

# **INSTRUCTION MANUAL**

## **MODEL 2115-125 Block Upconverter**

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## MODEL 2115-125 Block Upconverter

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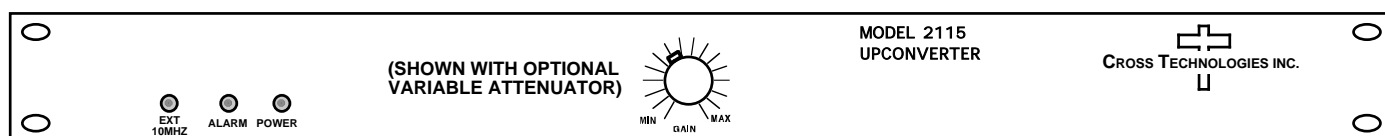
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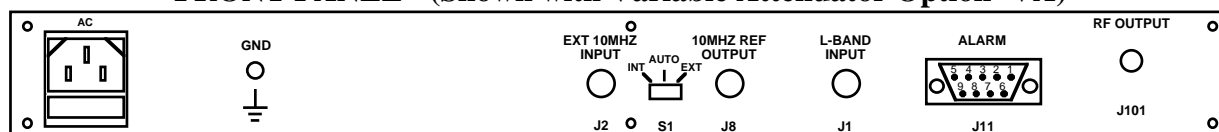
## 1.0 General

### 1.1 Equipment Description

The 2115-125 Block Upconverter converts 0.95 - 1.5 GHz to 12.2 - 12.75 GHz with a local oscillator at 11.25 GHz. Front panel LEDs provide indication of DC Power, External 10 MHz, and PLL Alarm. The L-band to RF 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, the 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.



FRONT PANEL - (Shown with Variable Attenuator Option -VA)



REAR PANEL

FIGURE 1.1 Front and Rear Panels

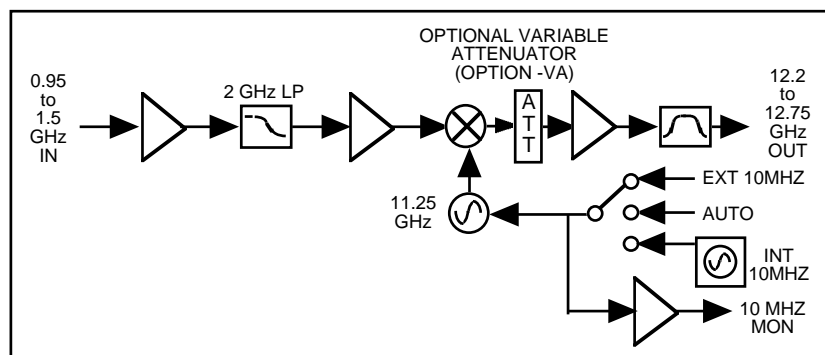


FIGURE 1.2 Model 2115-125 Upconverter Block Diagram

## 1.2 Technical Characteristics

**TABLE 1.0 2115-125 Upconverter Specifications\***

### Input Characteristics

Impedance/Return Loss	50 $\Omega$ /14 dB (see TABLE 2.2 for connector options)
Frequency	0.95 to 1.5 GHz
Noise Figure, max.	20 dB, max gain
Input Level	-40 to -25 dBm
Input 1dB Compression	-15 dBm

### Output Characteristics

Impedance/Return Loss	50 $\Omega$ /14 dB (see TABLE 2.2 for connector options)
Frequency	12.2 to 12.75 GHz
Output Level Range	-20 to -5 dBm
Output 1dB Compression	+5 dBm

### Channel Characteristics

Gain	+20 $\pm$ 1 dB, (+20 to +5 dB variable with Variable Attenuator Option)
Image Rejection	> 60 dB
Spurious, Inband	Signal related < -60 dBC, -5 dBm out: Signal independent < -60 dBm
Spurious, Out of Band	< -50 dBm
Intermodulation	< -50 dBC for two carriers each at -10 dBm out
Frequency Response	$\pm$ 1 dB, 12.2 to 12.75 GHz; $\pm$ 0.5 dB, 40 MHz BW
Frequency Sense	Non-inverting

### LO Characteristics

LO Frequency	11.25 GHz
Frequency Accuracy	$\pm$ 0.01 ppm max over temp internal reference; external ref. input
10 MHz Level	+3 dBm $\pm$ 3 dB, External In or 10MHz Out
Phase Noise	@ Freq   100Hz    1kHz    10kHz    100kHz    1MHz
	dBC/Hz   < -70    < -80    < -85    < -100    < -110

### Controls, Indicators

Attenuator Option -VA	Provides +20 to +5 dB variable gain via front panel potentiometer
Ext 10 MHz	Yellow LED, Indicates Ext 10 MHz reference is selected (rear panel sw)
PLL Alarm	Red LED, External contact closure
Power	Green LED

### 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 (female) 75 $\Omega$ connector; Works with 50 $\Omega$ or 75 $\Omega$ .
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, 25 watts max

### Options

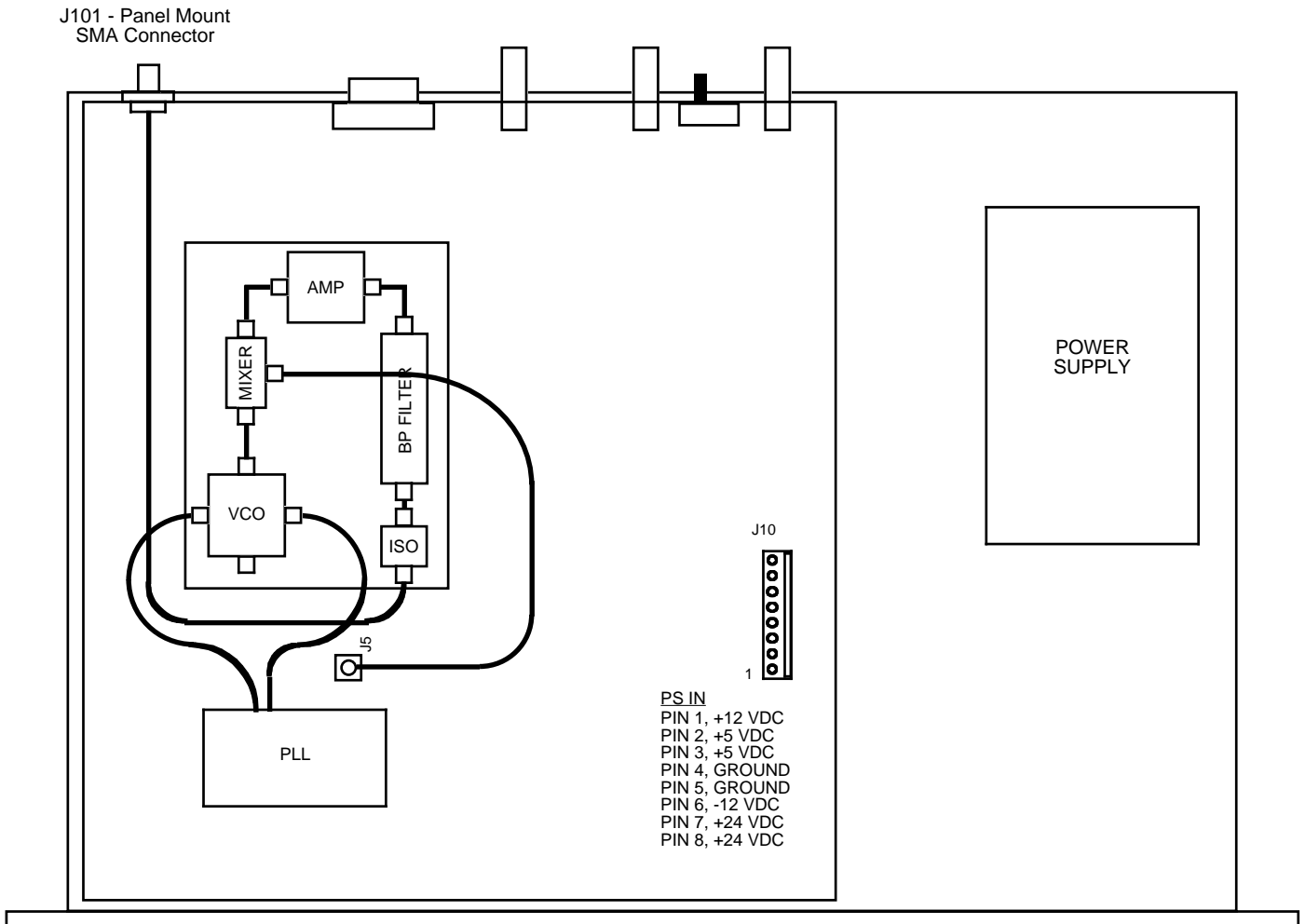
Connector options	see TABLE 2.2
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\*+10°C to +40°C; Specifications subject to change without notice.

## 2.0 Installation

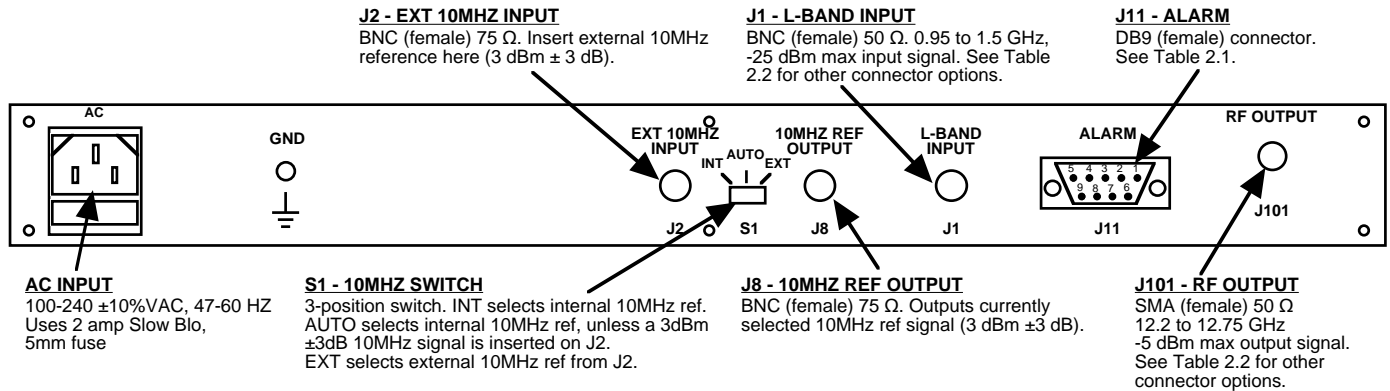
### 2.1 Mechanical

The 2115-125 consists of a PCB and an RF assembly 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 2115-125 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2115-125 is assembled.



**FIGURE 2.0 2115-125 Mechanical Assembly**

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

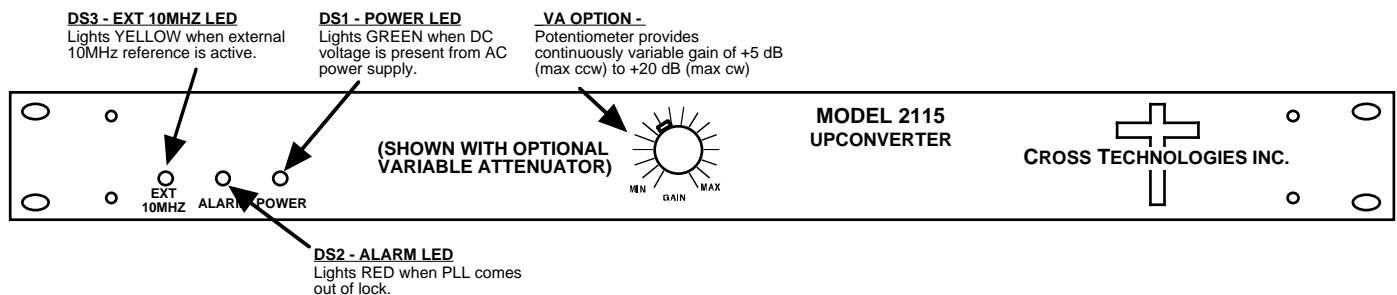


**FIGURE 2.1 2115-125 Rear Panel I/O's**

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

Option	RF	L-Band
STD	SMA, 50Ω	BNC, 50Ω
M	Type N, 50Ω	BNC, 50Ω
N	Type N, 50Ω	BNC, 75Ω
NF	Type N, 50Ω	Type F, 75Ω
NN	Type N, 50Ω	Type N, 50Ω
S7	SMA, 50Ω	BNC, 75Ω
SF	SMA, 50Ω	Type F, 75Ω
SN	SMA, 50Ω	Type N, 50Ω
SS	SMA, 50Ω	SMA, 50Ω

## 2.3 Front Panel Indicators -The following are the front panel indicators.

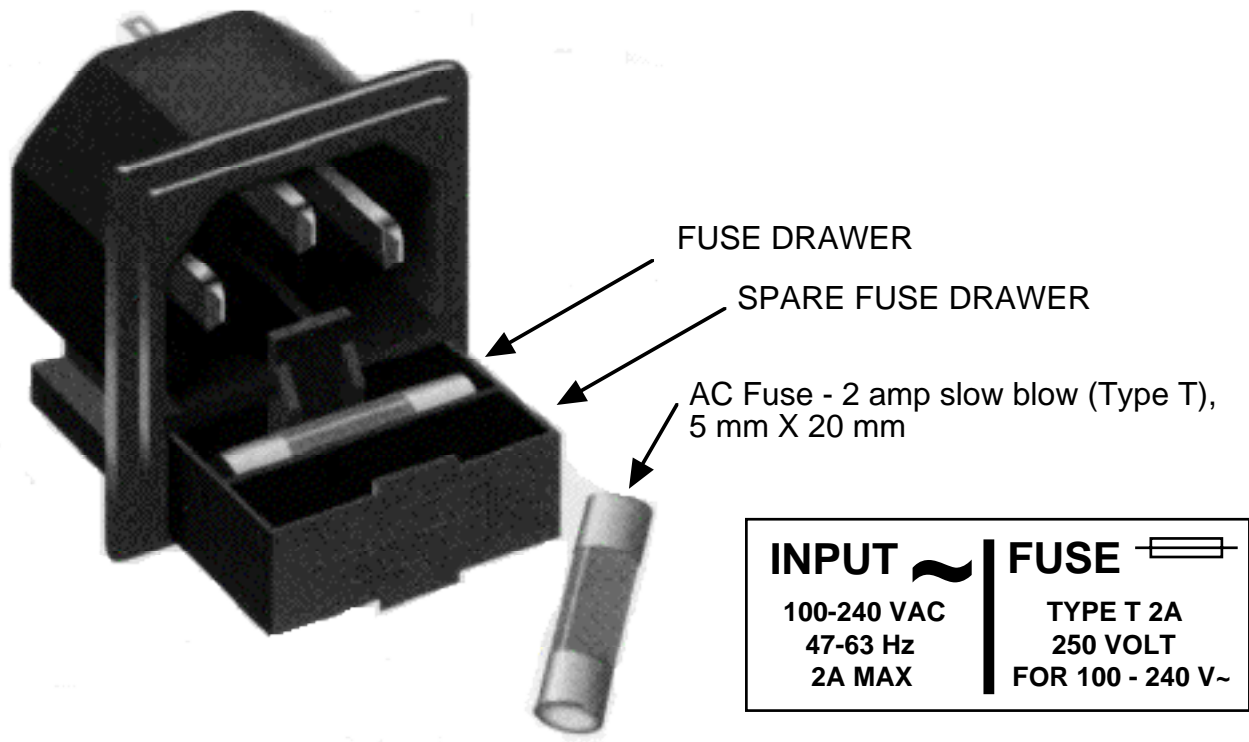


**FIGURE 2.2 2115-125 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2115-125 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. For Option -VA, adjust front panel potentiometer to get desired gain.
6. Select either INT (for internal 10MHz ref), AUTO (for internal 10MHz ref UNLESS an 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).
7. 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).
8. Check that a 10MHz, +3 dBm  $\pm$ 3 dB signal is present at the 10MHz REF OUTPUT (J8) (Figure 2.1).
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.



**FIGURE 2.3 Fuse Location and Spare Fuse**

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