

# Instruction Manual

# Model 2115-139 Block Upconverter

February 2007 Rev. 0



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# INSTRUCTION MANUAL

## MODEL 2115-139 Block Upconverter

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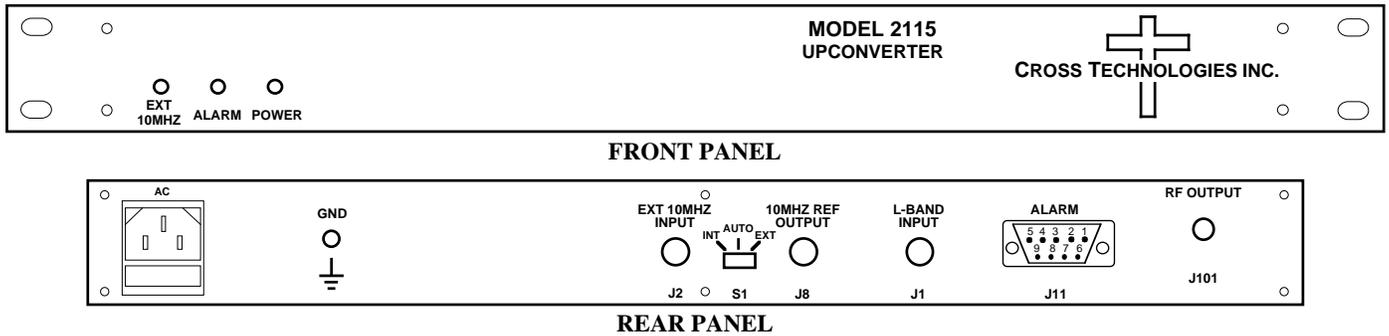
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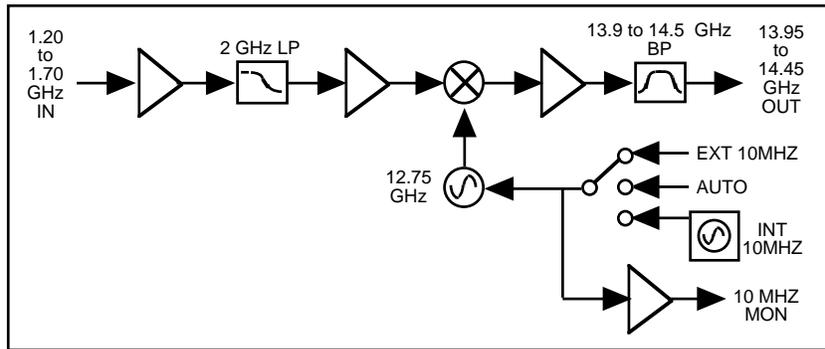
## 1.0 General

### 1.1 Equipment Description

The 2115-139 Block Upconverter converts 1.20 - 1.70 GHz to 13.95 - 14.45 GHz with low phase noise and flat frequency response. Frequency translation is via a 12.75 GHz local oscillator. Front panel LEDs provide indication of DC Power, External 10 MHz, and PLL Alarm. The gain is +20 dB. Connectors are SMA female for the RF and BNC female for the L-Band and external reference input and reference output. A three-way switch controls which 10 MHz reference is being used. In the INT position, the internal reference is used, in the EXT position, an external reference is used, and in the AUTO position, the internal reference is used unless a 3 dBm  $\pm$  3 dB, 10MHz reference signal is connected to the external reference input. The 2115 is powered by a 100-240 $\pm$  10% VAC power supply, and mounted in a 1 3/4" X 19" X 14" rack mount chassis.



**FIGURE 1.1 Front and Rear Panels**



**FIGURE 1.2 Block Diagram**

## 1.2 Technical Characteristics

**TABLE 1.0 2115-139 Upconverter Specifications\***

### Input Characteristics

Impedance/Return Loss	50 $\Omega$ / 14 dB (see TABLE 2.2 for connector options)
Frequency	1.20 to 1.70 GHz
Noise Figure, max.	20 dB, max gain
Input Level	-40 to -25 dBm
Input 1dB Compression	-10 dBm

### Output Characteristics

Impedance/Return Loss	50 $\Omega$ / 14 dB (see TABLE 2.2 for connector options)
Frequency	13.95 to 14.45 GHz
Output Level Range	-20 to -5 dBm
Output 1dB Compression	+10 dBm

### Channel Characteristics

Gain	+20 dB $\pm$ 1 dB
Image Rejection	> 60 dB
Spurious, Inband	< -60 dBC (0 dBm output level) < -60 dBm (signal independent)
Spurious, Out of Band	LO < -70 dBm
Intermodulation	< -55 dBC for two carriers each at -10 dBm out
Frequency Response	$\pm$ 1 dB, 13.95 to 14.45 GHz; $\pm$ 0.5 dB, 40 MHz BW
Frequency Sense	Non-inverting

### LO Characteristics

LO Frequency	12.75 GHz
Frequency Accuracy	$\pm$ 0.01 ppm max over temp internal reference
10 MHz Input/Output Level	+3 dBm $\pm$ 3 dB

Phase Noise @ Freq	100 MHz	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-65	-80	-85	-100	-110

### Controls, Indicators

Power	Green LED
PLL Alarm	Red LED, External contact closure
Ext 10 MHz	Yellow LED, Indicates Ext 10 MHz reference is selected (rear panel sw)

### Other

RF Connector	SMA 50 $\Omega$ female (see TABLE 2.2 for other options)
L-Band Connector	BNC 50 $\Omega$ , female (see TABLE 2.2 for other options)
10 MHz Connectors	BNC 50/75 $\Omega$ , female
Alarm Connector	DB9, female - NO or NC contact closure on Alarm
Size	19 inch, 1RU standard chassis 1.75"high X 14.0" deep
Power	100-240 $\pm$ 10% VAC, 47-63 Hz, 45 watts max.

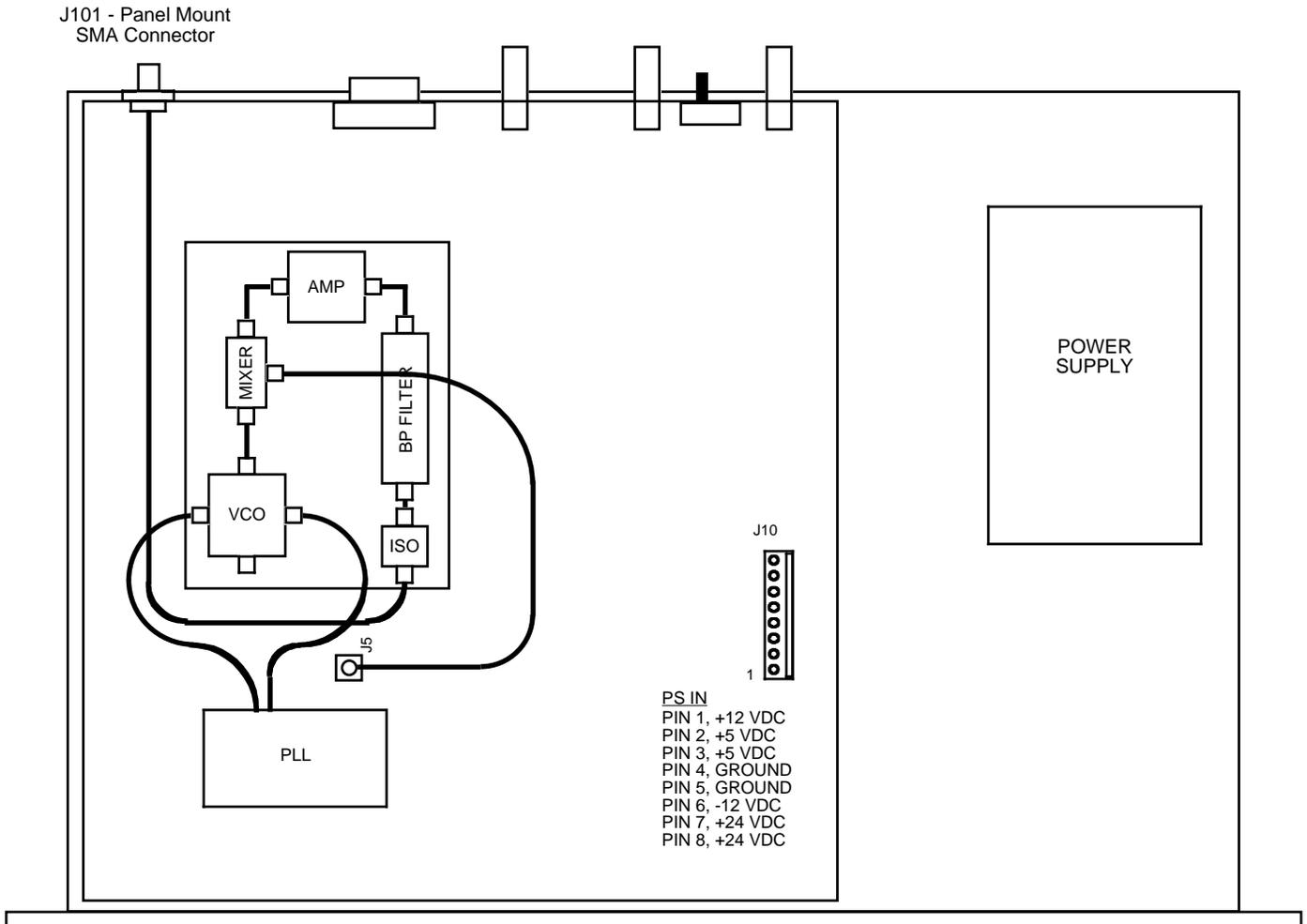
### Options

Connector options	see TABLE 2.2
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\*+10°C to +40°C; Specifications subject to change without notice.

## 2.0 Installation

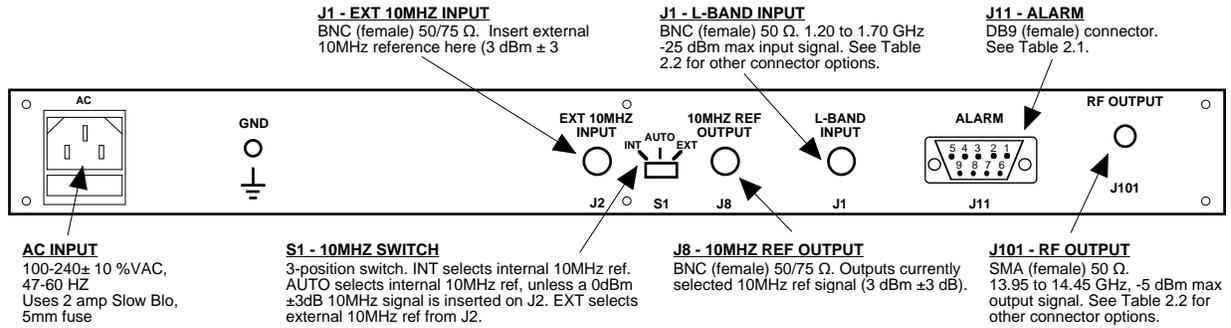
**2.1 Mechanical** - The 2115-139 consists of one RF PCB housed in a 1 RU (1 3/4 inch high) by 12 inch deep chassis. A switching,  $\pm 12$ , +24, +5 VDC power supply provides power for the assemblies. The 2115-139 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2115-139 is assembled.



**FIGURE 2.0 2115-139 Mechanical Assembly**

## 2.2 Rear Panel Input/Output Signals

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



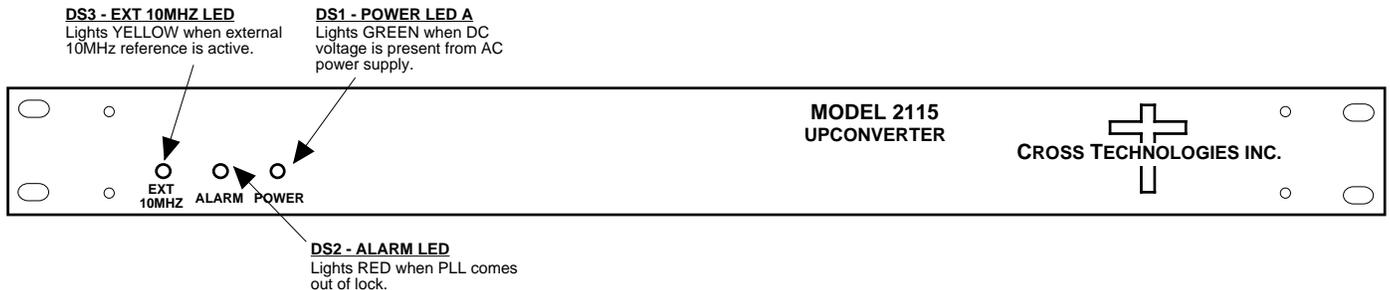
**FIGURE 2.1 2115-139 Rear Panel I/O's**

TABLE 2.1 J11 Pinouts (DB9)	
Pin	Function
1	Not Used
2	Not Used
3	Not Used
4	Not Used
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

TABLE 2.2 Connector Options	
L-Band	RF
BNC, 50Ω (STD)	SMA, 50Ω (STD)
BNC, 75Ω	Type N, 50Ω
Type F, 75Ω	
Type N, 50Ω	
SMA, 50Ω	

## 2.3 Front Panel Indicators

The following are the front panel indicators.

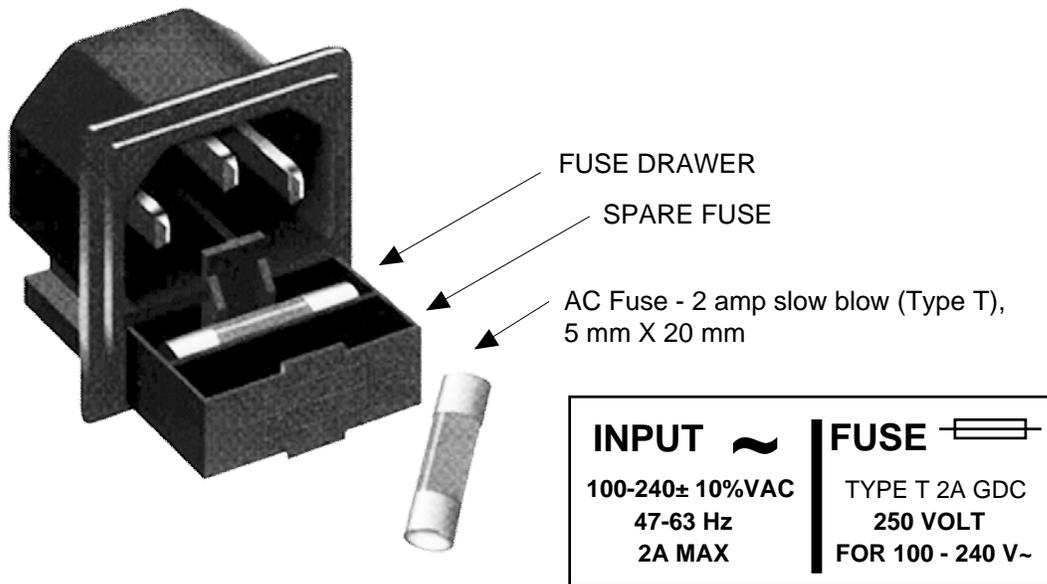


**FIGURE 2.2 2115-139 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2115-139 Upconverter

1. Connect a -40 dBm to -25 dBm signal to L-BAND INPUT, J1 (Figure 2.1).
2. Connect the RF OUTPUT, J101, to the external equipment.
3. Connect 100-240 $\pm$  10% VAC, 47 - 63 Hz to AC connector on the back panel.
4. Be sure DS1 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).
5. Select either INT (for internal 10MHz ref), AUTO (for internal 10MHz ref UNLESS a external 10MHz, 3 dBm signal is connected to J2), or EXT (for external 10MHz, 3 dBm ref that is inserted at J2) on rear panel switch S1 (Figure 2.1).
6. If EXT is selected or AUTO is selected and there is a 10MHz, 3 dBm signal at J2, check that DS3 (yellow, Ext 10MHZ) is on (Figure 2.2).
7. Check that a 10MHz, 3 dBm  $\pm$ 3 dB signal is present at the 10MHZ REF OUTPUT (J8) (Figure 2.1).
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**



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