

# **INSTRUCTION MANUAL**

## **MODEL 2088-22 UPCONVERTER**

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MODEL 2088-22 UP CONVERTER**

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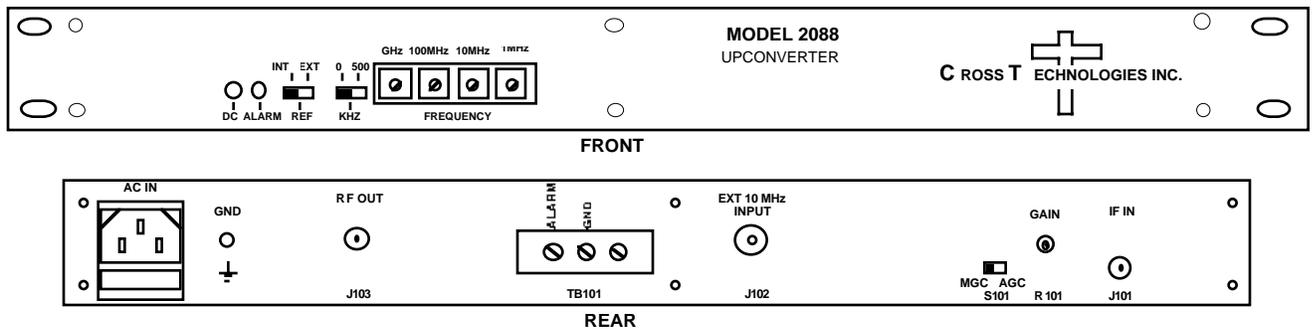
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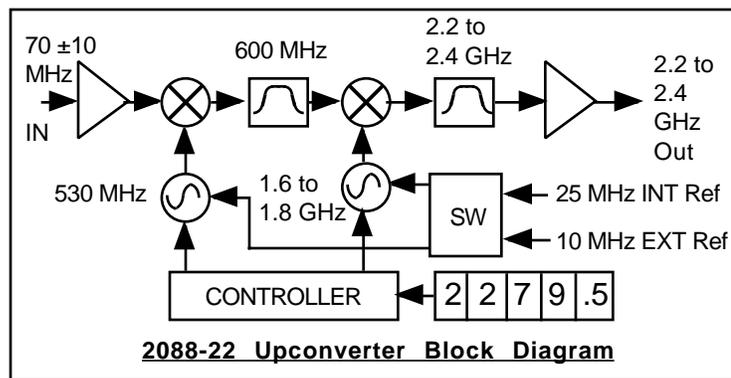
# MODEL 2088-22 UP CONVERTER

## SECTION 1 GENERAL

**1.1 Equipment Description** - The 2088-22 Upconverter converts a 70 MHz IF signal to 2.2 to 2.4 GHz with no spectrum inversion, low group delay, and flat frequency response. The 70 MHz IF input is mixed with synthesized local oscillator (LO) signals, first to 600 MHz and finally to 2.2 to 2.4 GHz. The frequency is selected using four front panel BCD switches and one front panel toggle switch, and is selectable in 0.5 MHz increments. The reference oscillator can be switched between the 25 MHz internal or a 10 MHz external oscillator. Front panel LEDs light when DC power is applied (green) or when a PLL alarm occurs (red). Gain is adjustable over a 40 dB range when in MGC mode and is automatically adjusted when in AGC mode. Connectors are SMA female for the IF input and the RF output and BNC female for the external 10 MHz input. The 2088-22 Upconverter is housed in an 1 3/4" X 19" X 14" deep rack mount chassis.



**FIGURE 1.1 Model 2088-22 Front and Rear Panels**



**FIGURE 1.1 Model 2088-22 Front and Rear Panels**

## 1.2 Technical Characteristics

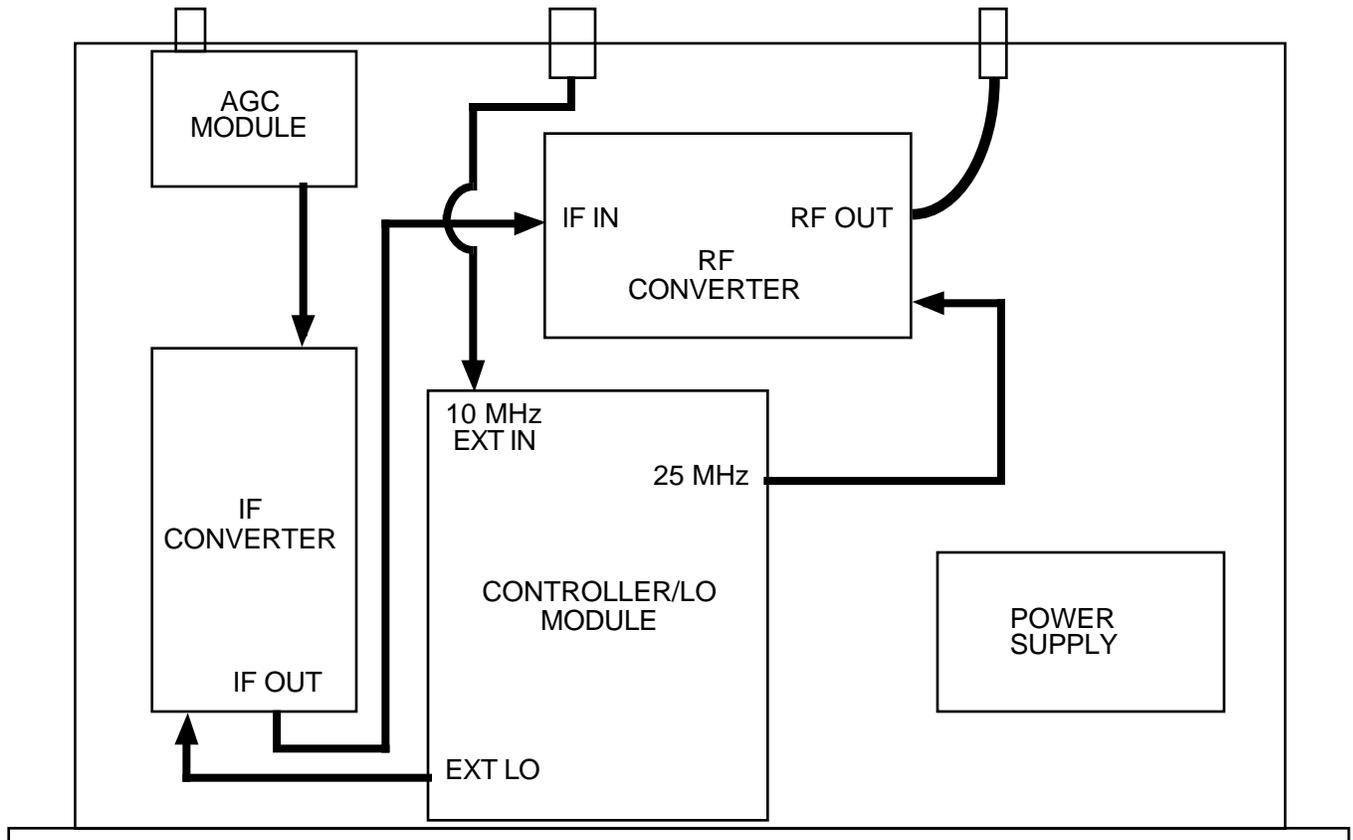
**TABLE 1.0 2088-22 Upconverter SPECIFICATIONS\***

<b>Input Characteristics</b>	
Impedance/RL	50 $\Omega$ /18 dB
Frequency	70 $\pm$ 10 MHz
Input Level range	-30 to -70 dBm (AGC mode) -30 to -50 dBm (MGC mode, gain set for output of -10 $\pm$ 5 dBm)
<b>Output Characteristics</b>	
Impedance/RL	50 $\Omega$ /12 dB
Frequency	2.2 to 2.4 GHz
Output 1 dB/3RD ORDER	0 / +10 dBm
<b>Channel Characteristics</b>	
Gain	20 to 55 dB (automatically adjusts in AGC mode, manually adjustable in MGC mode)
Spurious Response	<-45dBC in band, < -45dBC out of band (at -10 $\pm$ 5 dBm output)
Frequency Response	$\pm$ 0.5 dB, $\pm$ 10 MHz increment
Group Delay, max	$\pm$ 5 ns, $\pm$ 6 MHz; $\pm$ 15 ns, $\pm$ 10 MHz
<b>Synthesizer Characteristics</b>	
Frequency Accuracy	$\pm$ 25 kHz max over temp (with internal reference)
Tuning Steps	0.5 MHz
Phase Noise(dBC/Hz)	$\leq$ -80, 10 kHz; $\leq$ -90, 100 kHz; $\leq$ -100, 1 MHz
<b>Controls</b>	
Frequency	BCD Switches, adjustable with small blade screwdriver Toggle switch selects 0 or 500 kHz
Gain control	Toggle switch selects MGC or AGC mode
Gain	Potentiometer adjusts gain over a 40 dB range when in MGC mode
Reference	Toggle switch selects 25MHz internal or 10MHz external reference
<b>Indicators</b>	
DC Power	Green LED
PLL Alarm	Red LED
<b>Other</b>	
Connectors, IF, RF	SMA, female
Connector, Ext 10 MHz	BNC, female
Connector, Alarm	Terminal Strip
Size	19 inch standard chassis 1.75"high X 14.0" deep
Power	90 - 260 VAC, 47 - 63 Hz, 30 watts max.

\*+10 to +40 degrees C; Specifications subject to change without notice

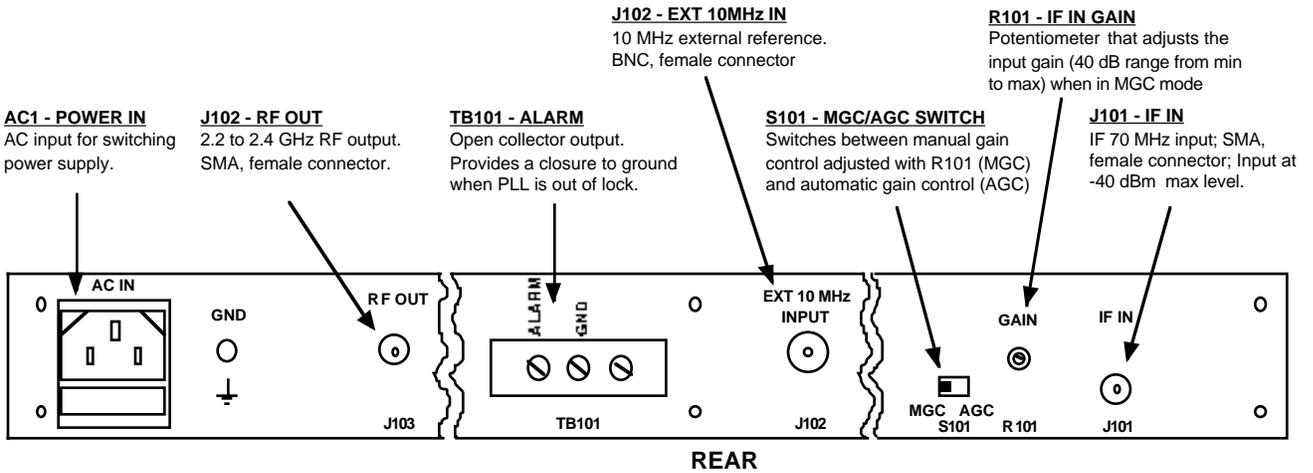
## 2.0 Installation

**2.1 Mechanical** - The 2088-22 consists of two RF Assemblies, one Controller/LO PCB, and one AGC (Automatic Gain Control) Assembly housed in a 1 RU (1 3/4 inch high) by 14 inch deep chassis. A switching,  $\pm 15$  VDC power supply provides power for the assemblies. The 2088-22 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2088-22 is assembled.



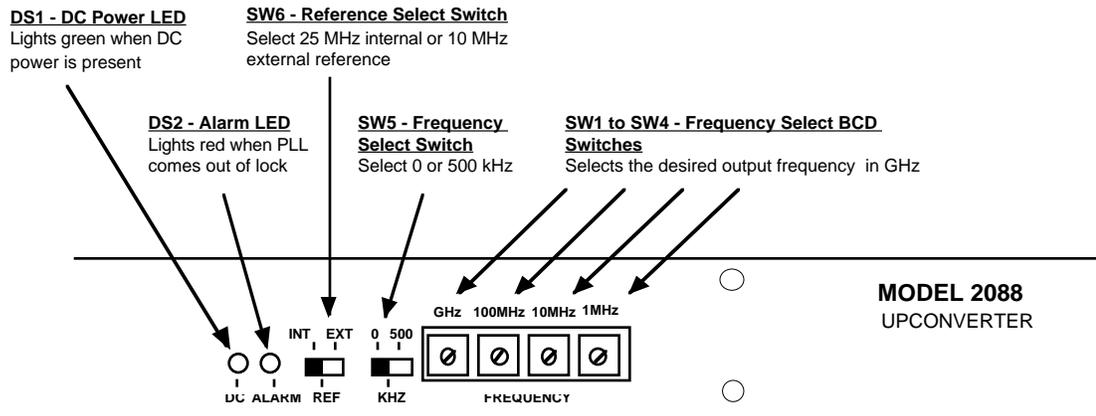
**FIGURE 2.0 2088-22 Mechanical Assembly**

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



**FIGURE 2.1 2088-22 Rear Panel I/Os and Level Control**

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



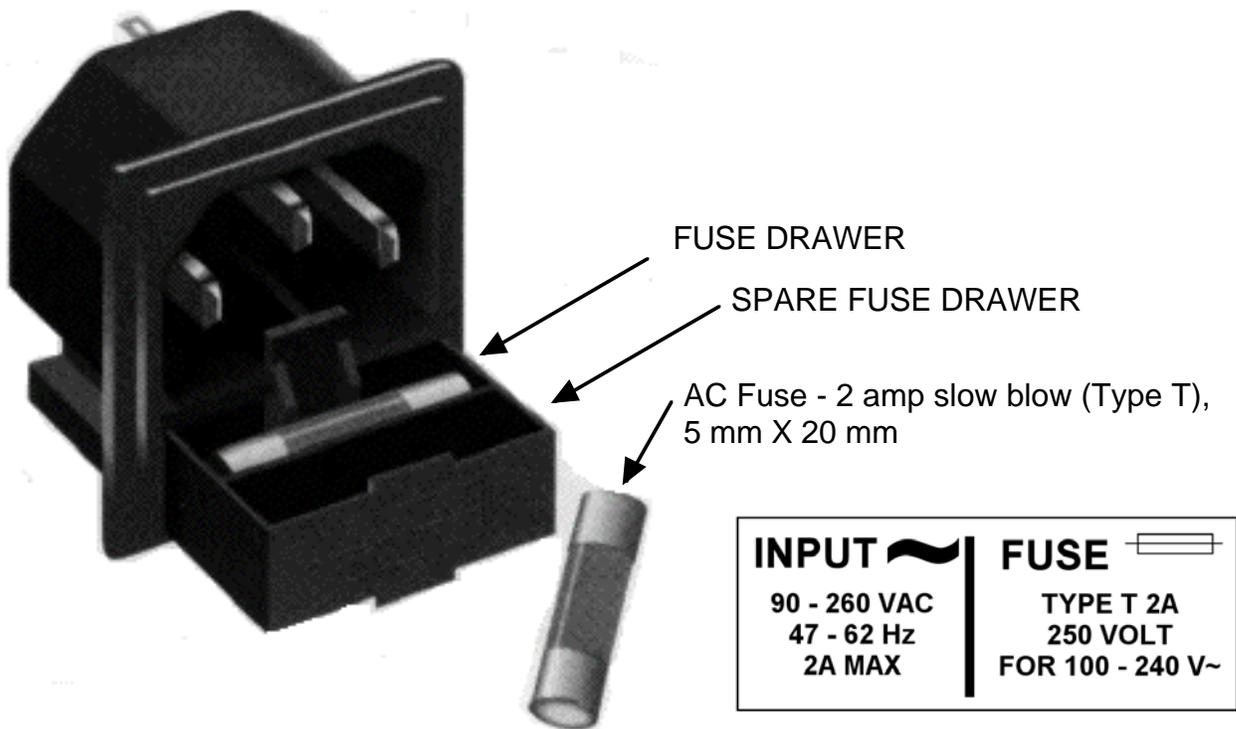
**FIGURE 2.2 2088-22 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2088-22

- 1.) Connect a -40 dBm to -70 dBm signal to IF In, J101 (Figure 2.1).
- 2.) Select manual (MGC) or automatic (AGC) gain control with switch S101 (Figure 2.1).
- 3.) Select internal or external reference with toggle switch SW6 (Figure 2.2).
- 4.) If EXT reference is selected be sure that a 10MHz ref signal is connected to J102 (Figure 2.1).
- 5.) Connect the RF OUT, J103, to the external equipment (Figure 2.1).
- 6.) Set BCD switches SW1 to SW4 and switch SW5 to the desired output frequency (Figure 2.2).
- 7.) Connect 90 - 260 VAC, 47 - 63 Hz to AC1 on the back panel (Figure 2.1).
- 8.) Be sure DS1 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).
- 9.) **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.

**2.4.2 Frequency Setting, SW1 to SW5** - The RF output frequency is selected by setting the BCD switches (SW1 to SW4) using a small blade screwdriver and setting the frequency toggle switch (SW5) on the front panel to the desired frequency. The frequency displayed on the BCD switches (plus 0 or 500 kHz determined by the frequency toggle switch) is the desired output frequency with 70 MHz IF center frequency input. There is no muting of the output carrier during frequency selection. If the switches are set to an invalid frequency, alarm LED DS2 will light.



**FIGURE 2.3 Fuse Location and Spare Fuse**