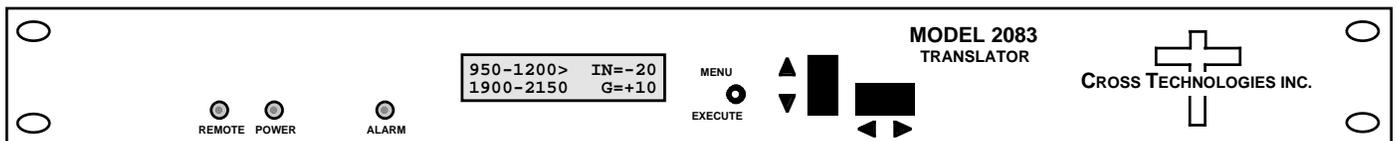


Instruction Manual

Model 2083-1222 Frequency Translator

May 2009 Rev A



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6170 Shiloh Road
Alpharetta, Georgia 30005

(770) 886-8005
FAX (770) 886-7964
Toll Free 888-900-5588

WEB www.crosstechnologies.com
E-MAIL info@crosstechnologies.com

INSTRUCTION MANUAL

MODEL 2083-1222 Frequency Translator

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MODEL 2083-1222 Frequency Translator

1.0 General

1.1 Equipment Description

The 2083-1222 Agile L-Band to L-Band Translator converts a 950-1200 MHz block to 1650-1900 MHz or 1900-2150 MHz block (selectable) with spectrum inversion, low group delay and flat frequency response. The 950-1200 MHz input is mixed with synthesized local oscillator (LO) of 2850 MHz to 1650-1900 MHz or with an LO signal of 3100 MHz to 1900-2150 MHz output. Multi-function push button switches select the translation, input level, and gain. Frequency translation, input level, and gain (0 to +20 dB, selectable in 1 dB steps) settings appear on the LCD display. Front panel LEDs indicate DC power (green), remote control (yellow), or a PLL alarm (red). Connectors are BNC female for RF input and output and for optional external 10 MHz reference (+3± 3 dBm in, option E). The 2083-1222 Translator is housed in an 1 3/4" X 19 " X 16" deep rack mount chassis. Option H provides a ±0.01 ppm reference.

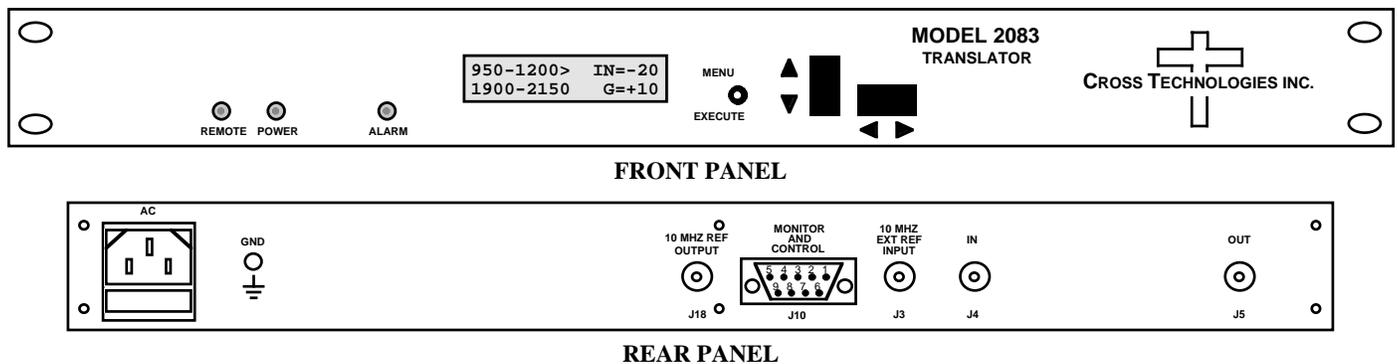
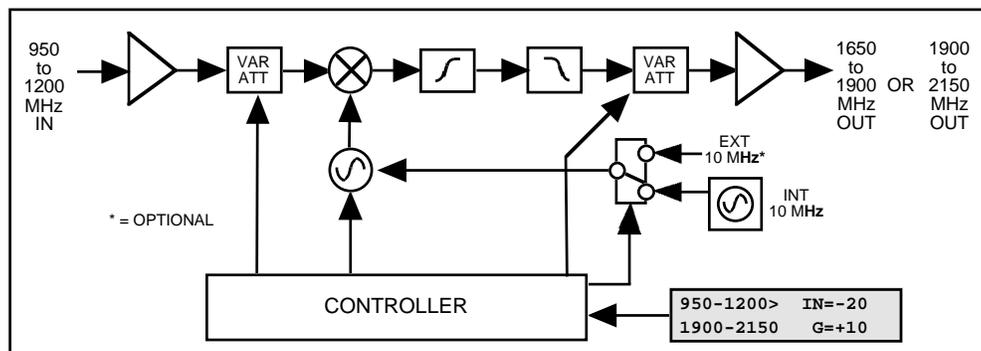


FIGURE 1.1 Front and Rear Panels



1.2 Technical Characteristics

TABLE 1.0 2083-1222 Frequency Translator Specifications*

Input Characteristics

Impedance/Return Loss	75 Ω /12 dB (see TABLE 2.2 for connector options)
Frequency	950-1200 MHz
Input Level	-30 to -10 dBm

Output Characteristics

Impedance/Return Loss	75 Ω /12 dB (see TABLE 2.2 for connector options)
Frequency	1650-1900 MHz OR 1900-2150 MHz
Output level	-30 to -10 dBm

Channel Characteristics

Gain range (adjustable)	0 to +20 dB
Frequency Response	±1.0 dB, 250 MHz BW; ± 0.5 dB, any 36 MHz BW
Intermodulation	<-50 dBm for two carriers each at -13 dBm
Spurious Response	<-60 dBm in band; <-50dBm out of band <-40 dBC, .95-1.2 GHz; <-45 dBC, 1.65-2.15 GHz; <-50 dBm, LO out
Group Delay, max	0.01 ns/MHz ² parabolic; 0.03 ns/MHz linear; 1 ns ripple
Frequency Sense	Inverting

Synthesizer Characteristics

Frequency Accuracy	± 1.0 ppm max over temp (± 0.01 ppm, option H) internal reference
10 MHz level (In & Out)	3 dBm, ± 3 dB (option E)

Phase Noise @ Freq	100 Hz	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-65	-75	-85	-95	-110

Controls, Indicators

Frequency Selection	LCD; pushbutton switches or remote selection; Set for low or high block
Input Level Selection	LCD; pushbutton switches or remote selection; Set to composite input lvl
Gain Selection	LCD; pushbutton switches or remote selection; Set to 0 to +20 dB
Power	Green LED
Alarm	Red LED
Remote	Yellow LED; RS232C (RS485, option Q), 9600 baud

Other

RF Connectors	BNC (female) (see TABLE 2.2 for other options)
10 MHz Connectors	BNC (female) (option E)
Alarm/Remote Connector	DB9 - NO or NC contact closure on Alarm
Size	19 inch, 1RU standard chassis 1.75"high X 16.0" deep
Power	100-240 ±10% VAC, 47-63 Hz, 45 watts max

Options

-E	Allows ext. 10 MHz ref input, 10 MHz ref can be inserted on the RF in
-H	High Stability (± 0.01 ppm) internal reference
-Q	RS-422/RS-485 Remote capability
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) Status Requests - Table 1.1 lists the status requests for the 2083-1205 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 2083-1222 Status Requests		
Command	Syntax *	Description
Command Status	{aaS1}	Returns {aaS1bccddA} where:
		• b = Output Band
		b = 0 - 1650 to 1900 MHz
		b = 1 - 1900 to 2150 MHz
		• ccc = Gain in dB
		• dd = Input level (10 to 30 => -10 to -30 dBm)
		• A = 0 - summary alarm
10 MHz Reference Status (option E only)	{aaS2}	Returns {aaS2ER} where:
		• E = Ext 10MHz Status (1 = on, 0 = off)
		• R = 10MHz RF insertion status (1 = inserted, 0 = NOT inserted)

C) Commands

Table 1.2 lists the commands for the 2083-1222 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 2083-1222 Commands		
Command	Syntax*	Description
Set Frequency Band	{aaC1x}	where x = : <ul style="list-style-type: none"> • x = 1 character • 0 for 1650-1900 MHz • 1 for 1900-2150 MHz
Set Input Level	{aaClxx}	where: <ul style="list-style-type: none"> • xx = 2 characters • Range: 10 to 30 (-10 to -30 dBm, in 1 dBm steps)
Set Gain	{aaC3xxx}	where: <ul style="list-style-type: none"> • xxx = 3 characters • Range: +00 to +20 (0 dB to +20 dB, in 1 dB steps)
Enable 10MHz RF Insertion (option -E only)	{aaC5x}	where x = : <ul style="list-style-type: none"> • 0 to disable 10MHz RF insertion • 1 to enable 10MHz RF insertion
Enable External 10MHz (option -E only)	{aaCEx}	where x = : <ul style="list-style-type: none"> • 0 to disable External 10MHz ref signal • 1 to enable External 10MHz ref signal
Enable Remote	#	Just # sign
Disable Remote	{aaCRO}	{CR and zero}

2.0 Installation

2.1 Mechanical

The 2083-1222 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 2083-1222 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-1222 is assembled.

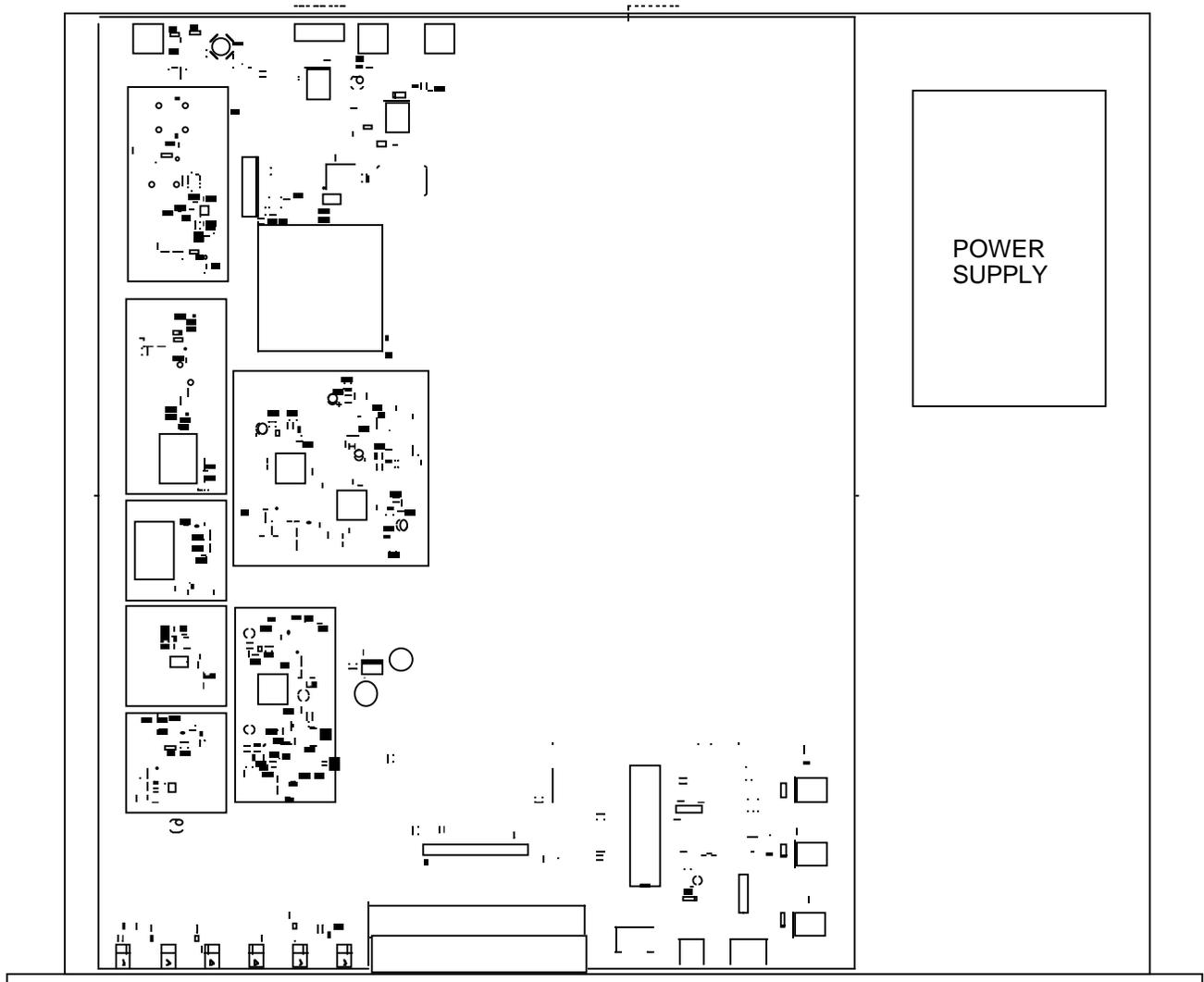


FIGURE 2.0 2083-1222 Mechanical Assembly

2.2 Rear Panel Input/Output Signals

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

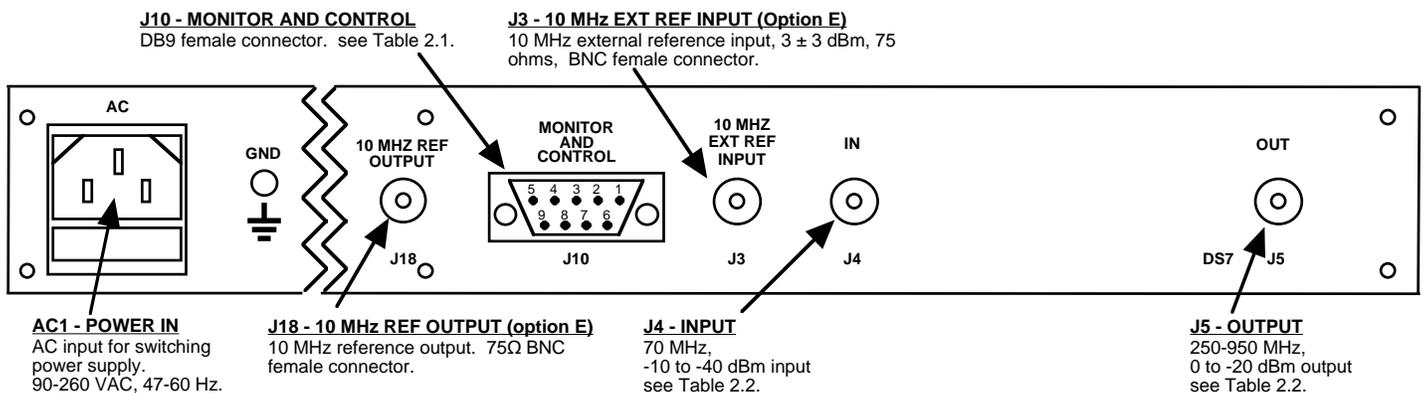


FIGURE 2.1 2083-1222 Rear Panel I/O's

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

Option	Input	Output
STD	BNC, 75Ω	BNC, 75Ω
D	BNC, 50Ω	BNC, 50Ω
F	Type F, 75 Ω	Type F, 75 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.

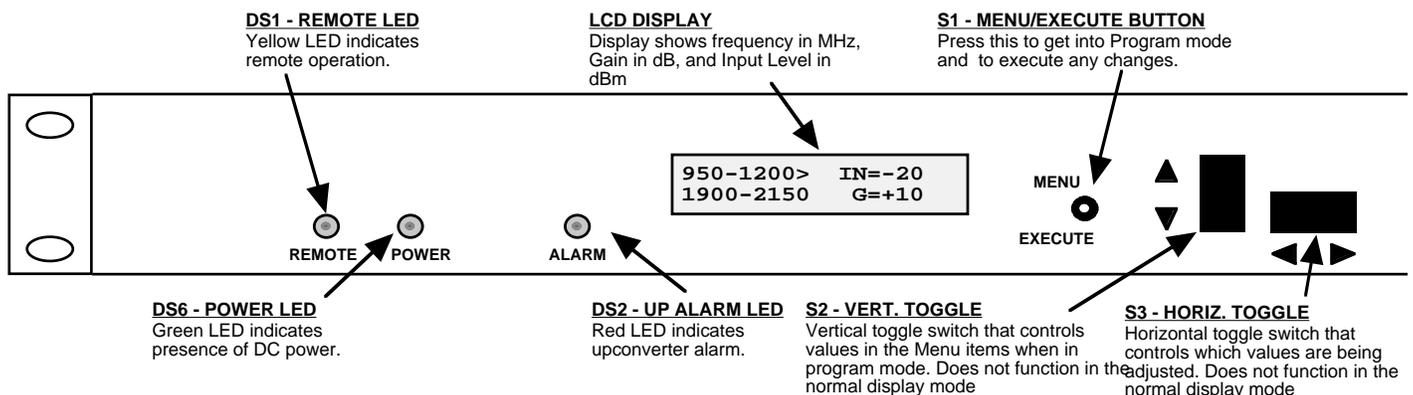


FIGURE 2.2 2083-1222 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2083-1222, Frequency Translator Section

1. Connect a -30 dBm to -10 dBm signal to IN, J4 (Figure 2.1)
2. Connect the OUT, J5, to the external equipment
3. Connect 100-240 \pm 10% VAC, 47 - 63 Hz to AC on the back panel.
4. Set the desired output frequency band (See Section 2.5 Menu Settings).
5. Set the composite input level (See Section 2.5 Menu Settings).
6. 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. The firmware will prevent setting gain and input level outside this range. (See Section 2.5 Menu Settings).
7. Be sure DS6 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).
8. 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.

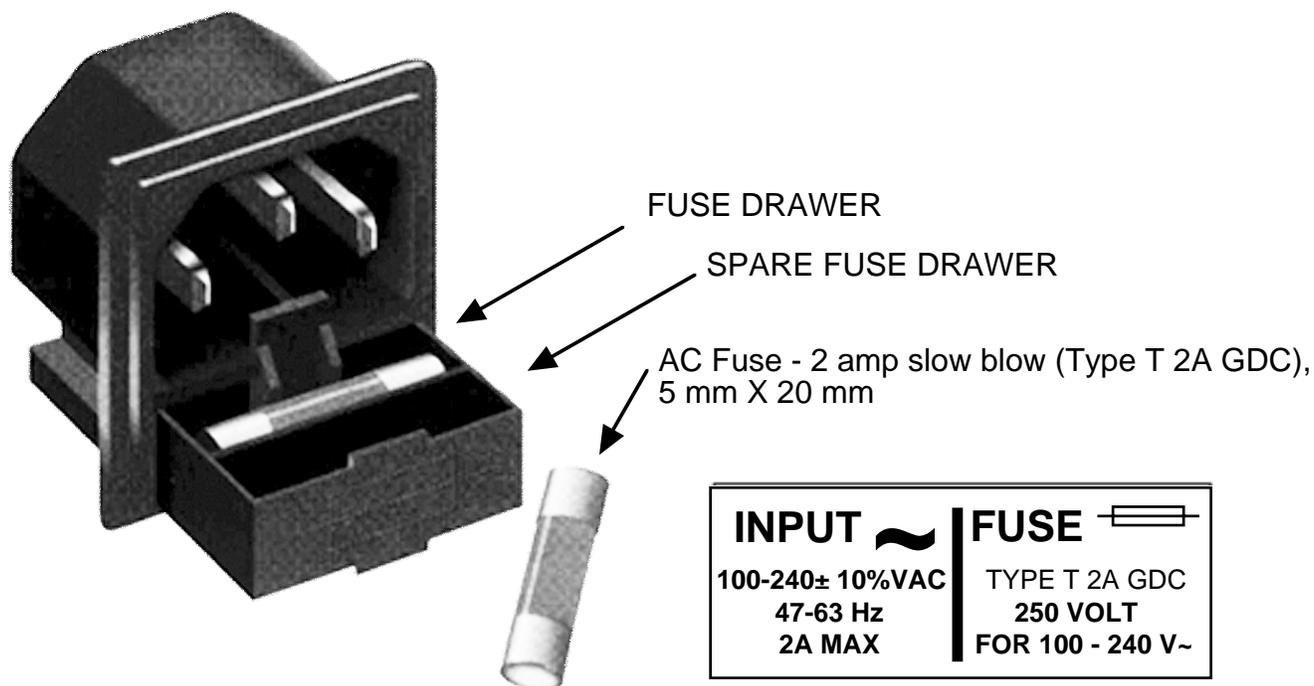


FIGURE 2.3 Fuse Location and Spare Fuse

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 Frequency band in MHz

Menu 2 Input Level (Set from -30 to -10)

Menu 3 Gain (0 to +20, 1dB steps)

Menu 4 Set Unit to Remote Operation

Menu 5 Select External 10 MHz Ref (option -E)

Menu 6 Select 10 MHz Reference RF insertion (option -E)

Menu 7 Set Remote mode (option -Q)

Menu 8 Set RS-485 address (option -Q)

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).

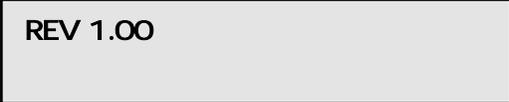
All program changes must start with the operation of the Menu/Execute switch and must also end with the operation of the Menu/Execute switch verified by the “Save Settings?” Menu. If this sequence is not followed, none of the changes will take effect. If programming is initiated and no operator action takes place for approximately 12 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.

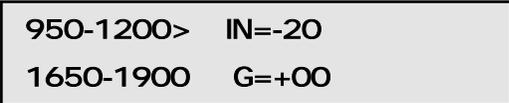
When power is first applied, the LCD display goes through three steps.

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



REV 1.00

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



950-1200> IN=-20
1650-1900 G=+00

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 frequency, 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 12 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 BAND:

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 translator frequency band:

```
F= 1650-190Q           R
```

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

```
F= 1900-215Q           R
```

NOTE: CHANGES DO NOT TAKE PLACE ON FREQUENCY UNTIL YOU GO TO THE SAVE MENU AND INDICATE YOU WANT TO SAVE THE CHANGES. THE CARRIER IS MUTED WHEN FREQUENCY IS CHANGED.

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

```
UP INLVL = -2Q           R
```

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 the :

```
950-1200>  IN=-20  
1900-2150  G=+00
```

Figure 2.4 gives the menu items and how to make changes

2.5.5 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 12 seconds, and the system will return to the normal operating mode.

The following display is for changing the upconverter input level. This is an important setting to optimize spurious and should be made as accurately as possible:

UP INLVL = -2 <u>0</u>	R
------------------------	---

NOTE: CHANGES TAKE PLACE ON LEVEL AND 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 level in 1 dB steps and then push the Menu/Execute switch to get to the Gain setting:

UP G= + <u>00</u>	R
-------------------	---

Pressing 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:

UP G= + <u>10</u>	R
-------------------	---

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

UP 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 0 dBm OR HAVE LESS THAN -30 dBm OUTPUT LEVEL. THE FIRMWARE PREVENTS YOU FROM THIS.

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 Mute LED will light if you select Mute and the Remote LED will light when you select the Remote mode.

Power Up	ON POWER UP		
	REV 1.00		
Normal Display	NORMAL DISPLAY		
	950-1200> IN=-20 1650-1900 G=+00		PUSH BUTTON
Menu 1 Frequency	PUSHING MENU/EXECUTE SEQUENCE		
	F= 1650-1900 R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 2 Input Level (Set from -40 to -10)	UP INLVL= -20 R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 3 Gain (0 to +20)	UP G= +00 R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 4 Set Unit to Remote Operation	REMOTE OFF R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 5 Select External 10 MHz Reference (option -E)	EXT REF OFF R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 6 Select 10MHz Reference RF Insertion (option -E)	REF OUT OFF R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 7 Set Remote Mode (option -Q)	RS 485 OFF R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Menu 8 Set RS-485 Address (option -Q)	ADDRESS = 00 R	SCROLL <>	
		SCROLL ◊	PUSH BUTTON
Save? When go to end	SAVE SETTINGS? Y N	SCROLL <>	PUSH BUTTON

FIGURE 2.4 Menu Display and Sequences

2.6 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 unit 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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