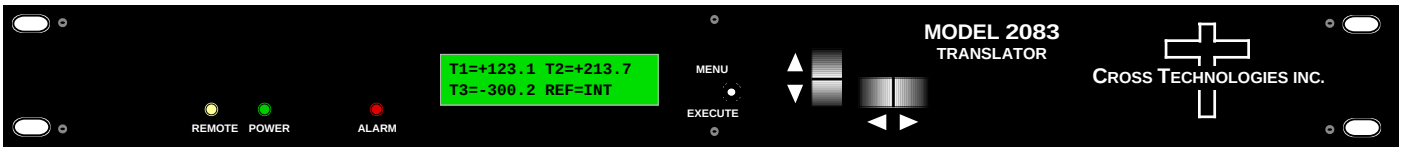
Instruction Manual

Model 2083-13-1518

Block Translator/3 Channel

May 2015, Rev. 0



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INSTRUCTION MANUAL

MODEL 2083-13-1518 Block Translator, 3 Channel

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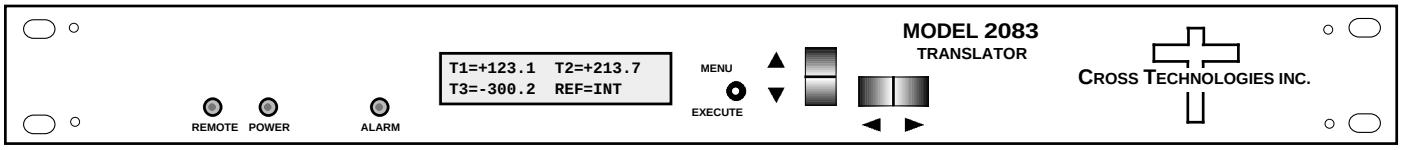
MODEL 2083-13-1518 Block Translator, 3 Channel

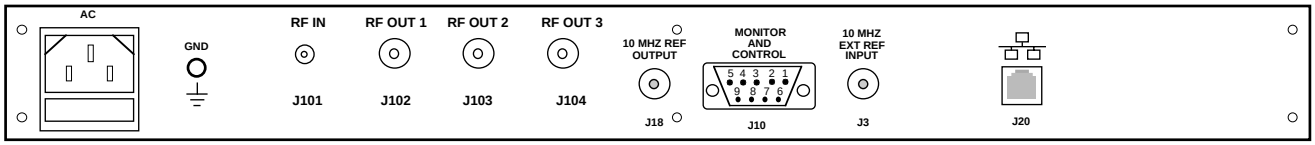
1.0 General

1.1 Equipment Description

2083-13-1518 Block Translator, Three Channel - The 2083-13-1518 Block Translator, 3 Channel, converts a single 950-1450 block input to three independently tuned 500 MHz block outputs in the 600-1800 MHz range (-350 to +350 MHz translation in 100 kHz steps) with no spectrum inversion, low group delay and flat frequency response. The 950-1450 MHz input is translated to a 500 MHz block in the 600-1800 MHz range using dual conversion. The gain is 0 ±3 dB at Fc. Multifunction switches select the translation frequency of each channel 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 SMA female for the RF input, Type F female for the RF output and BNC female for the external 10 MHz reference input and 10 MHz reference output. The 10 MHz output connector contains either the internal or external 10 MHz reference signal. The unit is powered by a 100-240 ± 10% VAC power supply, and housed in a 1.75" X 19.0" X 16.0" 1RU chassis.



FRONT PANEL



REAR PANEL

FIGURE 1.1 2083-13-1518 Front and Rear Panels

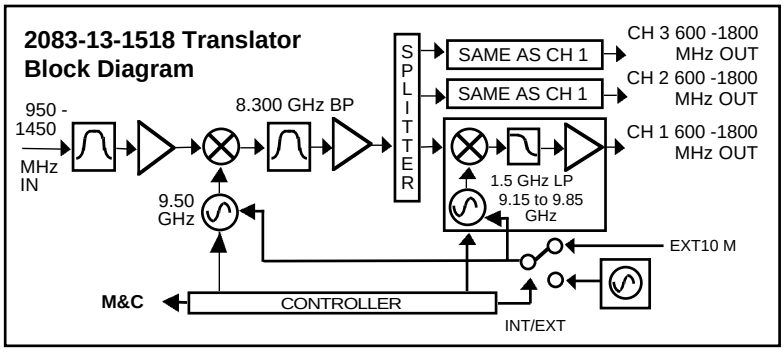


FIGURE 1.2 2083-13-1518 Translator Block Diagram

1.2 Technical Characteristics

TABLE 1.0 2083-13-1518 Block Translator Specifications*	
Input Characteristics	
Input Impedance/RL	50Ω/12 dB
Frequency	950 - 1450 MHz
Input Level	-10 to -20 dBm
Input, maximum no damage	+10 dBm
Output Characteristics (each Channel)	
Impedance/RL	75Ω / 10 dB
Frequency (500 MHz Band)	600 - 1800 MHz range
Output Level	-10 to -20 dBm
Output 1 dB Compression	0 dBm
Channel Characteristics	
Gain, at F_C	0 dB, ±3 dB, Fixed
Frequency Response	±2.0 dB, 500 MHz bandwidth; ±0.5 dB, 36 MHz increment
Spurious, Inband	< -45 (-50 typical) dBC in band, (in the selected 500 MHz Band in the 600 - 1800 MHz range)
Spurious, 0.6 - 1.45 GHz	< -45 dBm; < -45 (-50 typical) dBC, 0.95 - 1.45 GHz feed through rejection
Spurious, out of band	< -45 dBm; 250 MHz above and below the selected 500 MHz band
Frequency Sense	Non-inverting
	NOTE 1: dBc is relative to the COMPOSITE Output Level
Synthesizer Characteristics	
Frequency Accuracy	±0.01 ppm
Frequency Step	100 kHz; -350 to + 350 MHz Translation adjustment
10 MHz Level (In or Out)	3 dBm, ± 3dB, (75Ω works with 50 or 75 ohms)

Phase Noise @ F(Hz) >	100 MHz	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-60	-70	-80	-90	-100

Controls, Indicators	
Frequency Translation	Setting Shown on LCD Display
Gain	Direct Readout LCD; Manual or Remote Selection
Power, Alarm, Remote	Green LED; Red LED; Yellow LED
Remote	RS232C, 9600 baud, RS485, Ethernet, Optional

Continued on page 5...

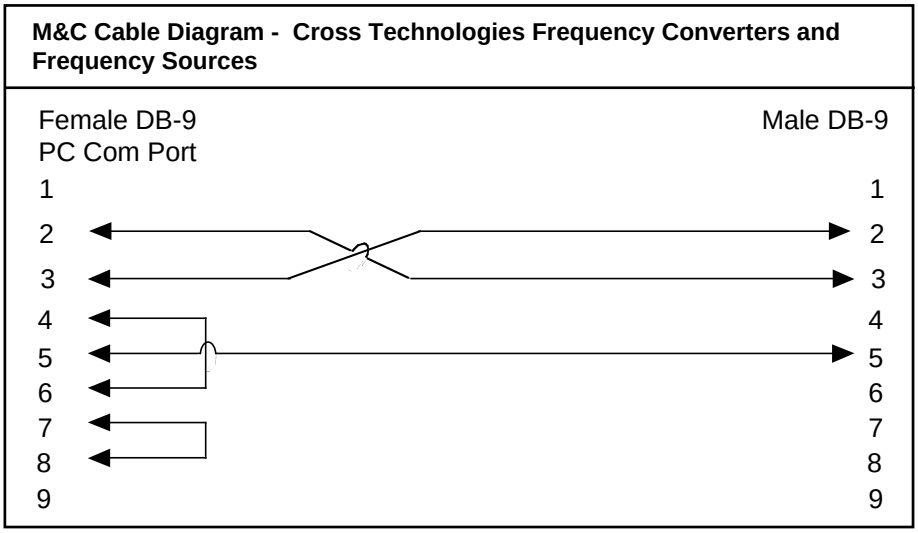
Technical Characteristics (continued)

Other	
RF In/RF Out Connector	SMA (female) / Type F (female)
10 MHz Connectors	BNC (female); 75Ω, works with 50 or 75 ohms
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 maximum
Available Options	
Communication 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 -	75Ω BNC (RF In), 75Ω BNC (RF Out)
D -	50Ω BNC (RF In), 50Ω 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 Request - Table 1.1 lists the status requests for the 2083-13-1518 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 2083-13-1518 Status Requests/Inquiries		
Channel 1 Translation Inquiry	{aaS1}	returns: {aaS1xxxxxx} where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		1 = command code
		xxxxxx = CH1 translation frequency in MHz
		The unit will append the '>' character if the command is sucessfully processed.
Channel 2 Translation Inquiry	{aaS2}	returns: {aaS2xxxxxx} where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		2 = command code
		xxxxxx = CH2 translation frequency in MHz
		The unit will append the '>' character if the command is sucessfully processed.
Channel 3 Translation Inquiry	{aaS3}	returns: {aaS3xxxxxx} where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		3 = command code
		xxxxxx = CH3 translation frequency in MHz
		The unit will append the '>' character if the command is sucessfully processed.
Reference Mode Inquiry	{aaSE}	returns: {aaSEx} where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		E = command code
		x = 1 if reference mode is internal, x = 2 if external
		The unit will append the '>' character if the command is sucessfully processed.
Alarm Status Inquiry	{aaSA}	returns: {aaSAwxyz} where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		A = command code
		w = Channel 1 Alarm Status
		x = Channel 2 Alarm Status
		y = Channel 3 Alarm Status
		z = Summary Alarm Status
		The unit will append the '>' character if the command is sucessfully processed.
Model # and firmware rev inquiry	{aaSV}	returns: {aaSVxxxxvyyyy} where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		V = command code
		xxxx = unit model number
		vyyyy = firmware rev.
		The unit will append the '>' character if the command is sucessfully processed.

C) Commands - 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 2083-13-1518 M&C Commands

Command Function	Syntax *	Command Description
Set Channel 1 Translation Frequency	{aaC1xxxxxx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		1 = command code
		xxxxxx = frequency in MHz, range = -350.0 to 350.0 (0.1 MHz steps)
		example: {C1-285.4}
		Will set CH1's translation frequency to -285.4 MHz
		The unit will reply with the '>' character if the command is sucessfully processed.
Set Channel 2 Translation Frequency	{aaC2xxxxxx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		2 = command code
		xxxxxx = frequency in MHz, range = -350.0 to 350.0 (0.1 MHz steps)
		example: {C2-285.4}
		The unit will reply with the '>' character if the command is successfully processed.
		Will set the reference mode to Auto.
		The unit will reply with the '>' character if the command is successfully processed.
Set Channel 3 Translation Frequency	{aaC3xxxxxx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		3 = command code
		xxxxxx = frequency in MHz, range = -350.0 to 350.0 (0.1 MHz steps)
		example: {C3-285.4}
		Will set CH3's translation frequency to -285.4 MHz
		The unit will reply with the '>' character if the command is sucessfully processed.
		M&C Commands Continued on page 9...

Continued from page 8...

TABLE 1.2 2083-13-1518 M&C Commands Continued		
Set 10 MHz Reference Mode	{aaCEx}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		E = command code
		x = 1 to set the unit's 10 MHz Reference to internal;
		x = 2 to set the unit's 10 MHz Reference to external
		example: {CE1}
		Will set the unit to lock to an external 10 MHz reference
		The unit will reply with the '>' character if the command is sucessfully processed.
Set Remote Off	{aaCRO}	where:
		aa = unit address, range = 00 to 31, only used if interface is RS485, otherwise omit
		R = command code
		0, ascii number zero.
		example: {CR0}
		Will disable the unit's serial M&C port
		The unit will reply with the '>' character if the command is sucessfully processed.
		(Note: this command only affects the serial M&C port, the ethernet port is
		always on and will not be affected)
Set Remote On	#	Just the ascii pound sign, (0x23)
		Will enable the unit's serial M&C port.
		The unit will reply with the '>' character if the command is sucessfully processed.
		(Note: this command only affects the serial M&C port, the ethernet port is
		always on and will not be affected)

2.0 Installation

2.1 Mechanical

The 2083-13-1518 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 2083-13-1518 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-13-1518 is assembled.

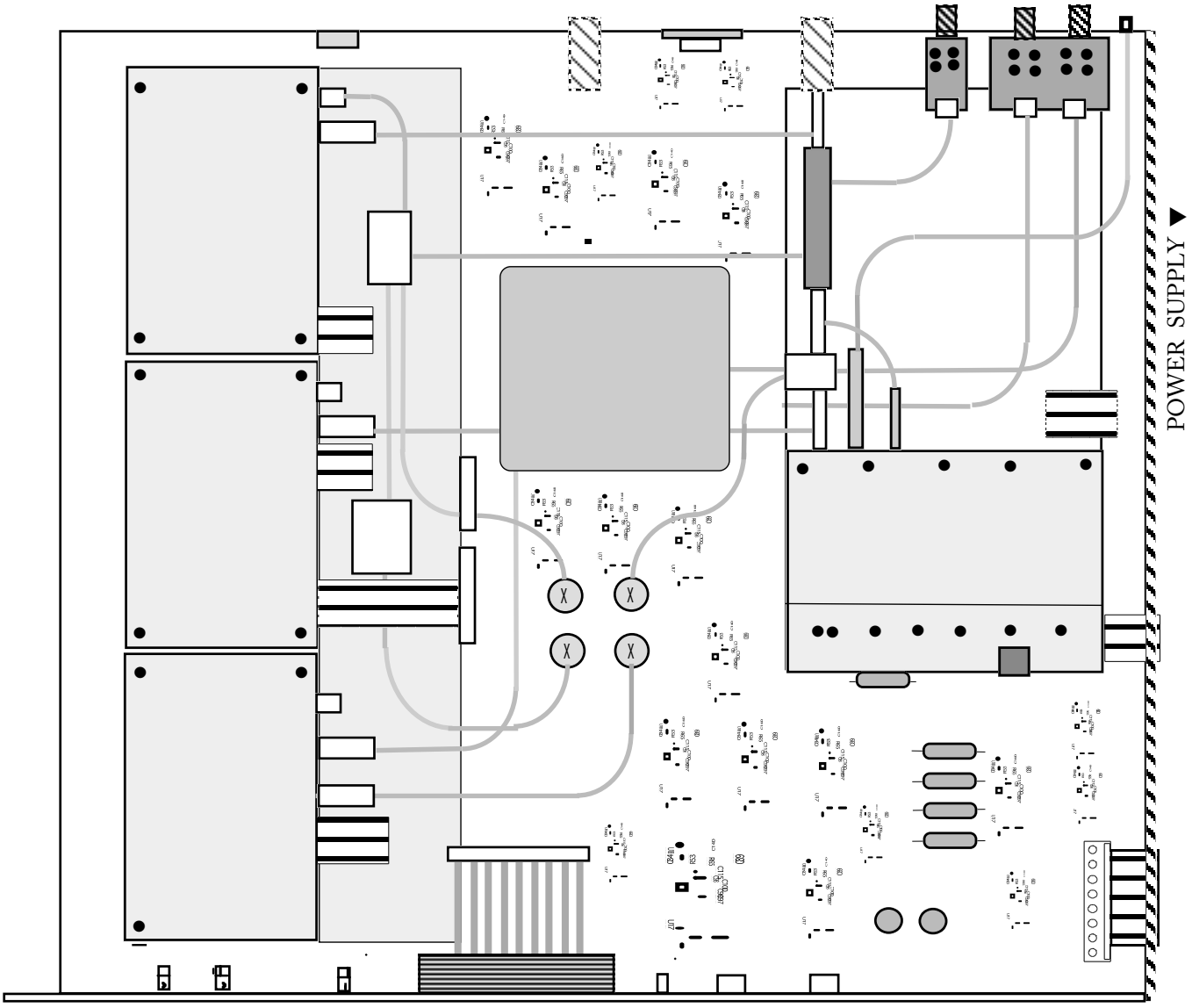


FIGURE 2.0 2083-13-1518 Mechanical Assembly

2.2 Rear Panel Input/Output Signals

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

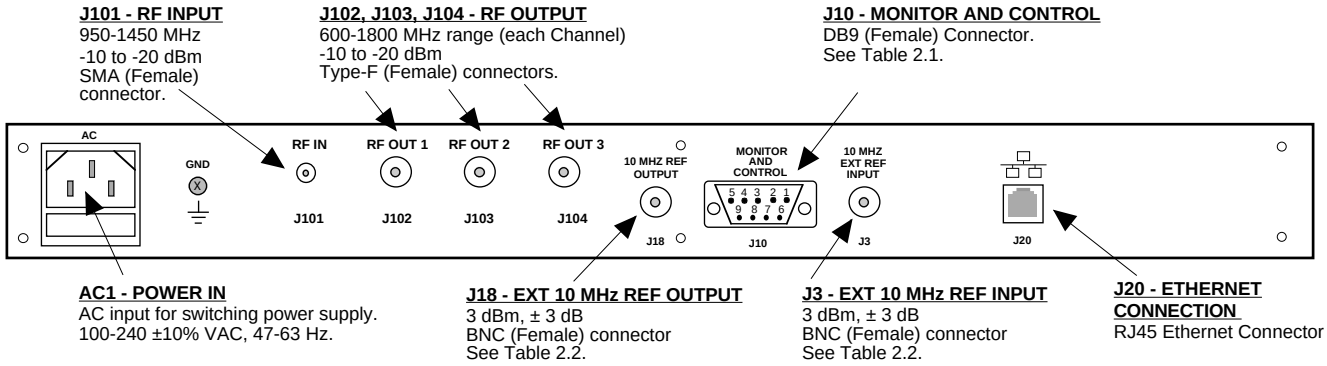


FIGURE 2.1 2083-13-1518 Rear Panel I/O's

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	RF Input	RF Output
B	BNC, 75Ω	BNC, 75Ω
D	BNC, 50Ω	BNC, 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.

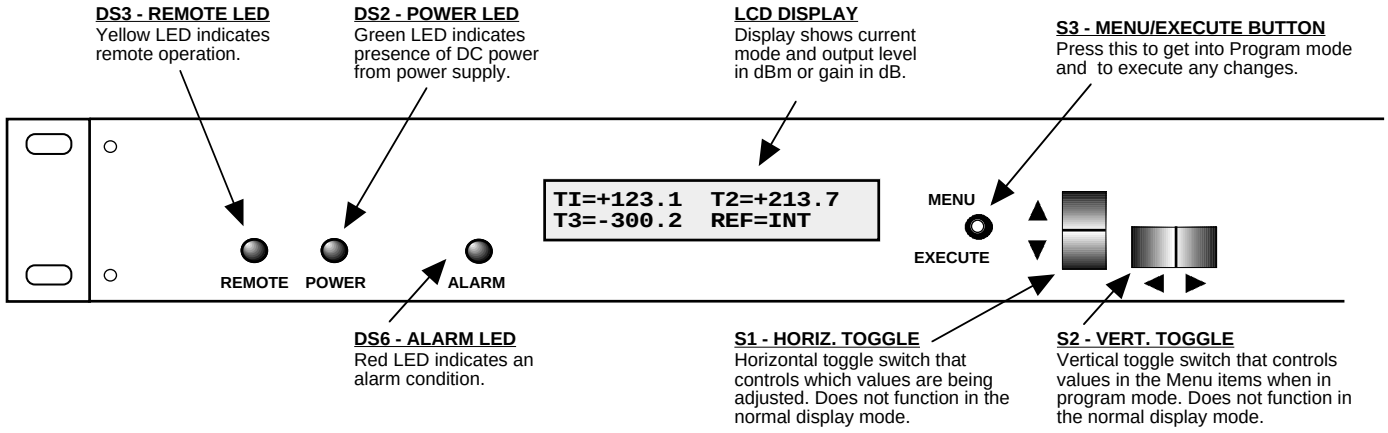


FIGURE 2.2 2083-13-1518 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2083-13-1518, Frequency Translator Section

1. Connect a -10 dBm to -20 dBm signal to RF IN, J1 (Figure 2.1)
2. Connect the RF OUT, J102, J103, J104 to the external equipment.
3. Connect 100-240 ±10% VAC, 47 - 63 Hz to AC connector on the back panel.
4. Be sure DS6 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).
5. 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.

   NOTE: If a fuse continues to open, the power supply is most likely defective.

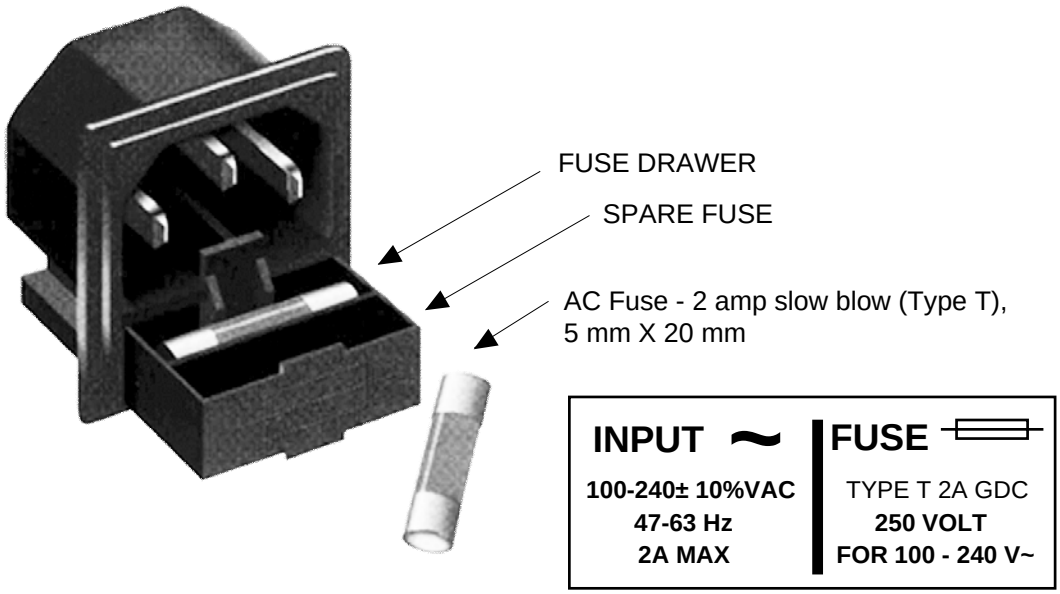


FIGURE 2.3 Fuse Location and Spare Fuse

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 Channel 1 Translation Frequency
Menu 2 Set Channel 2 Translation Frequency
Menu 3 Set Channel 3 Translation Frequency
Menu 4 Set 10 MHz Reference Mode
Menu 5 Set Remote
Menu 6 Set Remote Interface (Option Q only)
Menu 7 Set RS485 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.

```
2083-13-1518
Rev. 1.00
```

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

```
T1=+123.1 T2=+123.7
T3=-300.2 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 Translation 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 TRANSLATION:

Operate the Menu/Execute switch until you get to the menu item you want to change see Figure 2.4 for the sequence of menu options. The following display is for changing the Translation:

```
CH1 TRANSLATION=          R
+200.1 MHZ
```

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

```
CH1 TRANSLATION=          R
+300.1 MHZ
```

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

```
CH1 TRANSLATION=          R
+300.1 MHZ
```

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:

```
CH2 TRANSLATION           R
+100.0
```

OR you can scroll to "R", push the Menu/Execute switch to get to:

```
SAVE SETTINGS?      Y 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:

```
T1=+123.1  T2=+123.7
T3=-300.2  REF=INT
```

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, ±3dB. 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.

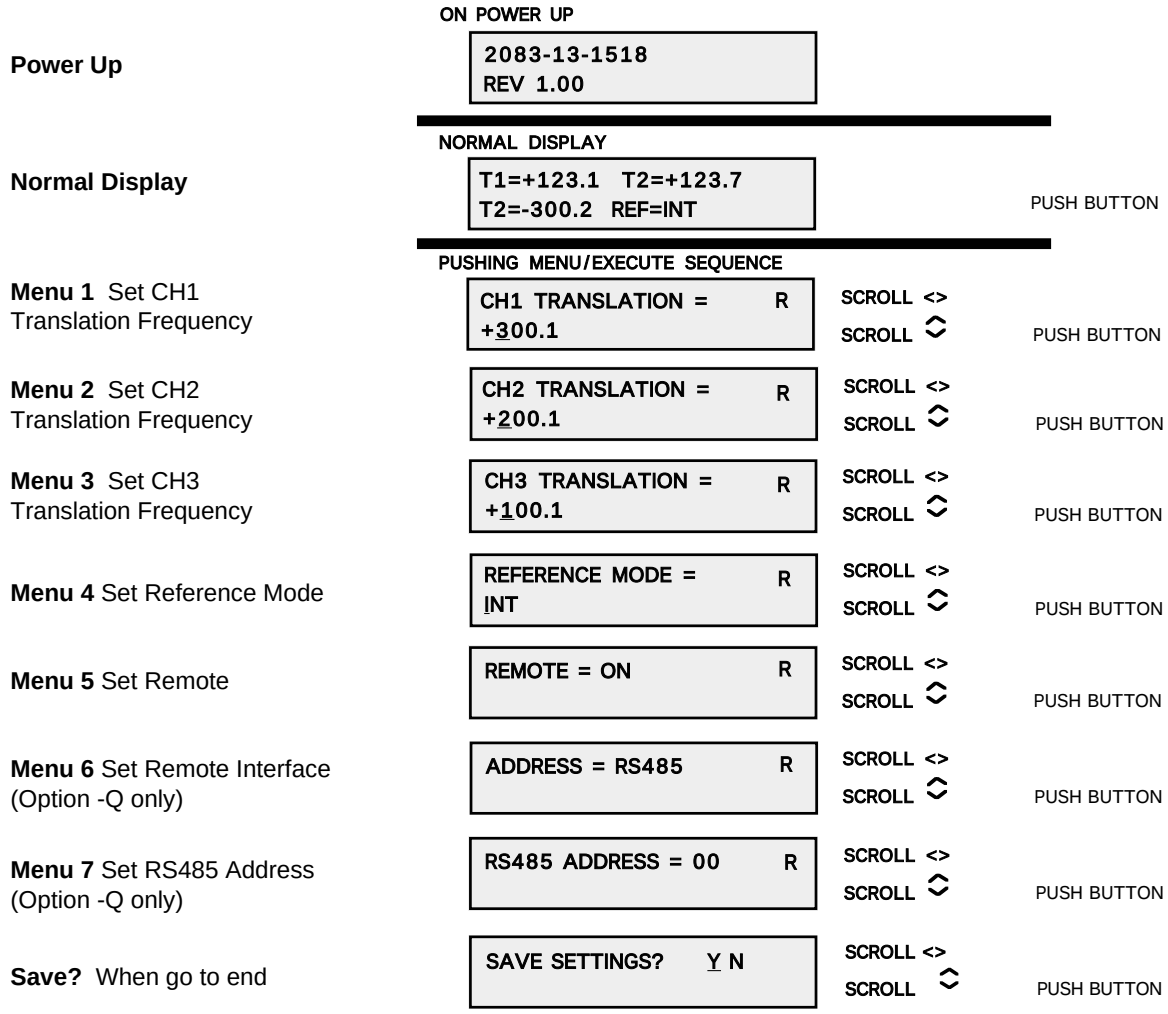


FIGURE 2.4 Menu Display and Sequences

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.

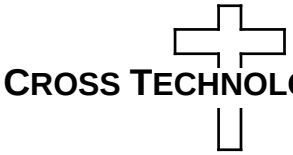
C. **Elevated Operating Ambient Temperature** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack may be greater than room ambient temperature. Therefore, consideration should be given to Tmra (Maximum Recommended Ambient Temperature).

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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