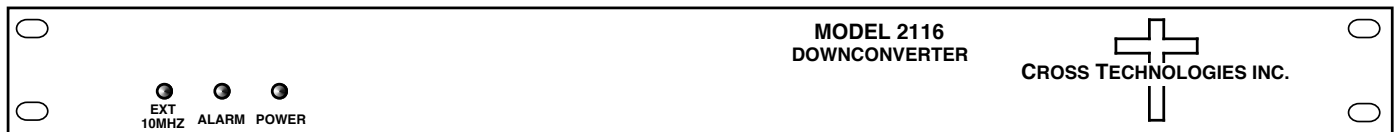


# Instruction Manual

# Model 2116-255270 Block Downconverter

April 2024, Rev. 0



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# INSTRUCTION MANUAL

## MODEL 2116-255270 Downconverter

<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>
<b>2.0 Installation</b>	<b>6</b>
2.1 Mechanical	<b>6</b>
2.2 Rear Inputs and Outputs	<b>7</b>
2.3 Front Panel Indicators	<b>7</b>
2.4 Operation	<b>8</b>
<b>3.0 Environmental Use Information</b>	<b>9</b>

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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.



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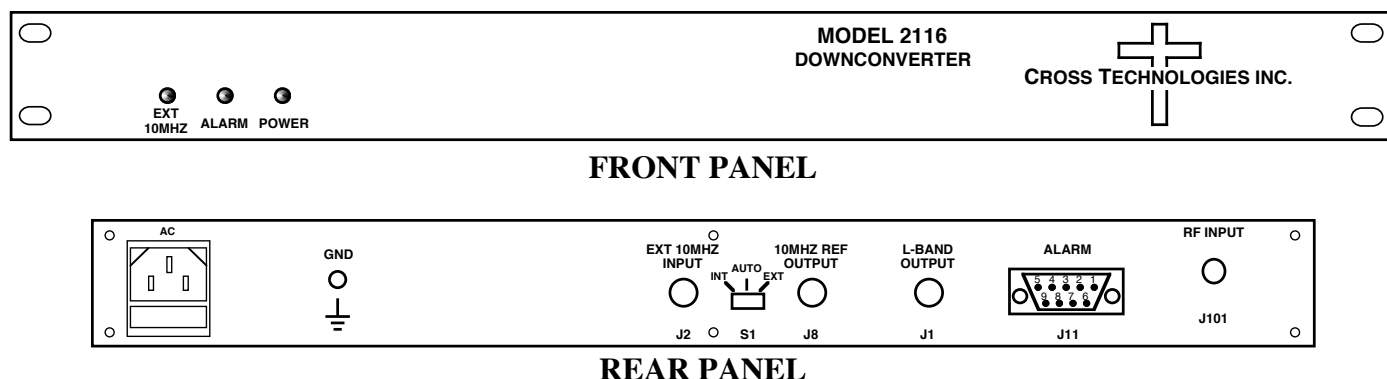
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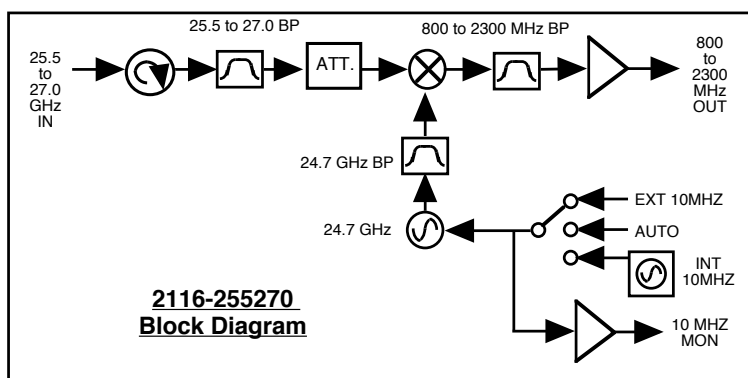
# MODEL 2116-255270 Downconverter

## 1.0 General

**1.1 Equipment Description** - The 2116-255270 Downconverter converts **25.5 - 27.0 GHz** to **800 - 2300 MHz** with a local oscillator at **24.7 GHz**. Front panel LEDs provide indication of DC Power, External 10 MHz, and PLL Alarm. The gain is **+0 dB**. Connectors are **2.92 mm** female for the RF input and BNC female for the RF output (designated 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, 10 MHz reference signal is connected to the external reference input. It is powered by a 100-240  $\pm$  10% VAC power supply, and in a 1 3/4" X 19" X 14" rack mount chassis.



**FIGURE 1.1 Model 2116-255270 Front and Rear Panels**



**FIGURE 1.2 Model 2116-255270 Downconverter Block Diagram**

## 1.2 Technical Characteristics

**TABLE 1.0 2116-255270 Downconverter Specifications\***

### Input Characteristics (RF)

Impedance/Return Loss	50Ω /14 dB (See TABLE 2.2 for connector options)
Frequency	25.5 to 27.0 GHz
Input Level	-20 to 0 dBm
Input 1dB Compression	+10 dBm

### Output Characteristics (designated L-Band)

Impedance/Return Loss	50Ω /14 dB
Frequency	800 to 2300 MHz
Output Level Range	-20 to 0 dBm
Output 1 dB compression	+10 dBm at Fc

### Channel Characteristics

Gain	0 dB ± 2 dB at Fc
Image Rejection	>55 dB, min.
Spurious, In Band	SIGNAL RELATED <-50 dBc in band, 0 dBm out; SIGNAL INDEPENDENT, <-50 dBm, 0.80-2.30 GHz Out
Spurious, Out of Band	<-50 dBm (0.1-0.79 GHz and 2.31-3.3 GHz Out)
Intermodulation	<-55 dBc for two carriers at Fc ± 2 MHz, each at -5 dBm out
Frequency Response	±2.0 dB, 0.80 to 2.30 GHz out; ± 0.5 dB, 500 MHz BW
Frequency Sense	Non-Inverting

### LO Characteristics

LO Frequency	24.70 GHz
Frequency Accuracy	± 0.01 ppm max over temp internal reference,

Phase Noise @ F (Hz) >	100	1K	10K	100K	1M
dBc/Hz	-60	-70	-80	-90	-110

10 MHz Level 3 dBm, ± 3 dB, 75 ohms, External In or 10MHz Out

### Controls, Indicators

INT/AUTO/EXT Switch	Selects internal or external 10 MHz (rear panel DP3T switch)
Power	Green LED
PLL Alarm	Red LED, External contact closure
Ext 10 MHz	Yellow LED, Indicates Ext 10 MHz reference selected

### Other

RF Connector	2.92 mm (female), 50Ω
L-Band Connector	BNC (female), 50Ω
10 MHz Connectors	BNC (female), 50Ω/75Ω
Alarm Connector	DB9 - NO or NC contact closure on Alarm
Size	19 inch standard chassis, 1.7" high X 14.0" deep
Power	100 - 240 ±10% VAC, 47 - 63 Hz, 45 watts max.

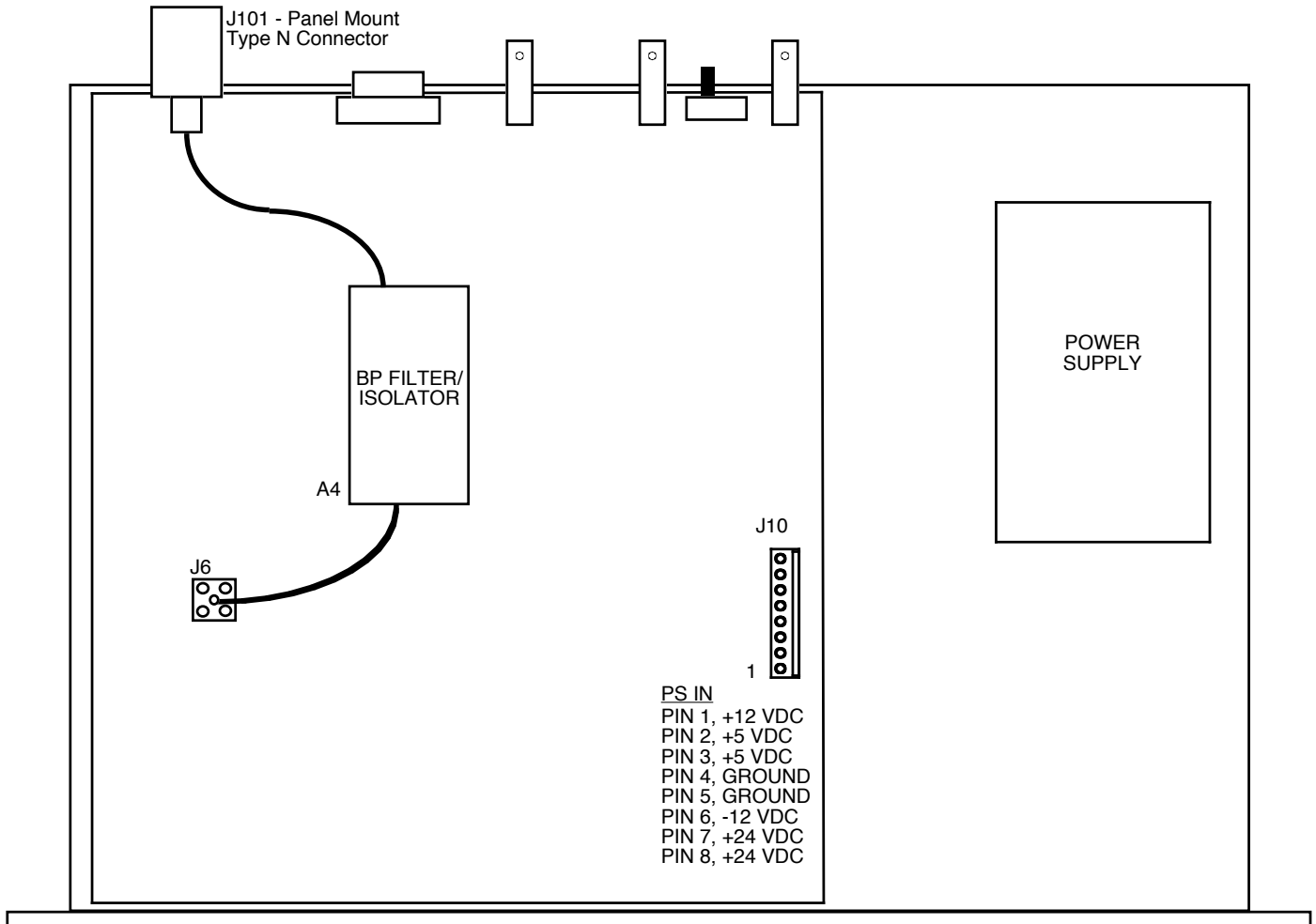
### Options

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

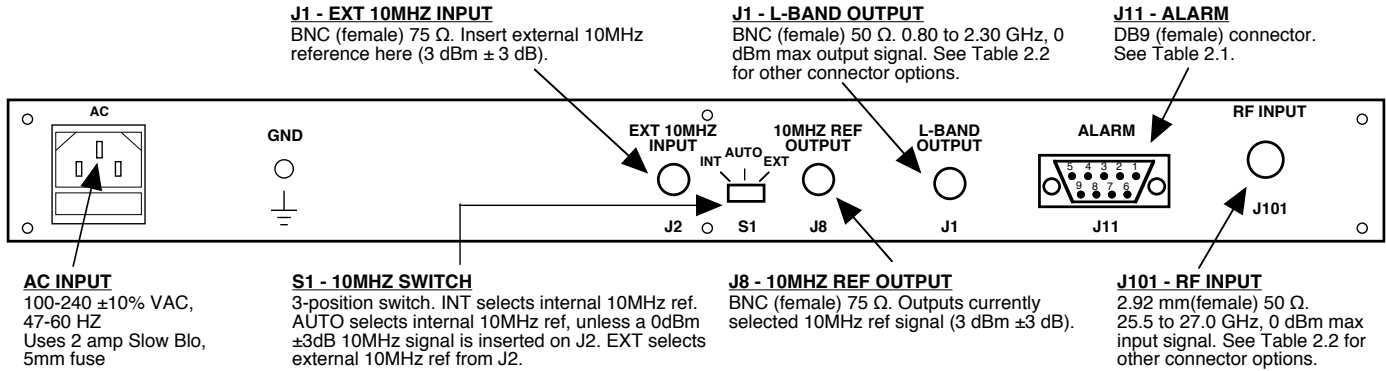
## 2.0 Installation

**2.1 Mechanical** - The 2116-255270 consists of one RF PCB housed in a 1 RU (1 3/4 inch high) by 14 inch deep chassis. A switching,  $\pm 12$ , +24, +5 VDC power supply provides power for the assemblies. The 2116-255270 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2116-255270 is assembled.



**FIGURE 2.0 2116-255270 Mechanical Assembly**

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

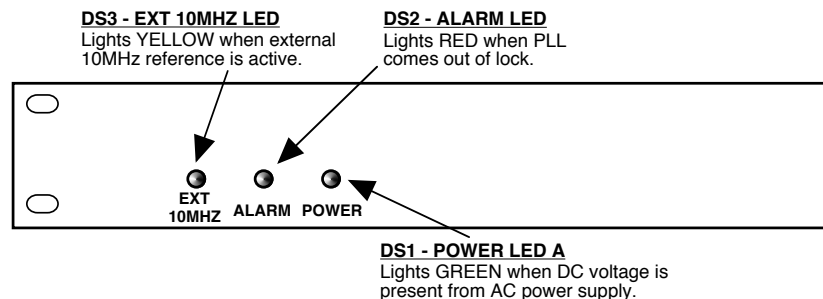


**FIGURE 2.1 2116-255270 Rear Panel I/O's**

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)	2.92 mm, 50Ω (STD)
BNC, 75Ω	
Type F, 75Ω	
Type N, 50Ω	

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

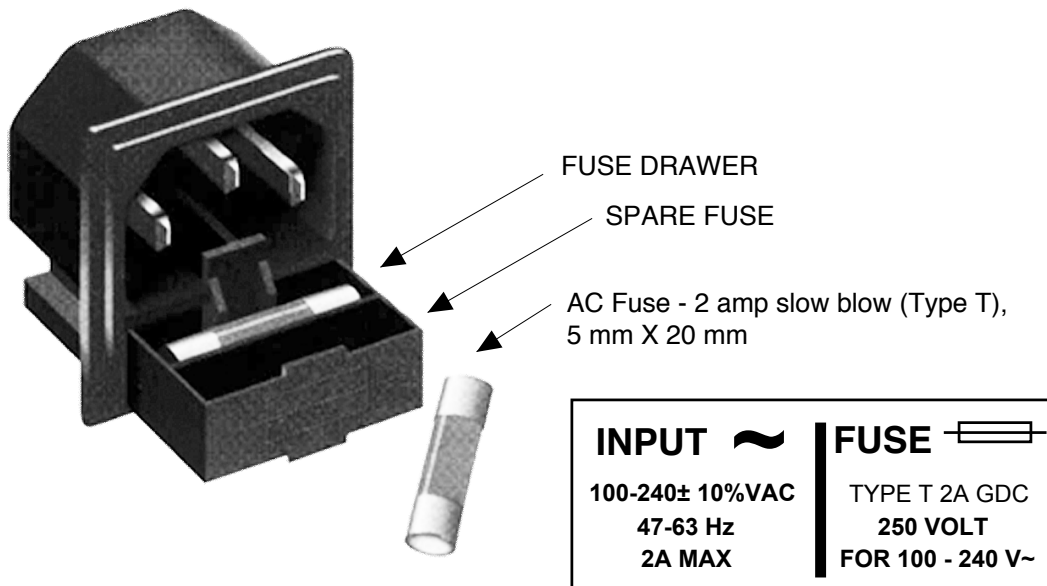


**FIGURE 2.2 2116-255270 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2116-255270 Downconverter

- 1.) Connect a -20 dBm to 0 dBm signal to RF INPUT, J101 (Figure 2.1).
- 2.) Connect the L-BAND OUTPUT, J1, 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, 0 dBm signal is connected to J2), or EXT (for external 10MHz, 0 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, 0 dBm signal at J2, check that DS3 (yellow, Ext 10MHZ) is on (Figure 2.2).
- 7.) Check that a 10MHz, 0 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**

### 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.





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