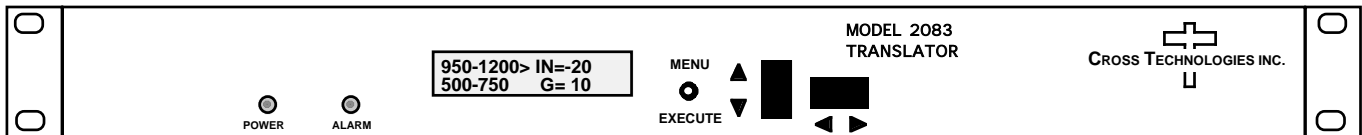


# Instruction Manual

# Model 2083-1205 Translator

July 2009 Rev 0



Data, drawings, and other material contained herein are proprietary to Cross Technologies, Inc., but may be reproduced or duplicated without the prior permission of Cross Technologies, Inc. for purposes of operating the equipment. Printed in USA.

When ordering parts from Cross Technologies, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.



6170 Shiloh Road  
Alpharetta, Georgia 30005

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

WEB [www.crosstechnologies.com](http://www.crosstechnologies.com)  
E-MAIL [info@crosstechnologies.com](mailto:info@crosstechnologies.com)

**INSTRUCTION MANUAL**  
**MODEL 2083-1205 Translator**

| <b><u>TABLE OF CONTENTS</u></b>          | <b><u>PAGE</u></b> |
|--|--------------------|
| <b>Warranty</b>                          | <b>2</b>           |
| <b>1.0 General</b>                       | <b>3</b>           |
| 1.1 Equipment Description                | <b>3</b>           |
| 1.2 Technical Characteristics            | <b>4</b>           |
| 1.3 Monitor & Control Interface          | <b>5</b>           |
| <b>2.0 Installation</b>                  | <b>7</b>           |
| 2.1 Mechanical                           | <b>7</b>           |
| 2.2 Rear I/O's                           | <b>8</b>           |
| 2.3 Front Panel Controls, Indicators     | <b>8</b>           |
| 2.4 Operation                            | <b>9</b>           |
| 2.5 Menu Settings                        | <b>10</b>          |
| <b>3.0 Environmental Use Information</b> | <b>15</b>          |

**WARRANTY** - The following warranty applies to all Cross Technologies, Inc. products.

All Cross Technologies, Inc. products are warranted against defective materials and workmanship for a period of one year after shipment to customer. Cross Technologies, Inc.'s obligation under this warranty is limited to repairing or, at Cross Technologies, Inc.'s option, replacing parts, subassemblies, or entire assemblies. Cross Technologies, Inc. shall not be liable for any special, indirect, or consequential damages. This warranty does not cover parts or equipment which have been subject to misuse, negligence, or accident by the customer during use. All shipping costs for warranty repairs will be prepaid by the customer. There are not other warranties, express or implied, except as stated herein.



6170 Shiloh Road  
Alpharetta, Georgia 30005

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

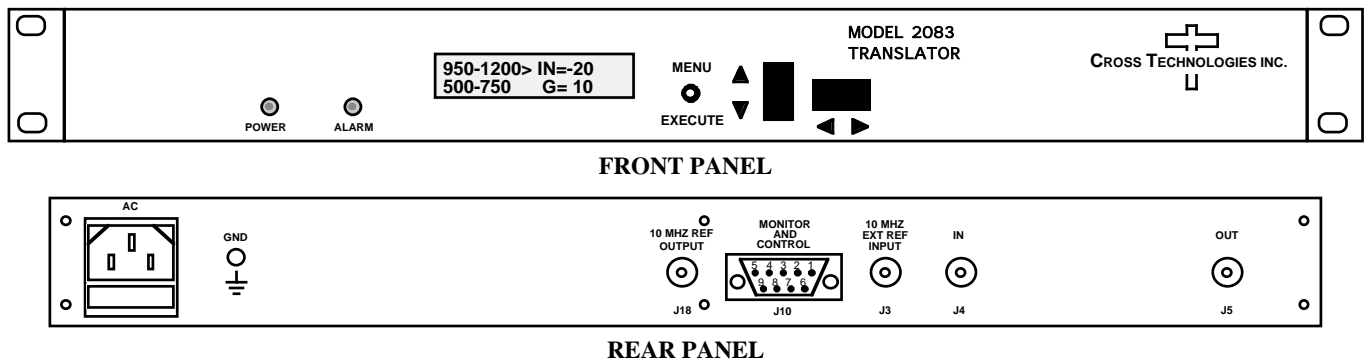
WEB [www.crosstechnologies.com](http://www.crosstechnologies.com)  
E-MAIL [info@crosstechnologies.com](mailto:info@crosstechnologies.com)

# MODEL 2083-1205 Translator

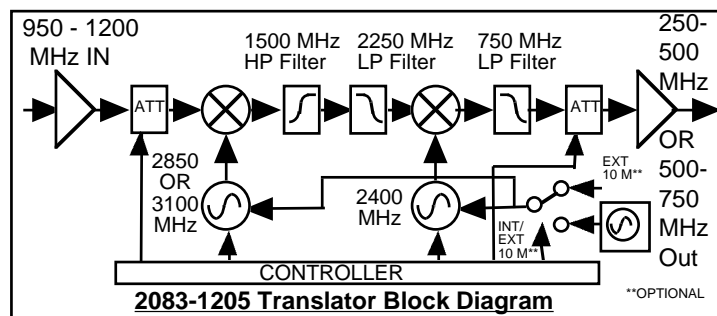
## 1.0 General

### 1.1 Equipment Description

The 2083-1205 Agile L to UHF Translator converts a 950-1200 MHz block to 250-500 MHz and 500-750 MHz with no 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 and then with an LO signal of 2400 MHz to 250-500 MHz and 500-750 MHz. 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 light when DC power is applied (green) or a PLL alarm occurs (red). Connectors are BNC female for RF input and output and for (**optional**) external 10 MHz reference (+3± 3 dBm in). The 2083-1205 Translator is housed in an 1 3/4" X 19" X 16" deep rack mount chassis.



**FIGURE 1.1 Front and Rear Panels**



**FIGURE 1.2 Block Diagram**

## 1.2 Technical Characteristics

**TABLE 1.0 2083-1205 Frequency Translator Specifications\***

### Input Characteristics

|                        |                |
|------------------------|----------------|
| Input Impedance/RL     | 75 Ω /12 dB    |
| Frequency,             | 950-1200 MHz   |
| Input Level            | -10 to -30 dBm |
| Input 1 dB compression | 0 dBm          |

### Output Characteristics

|                         |                            |
|-------------------------|----------------------------|
| Impedance/RL            | 75 Ω/12 dB                 |
| Output Level, Range     | -10 to -30 dBm             |
| Output 1 dB compression | 0 dBm                      |
| Frequency               | 250-500 MHz or 500-750 MHz |

### Channel Characteristics

|                    |   |
|--------------------|---|
| Gain               | 0 to +20 ± 0.5 dB, selectable in 1 dB steps                 |
| Frequency Response | ± 1.0 dB, 250 MHz bandwidth; ± 0.5 dB, any 36 MHz increment |

### Intermodulation

|                   |  |
|-------------------|--|
| Spurious Response | <-50 dBC for two carriers each at -13 dBm out<br><-60 dBm in band; < -50 dBm out of band<br><-40 dBC, 0.95 to 1.2 GHz out; <-45 dBC,<br>1.9 to 2.4 GHz out; <-50 dBm, LO out |
| Group Delay, max  | 0.01 ns/MHz <sup>2</sup> , parabolic, 0.03ns/MHz, linear, 1 ns ripple any 36 MHz BW  |
| Frequency Sense   | <u>Non-Inverting</u>   |

### Synthesizer Characteristics

|                    |  |
|--------------------|--|
| Frequency Accuracy | ± 1 ppm max over temp: Optional, High Stability (± 0.01 ppm) Option -H |
| Reference          | 10 MHz Internal; Internal/External selectable is Option -E             |

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

### Controls, Indicators

|                       |  |
|-----------------------|--|
| Frequency Translation | pushbutton switches; setting shown on LCD display;<br>Set for low or high block            |
| Input Level Selection | pushbutton switches; setting shown on LCD display;<br>Set to composite input level         |
| Gain Selection        | pushbutton switches; setting shown on LCD display;<br>Set to 0 to +20 dB (-10 dBm max out) |
| DC Power; PLL Alarm   | Green LED; Red LED   |

### Other

|                  |   |
|------------------|---|
| Connectors       | RF In and Out and (optional) external 10 MHz ref. In, BNC, female, 75 ohm |
| Connector, Alarm | DB9 - 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.                               |

### Options

|                   |  |
|-------------------|--|
| -E                | External 10 MHz reference In                   |
| - D               | BNC, female, 50 ohms for RF In and Out         |
| - H               | High Stability (± 0.01 ppm) internal reference |
| 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 2083-1205 Status Requests        |          |  |
|--|----------|--|
| Command                                    | Syntax * | Description  |
| Command Status                             | {aaS1}   | Returns {aaS1bccdddA} where:                                     |
|  |          | • b = Output Band  |
|  |          | b = 0 - 500 to 750 MHz   |
|  |          | b = 1 - 250 to 500 MHz   |
|  |          | • ccc = Gain in dB   |
|  |          | • dd = Input level (10 to 30 => -10 to -30 dBm)                  |
|  |          | • A = 0 - summary alarm  |
| 10 MHz Reference Status<br>(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 2083-1205 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

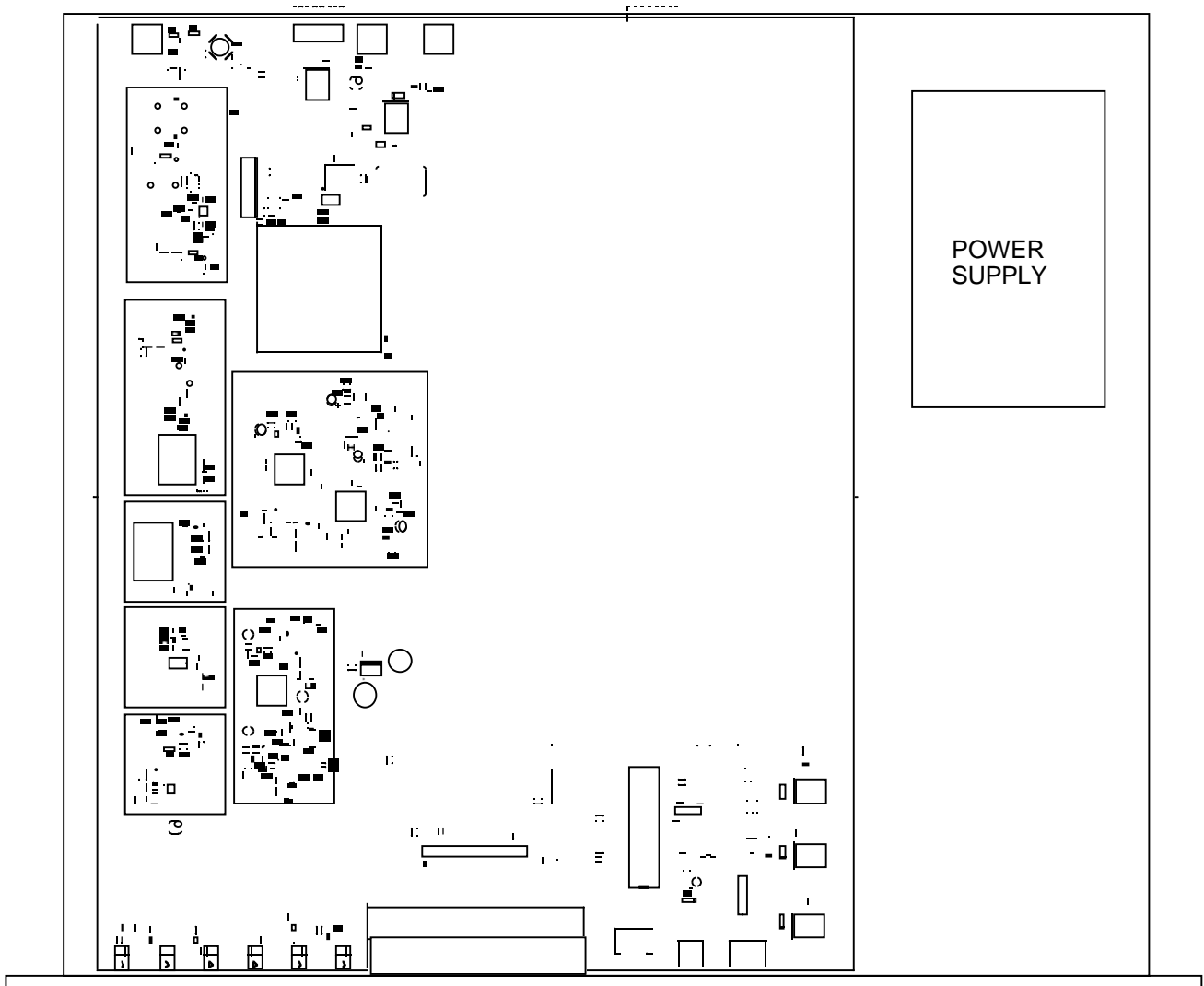
\* PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below, should be used ONLY when RS-485, (OPTION-Q), is selected.

| Table 1.2 2083-1205 Commands                  |           |  |
|---|-----------|--|
| Command                                       | Syntax*   | Description  |
| Set Frequency Band                            | {aaC1x}   | where x = :<br><ul style="list-style-type: none"> <li>• x = 1 character</li> <li>• 0 for 500-750 MHz</li> <li>• 1 for 250-500 MHz</li> </ul>               |
| Set Input Level                               | {aaClxx}  | where:<br><ul style="list-style-type: none"> <li>• xx = 2 characters</li> <li>• Range: 10 to 30 (-10 to -30 dBm, in 1 dBm steps)</li> </ul>                |
| Set Gain                                      | {aaC3xxx} | where:<br><ul style="list-style-type: none"> <li>• xxx = 3 characters</li> <li>• Range: +00 to +20 (0 dB to +20 dB, in 1 dB steps)</li> </ul>              |
| Enable 10MHz RF Insertion<br>(option -E only) | {aaC5x}   | where x = :<br><ul style="list-style-type: none"> <li>• 0 to disable 10MHz RF insertion</li> <li>• 1 to enable 10MHz RF insertion</li> </ul>               |
| Enable External 10MHz<br>(option -E only)     | {aaCEx}   | where x = :<br><ul style="list-style-type: none"> <li>• 0 to disable External 10MHz ref signal</li> <li>• 1 to enable External 10MHz ref signal</li> </ul> |
| Enable Remote                                 | #         | Just # sign  |
| Disable Remote                                | {aaCRO}   | {CR and zero}  |

## 2.0 Installation

### 2.1 Mechanical

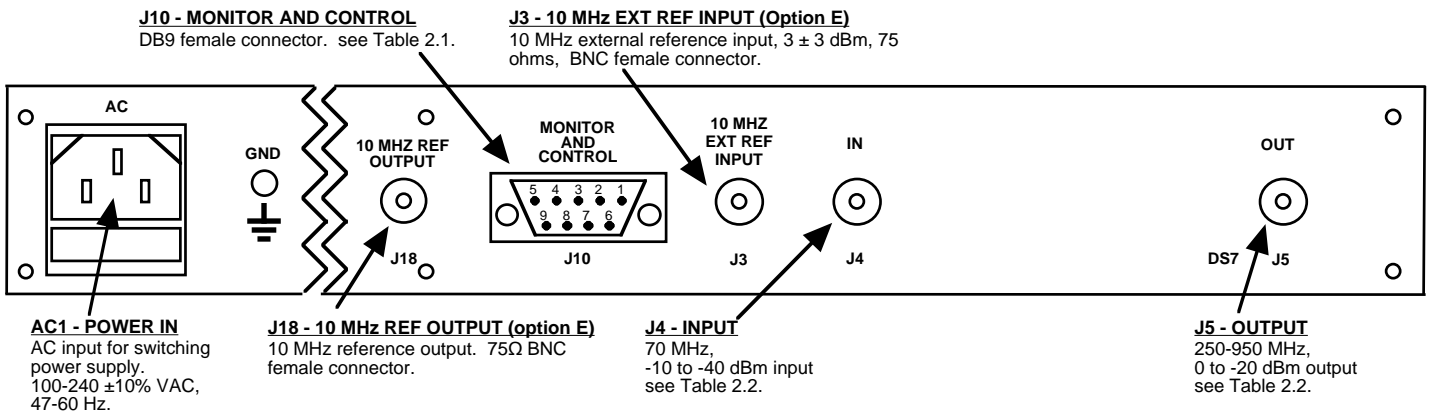
The 2083-1205 consists of one RF/Controller PCB housed in a 1 RU (1 3/4 inch high) by 16 inch deep chassis. A switching,  $\pm 12$ , +24, +5 VDC power supply provides power for the assemblies. The 2083-1205 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2083-1205 is assembled.



**FIGURE 2.0 2083-1205 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 2083-1205 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 |

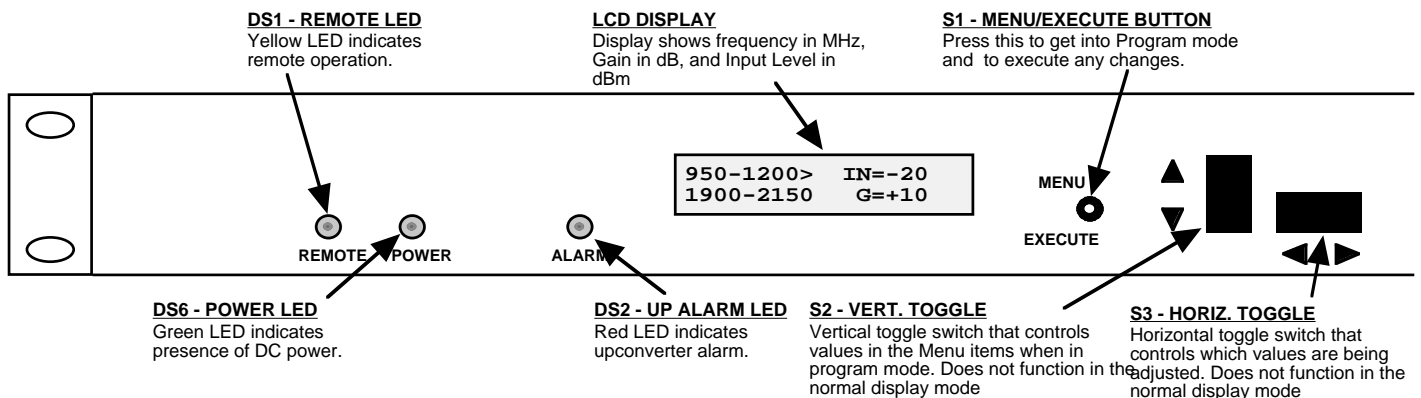
| Option | Input               | Output              |
|--------|---------------------|---------------------|
| STD    | BNC, 75 $\Omega$    | BNC, 75 $\Omega$    |
| D      | BNC, 50 $\Omega$    | BNC, 50 $\Omega$    |
| F      | Type F, 75 $\Omega$ | Type F, 75 $\Omega$ |

### \*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.



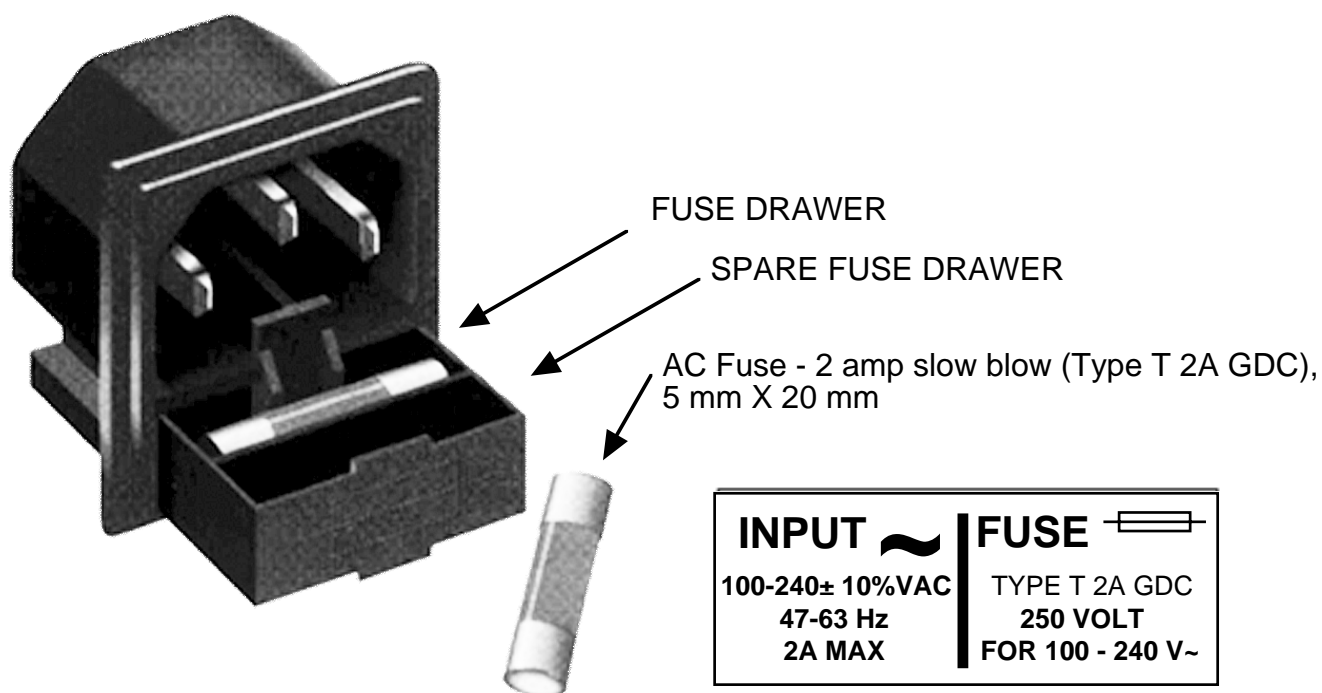


## **FIGURE 2.2 2083-1205 Front Panel Controls and Indicators**

### **2.4 Installation / Operation**

#### **2.4.1 Installing and Operating the 2083-1205, Frequency Translator Section**

1. Connect a -10 dBm to -30 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 connector 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 -10 to -30 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.**

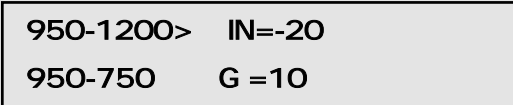
When power is first applied, the LCD display goes through three steps.

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  
950-750 G =10

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  
950-750    G =10
```

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.

|   |  |                       |             |
|---|--|-----------------------|-------------|
| <b>Power Up</b>   | ON POWER UP<br>REV 1.00                            |                       |             |
| <b>Normal Display</b>   | NORMAL DISPLAY<br>950-1200> IN=-20<br>500-750 G=10 |                       | PUSH BUTTON |
|   | PUSHING MENU/EXECUTE SEQUENCE                      |                       |             |
| <b>Menu 1</b> Frequency                                       | F= 1650-1900 R                                     | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 2</b> Input Level (Set from -40 to -10)               | UP INLVL= -20 R                                    | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 3</b> Gain (0 to +20)                                 | UP G= +00 R  | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 4</b> Set Unit to Remote Operation                    | REMOTE OFF R                                       | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 5</b> Select External 10 MHz Reference (option -E)    | EXT REF OFF R                                      | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 6</b> Select 10MHz Reference RF Insertion (option -E) | REF OUT OFF R                                      | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 7</b> Set Remote Mode (option -Q)                     | RS 485 OFF R                                       | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Menu 8</b> Set RS-485 Address (option -Q)                  | ADDRESS = 00 R                                     | SCROLL <><br>SCROLL ⬇ | PUSH BUTTON |
| <b>Save?</b> When go to end                                   | SAVE SETTINGS? Y N                                 | 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 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.



6170 Shiloh Road  
Alpharetta, Georgia 30005

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

WEB [www.crosstechnologies.com](http://www.crosstechnologies.com)  
E-MAIL [info@crosstechnologies.com](mailto:info@crosstechnologies.com)

2009 • Printed in USA