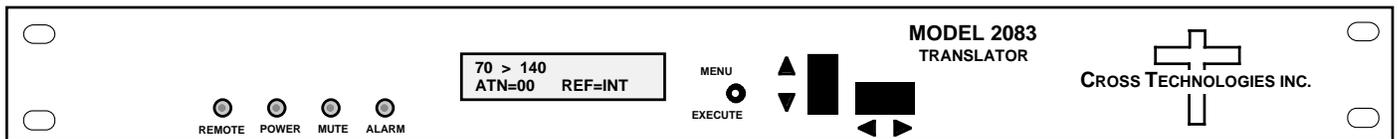


Instruction Manual

Model 2083-714 Frequency Translator

March 2011 Rev. A



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INSTRUCTION MANUAL

MODEL 2083-714 Frequency Translator

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MODEL 2083-714 Frequency Translator

1.0 General

1.1 Equipment Description

The 2083-714 Frequency Translator converts a 70 MHz signal to 140 MHz or a 140 MHz signal to 70 MHz with no spectrum inversion, low group delay, and flat frequency response. The 70 MHz or 140 MHz IF input is mixed with synthesized local oscillator (LO) signals, first to 1750 MHz and finally to 140 MHz or 70 MHz. Multi-function push button switches select the translation and gain. Frequency translation and gain (0 to -10 dB, adjustable) settings appear on the LCD display. Front panel LEDs light when DC power is applied (green), a PLL alarm occurs (red), the signal is muted (yellow), or remote control is active (yellow). A 10 MHz input allows for connection of an external 10 MHz reference. The 10 MHz output contains the 10 MHz reference signal (be it internal or external). Connectors are BNC female for the IF and 10 MHz input and output. The 2083-714 Translator is housed in a 1 3/4" X 19" X 16" deep rack mount chassis. **Option -H** provides a 0.01 ppm high stability reference.

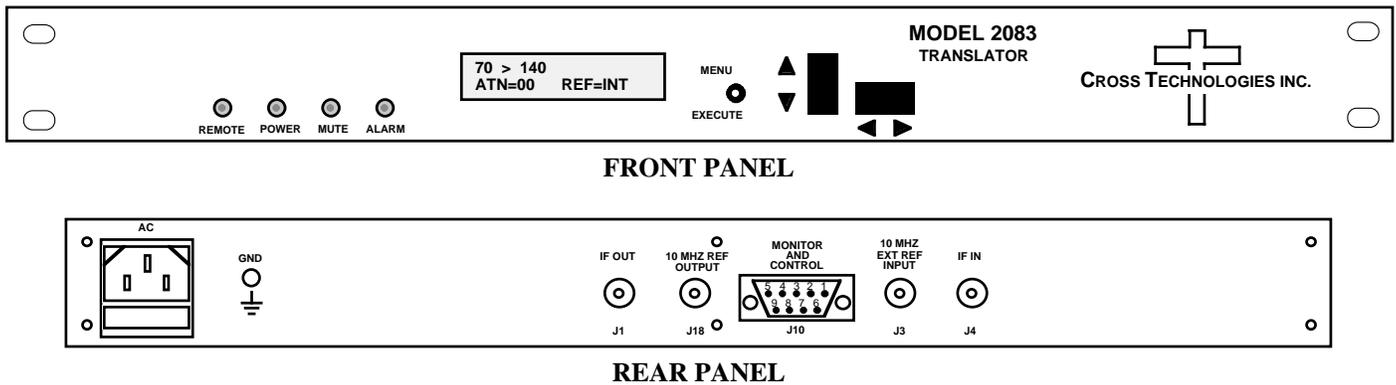


FIGURE 1.1 Model 2083-714 Front and Rear Panels

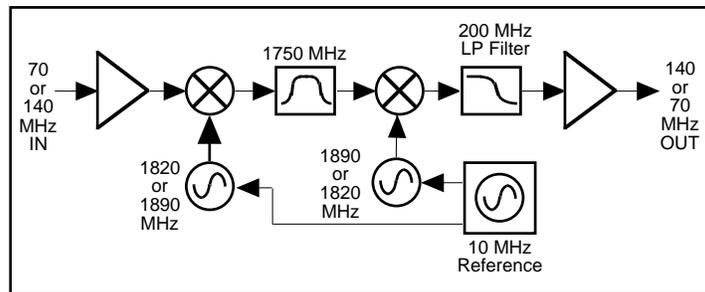


FIGURE 1.2 Model 2083-714 Translator Block Diagram

1.2 Technical Characteristics

TABLE 1.0 2083-714 Frequency Translator Specifications*

Input Characteristics

Impedance/Return Loss	75 Ω /18 dB
Frequency	70 \pm 18 MHz or 140 \pm 18 MHz
Input Level	-20 to -10 dBm
Input 1dB compression	0 dBm

Output Characteristics

Impedance/Return Loss	75 Ω /18 dB
Frequency	140 \pm 18 MHz or 70 \pm 18 MHz
Output level	-30 to -10 dBm
Output 1 dB compression	+6 dBm

Channel Characteristics

Gain range (adjustable)	-10 to 0 dB \pm 0.5 dB, selectable in 1 dB steps
Spurious Response	<-50 dBC (in-band and out-of-band)
Frequency Response	\pm 0.3 dB, \pm 12 MHz; \pm 0.5 dB, \pm 18 MHz
Group Delay, max	3 ns, 30 MHz, 5 ns, 36 MHz BW
Frequency Sense	Non-inverting

Synthesizer Characteristics

Frequency Accuracy	\pm 70 Hz max over temp; \pm 1.0 ppm internal ref (\pm 0.01 ppm option -H)
10 MHz level (In and Out)	0 dBm, \pm 3 dB, 75 ohms, option -E

Frequency	1kHz	10kHz	100kHz	1MHz
Phase Noise (dBC/Hz)	<-80	<-90	<-100	<-110

Controls, Indicators

Frequency Selection	pushbutton switches; setting shown on LCD display
Gain Selection	pushbutton switches; setting shown on LCD display
Power	Green LED
Alarm	Red LED
Remote	Yellow LED, RS232C, 9600 baud
Mute	Yellow LED

Other

IF Connectors	BNC, female, 75 Ω
10 MHz Connectors	BNC, female, 75 Ω
Connector, Alarm/Remote	DB9 - NO or NC contact closure on Alarm
Size	19 inch, 1RU standard chassis 1.75" high X 16.0" deep
Power	100-240 \pm 10% VAC, 47-63 Hz, 30 W max

Options

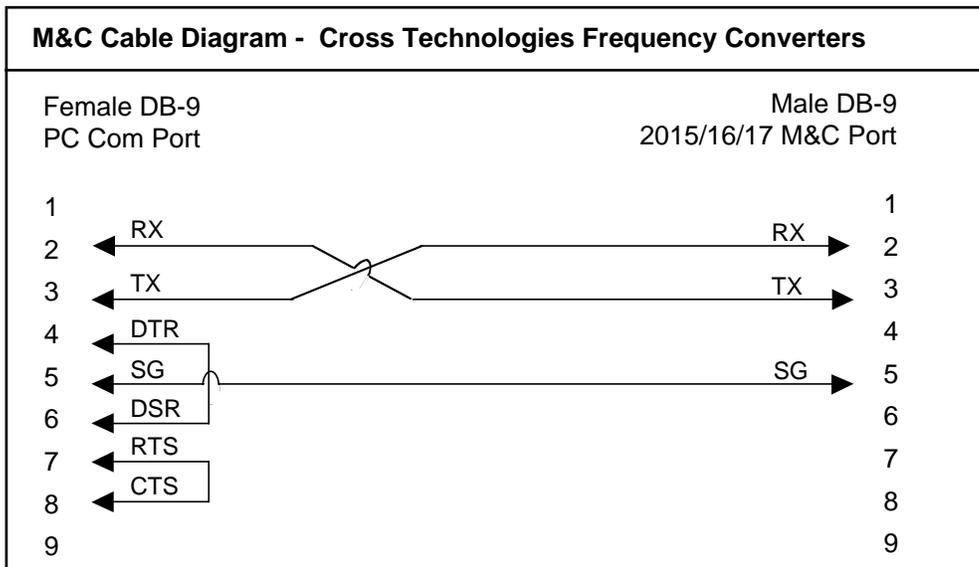
- H	High Stability (\pm 0.01 ppm) internal reference
-----	---

*+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.



Connector: Rear panel, DB-9 male

J10 Pinouts (RS-232C)	
Pin	Function
1	Not Used
2	Rx+ (RS-232C)
3	Tx+ (RS-232C)
4	Not Used
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

B) Commands Table 1.1 lists the commands for the 2083-714 and briefly describes them. After a command is sent the 2083-714 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-digit command or status number, 1 through 9
- 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 1.1 2083-714 Commands		
Command	Syntax	Description
Set Input Frequency	{C1xxx}	where: <ul style="list-style-type: none"> • xxx = 3 characters • Values: either 070 or 140 (70 or 140 MHz)
Set Attenuation	{C2xx}	where: <ul style="list-style-type: none"> • xx = 2 characters • Range: 00 to 10 (0 to 10 dB, in 1 dB steps)
Mute Output	{C3x}	where x =: <ul style="list-style-type: none"> • 0 to mute output • 1 to Unmute Output
External Reference	{C4x}	where x =: <ul style="list-style-type: none"> • 0 for Internal Reference • 1 for External Reference
Enable Remote	#	Just # sign
Disable Remote	{CRO}	{CR and zero}

C) Status Requests Table 1.2 lists the status requests for the 2083-714 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 1.2 2083-714 Status Requests		
Command	Syntax	Description
Command Status	{S1}	Returns {S1bbbccdef} where: <ul style="list-style-type: none"> • bbb = Input Frequency (070 or 140) • cc = Attenuation (00 to 10) • d = Mute Status (0=Mute, 1=Unmute) • e = Alarm Status (0=No Alarm, 1=Alarm) • f = Reference Status (0=Internal, 1=External)

2.0 Installation

2.1 Mechanical - The 2083-714 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 2083-714 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-714 is assembled.

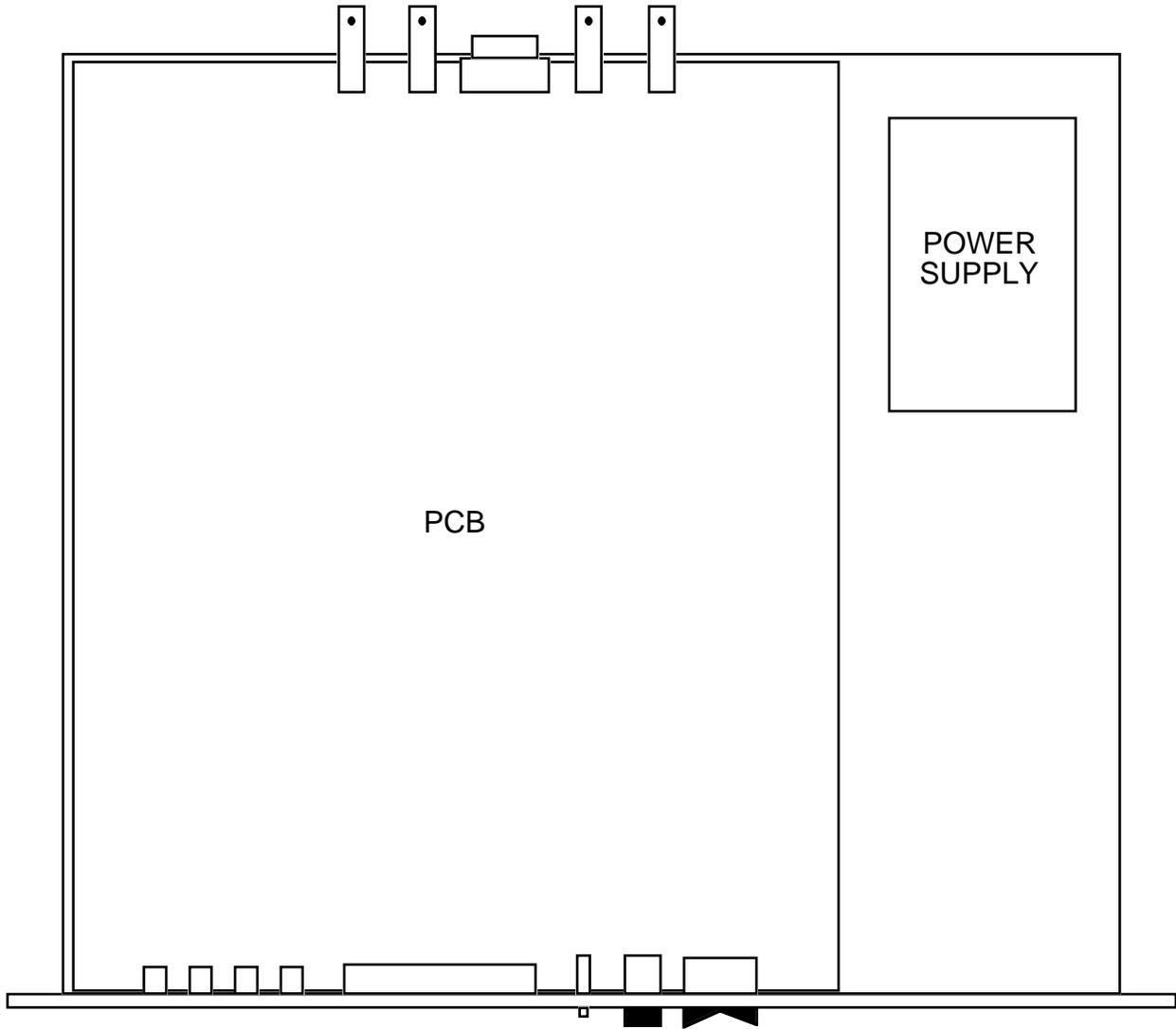


FIGURE 2.0 2083-714 Mechanical Assembly

2.2 Rear Panel Input/Output Signals - Figure 2.1 shows the input and output connectors on the rear panel.

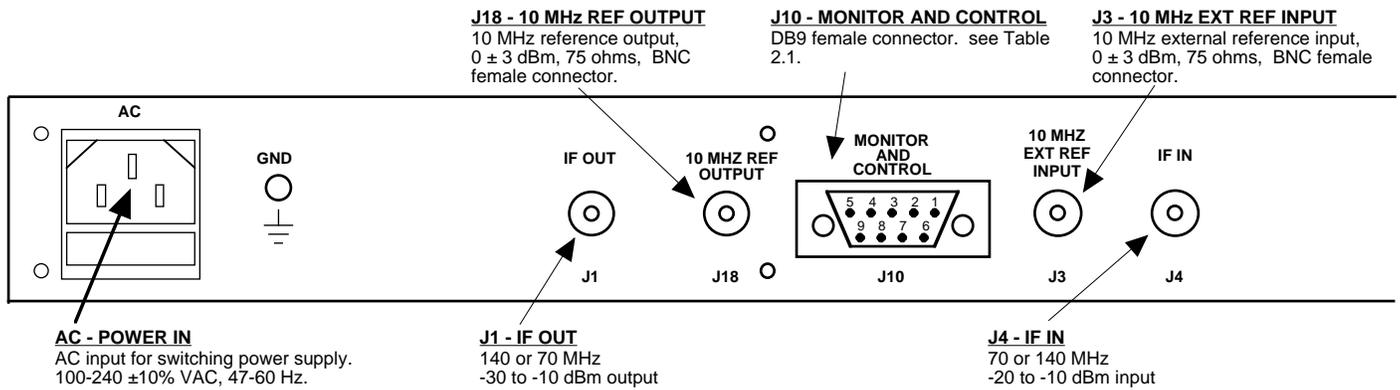
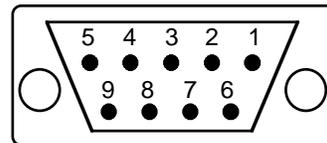


FIGURE 2.1 2083-714 Rear Panel I/O's

TABLE 2.1 J10 Pinouts (RS-232C*)	
Pin	Function
1	Not Used
2	Rx+ (RS-232C)
3	Tx+ (RS-232C)
4	Not Used
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed



***Remote Serial Interface**

Interface: DB-9 Male

Protocol: RS-232C, 9600 baud rate, no parity, 8 data bits, 1 start bit, 1 stop bit.

2.3 Front Panel Controls and Indicators - The following are the front panel controls and indicators.

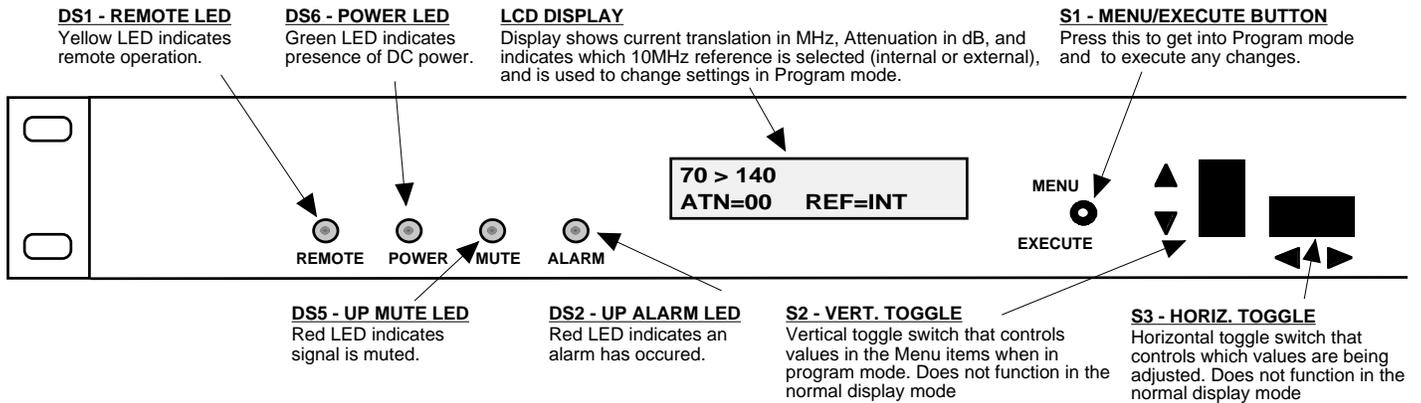


FIGURE 2.2 2083-714 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2083-714 Frequency Translator

1. Connect a -10 dBm to -20 dBm signal to IF IN, J4 (Figure 2.1).
2. Connect the IF OUT, J1, to the external equipment.
3. Connect 100-240 \pm 10% VAC, 47 - 63 Hz to AC connector on the back panel.
4. Set the desired frequency translation (See Section 2.5 Menu Settings).
5. Set the input level (See Section 2.5 Menu Settings).
6. Set the attenuation for 0 to 10 dB (See Section 2.5 Menu Settings).
7. Be sure DS6 (green, 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.

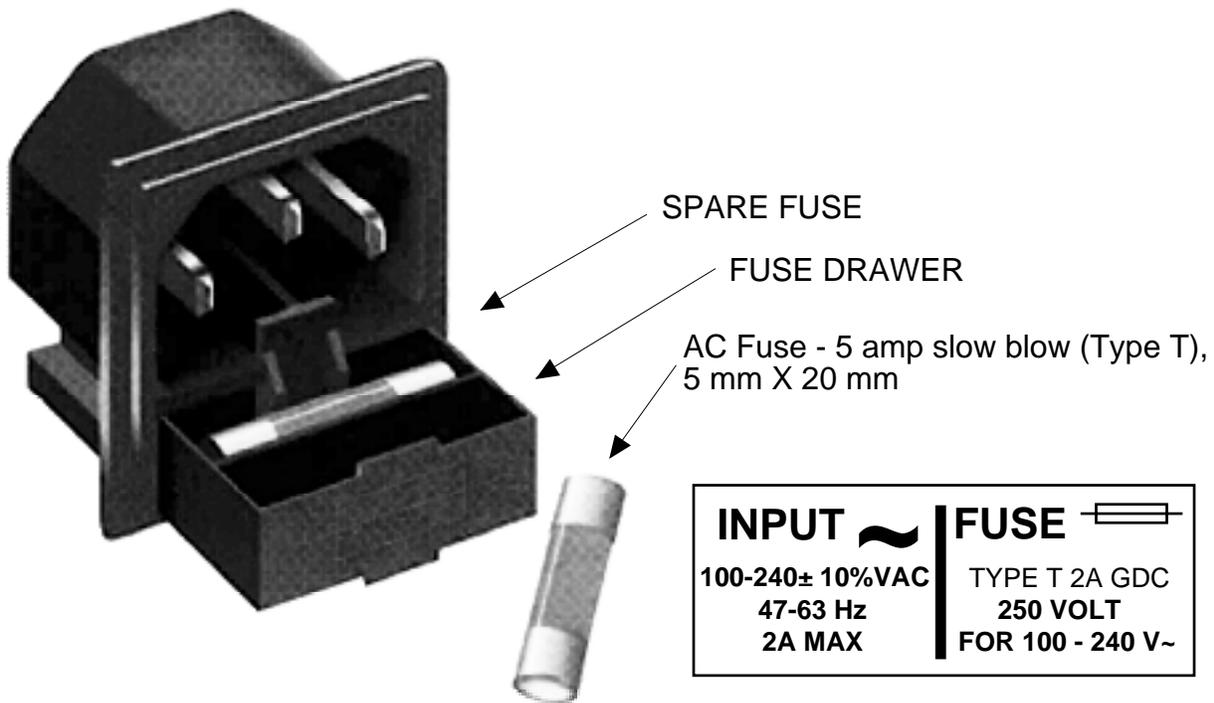


FIGURE 2.3 Fuse Location and Spare Fuse

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 Translation in MHz

Menu 2 Attenuation in dB (0 to 10)

Menu 3 Mute

Menu 4 Select External 10 MHz Ref

Menu 5 Set Unit to Remote Operation (Note: the local controls still function when in REMOTE)

Save Menu When go to 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 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 its 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 translation, attenuation, and INT/EXT Reference is shown.



70 > 140
ATN=00 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 cursor left or right.
3. Vertical Switch - This switch is mounted so its movement is vertical and has two functions:
 - a. During attenuation changes, the vertical movement will raise or lower the number selected.
 - b. For other functions such as Mute on/off, the vertical switch will alternately turn the function on or off.

2.5.4 Frequency 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 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 Translation:

1. 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 frequency translation:

```
70 > 140 _
```

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

```
140 > 70 _
```

NOTE: CHANGES DO NOT TAKE PLACE ON FREQUENCY TRANSLATION 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:

```
ATN = 00                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 :

```
140 > 70
ATN=00  REF=INT
```

Figure 2.4 shows all the menu items and how to make changes.

2.5.5 Attenuation Changes

When you get to this menu note that the attenuation 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.

To change the translator attenuation, push the Menu/Execute switch until you get to the ATTN setting:

ATTN = <u>0</u> 0	R
-------------------	---

Press the Up/Down switch to change the attenuation in 1 or 10 dB steps.

ATTN = <u>1</u> 0	R
-------------------	---

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

ATTN = 1 <u>0</u>	R
-------------------	---

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

NOTE: THE ATTENUATION WILL CHANGE AS IT IS ADJUSTED, HOWEVER, THE VALUE WILL NOT BE STORED UNTIL YOU INDICATE YES IN THE SAVE SETTINGS WINDOW.

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.

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

140 > 70
ATN=10 REF=INT

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.

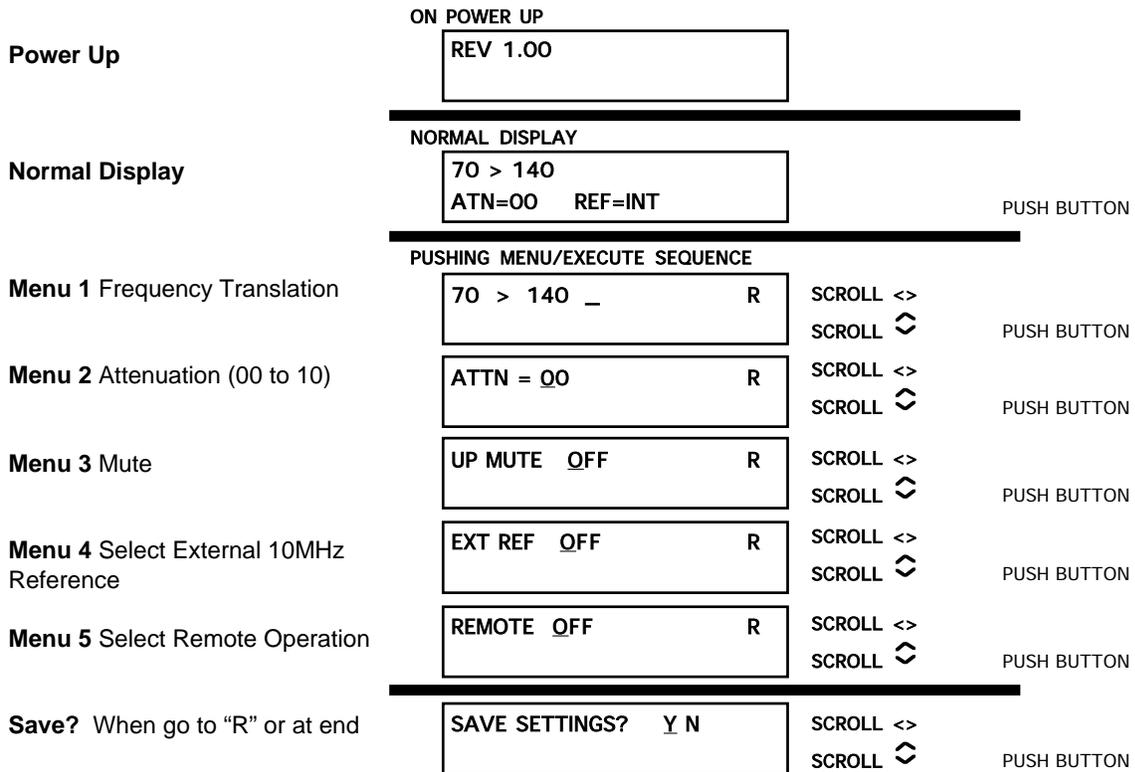


FIGURE 2.4 Menu Display and Sequences

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 T_{mra} .
- 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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