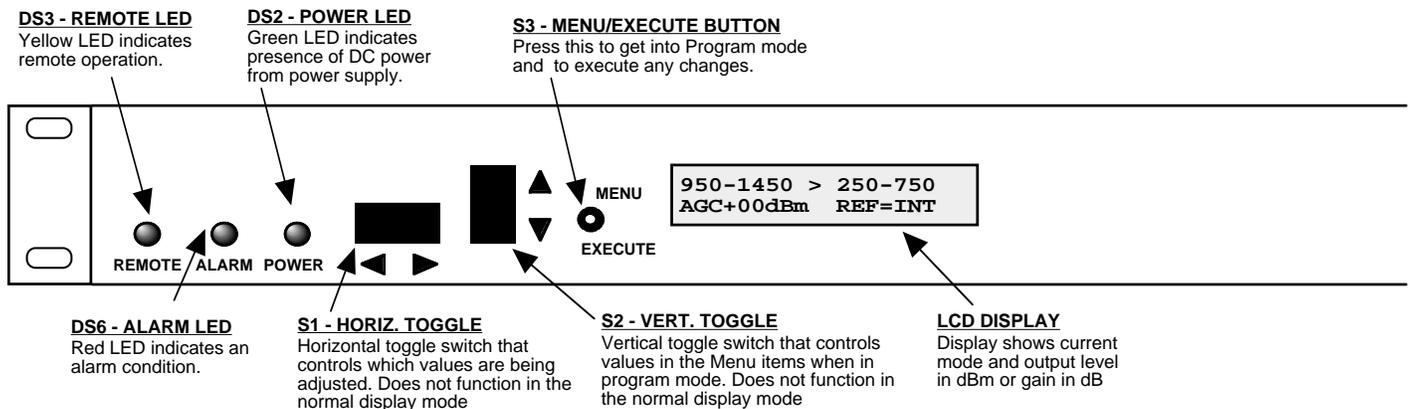


FIGURE 2.2 2083-158 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2083-158, Frequency Translator Section

1. Connect a -25 dBm to -45 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 +15 to +45 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.

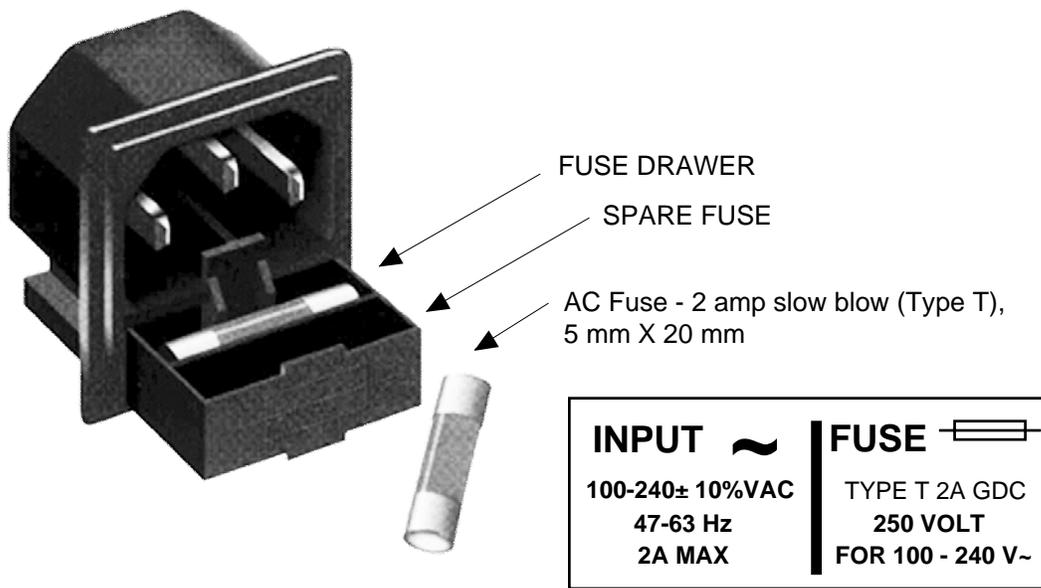


FIGURE 2.3 Fuse Location and Spare Fuse

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 Output Frequency
- Menu 2** Set Gain Mode (gain Mode = AGC)
- Menu 3a** Set Output Level (this menu appears if Gain Mode = AGC)
- Menu 3b** Set Gain (appears if Gain Mode = MGC)
- Menu 4** Set 10 MHz Reference Mode (Option E only)
- Menu 5** Set Remote
- Menu 6** Set Remote Interface (Option Q only)
- Menu 7** 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.



2083-158E1W8
Rev. 4.00

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



1650 -2150 > 250-750
AGC +00dBm REF=INT

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 Gain/Level Changes

When you get to this menu note that the gain and level 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 AND LEVEL 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 or level in 1 or 10 dB steps and then push the Menu/Execute switch to get to the Save Settings Menu:

OUTPUT LEVEL = -0 <u>3</u> R

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

GAIN = +1 <u>7</u> R

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

NOTE: THE GAIN AND LEVEL 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 0 dBm OR HAVE LESS THAN -10 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 10 MHz Reference Mode Operation

- Internal Mode:** The unit uses its own built-in 10 MHz OCXO. The Internal Reference is present on the Reference Output Connector, J8. 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, J2. REF = EXT appears on the front panel display. The External 10 MHz Reference level must be +3dBm, ± 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, J8.
- Auto Mode:** The unit defaults to the External 10 MHz Reference as long as the level meets the +3dBm, ± 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.

	ON POWER UP		
Power Up	2083-158E1W8 REV 4.00		
<hr style="border: 1px solid black;"/>			
	NORMAL DISPLAY		
Normal Display	950 - 1450 > 250 - 750 AGC +00dBm REF=INT		PUSH BUTTON
<hr style="border: 1px solid black;"/>			
	PUSHING MENU/EXECUTE SEQUENCE		
Menu 1 Set Output Frequency	OUTPUT FREQUENCY = R 250 - 750	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 2 Set Gain Mode	GAIN MODE = AGC R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 3a Set Output Level (this menu, 3a appears if Gain Mode = AGC)	OUTPUT LEVEL = -03 R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 3b Set Gain (appears if Gain Mode = MGC)	GAIN = +17 R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 4 Set 10 MHz Reference Mode	REF MODE = AUTO R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 5 Set Remote	REMOTE = ON R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 6 Set Remote Interface (Option -Q only)	INTERFACE = RS232 R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Menu 7 Set RS485 Address (Option -Q only)	RS485 ADDRESS = 00 R	SCROLL <> SCROLL ⤴	PUSH BUTTON
Save? When go to end	SAVE SETTINGS? Y N	SCROLL <> SCROLL ⤴	PUSH BUTTON

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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