

Instruction Manual

Model 2116-41-109#

Block Downconverter

March 2014, Rev. 0



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INSTRUCTION MANUAL

MODEL 2116-41-109# Block Downconverter

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
Warranty	2
1.0 General	3
1.1 Equipment Description	3
1.2 Technical Characteristics	4
2.0 Installation	5
2.1 Mechanical	5
2.2 Rear Inputs and Outputs	6
2.3 Front Panel Indicators	6
2.4 Operation	7
3.0 Environmental Use Information	8

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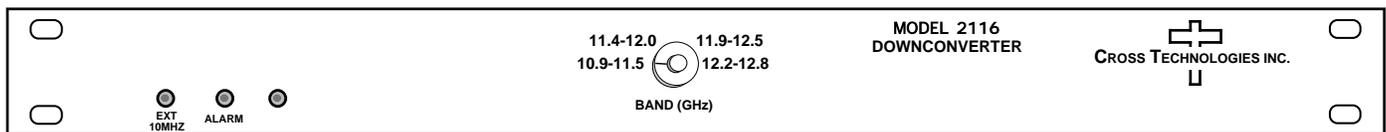
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MODEL 2116-41-109# Block Downconverter

1.0 General

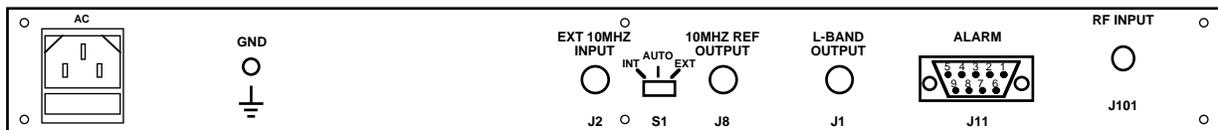
1.1 Equipment Description

The 2116-41-109# Downconverter, 4 Bands converts 10.9 - 12.8 GHz to 0.15 - 0.75 GHz with dual conversion and a 4 band switchable local oscillator. Front panel LEDs provide indication of DC Power, External 10 MHz, and PLL Alarm. The gain is 0 ± 2 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 (design goal), 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 ± 3 dB, 10MHz reference signal is connected to the external reference input. It is powered by a $100-240 \pm 10\%$ VAC power supply, and mounted in a $1 \frac{3}{4}$ " X 19" X 14" rack mount chassis.



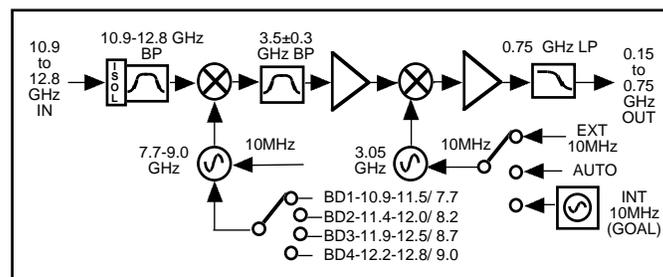
(SHOWN WITH CUSTOM SP4T BAND SWITCH)

FRONT PANEL



REAR PANEL

FIGURE 1.1 Model 2116-41-109# Front and Rear Panels



2116-41-109# Block Diagram

FIGURE 1.2 Model 2116-41-109# Downconverter Block Diagram

1.2 Technical Characteristics

TABLE 1.0 2016-41-109 Downconverter Specifications**					
Input Characteristics					
Input Impedance/Return Loss	50Ω/14 dB				
Frequency	10.9 - 12.8 GHz (in 4 Bands)				
Noise Figure, Maximum	25 dB				
Level	-20 to -10 dBm				
Input 1 dB Compression	0 dBm				
Output Characteristics					
Impedance/Return Loss	50Ω / 14 dB				
Frequency	0.15 to 0.75 GHz, 4 Bands				
Level	-20 to -10 dBm				
1 dB Compression	0 dBm				
Channel Characteristics					
Gain	0 ±2 dB at Fc				
Image Rejection	> 30 dB, 0.15 - 0.40 GHz out; > 40 dB, 0.41 - 0.75 GHz out;				
Spurious, In Band	< 40 dBC in band, -10 dBm out, 10.9 - 12.8 GHz in, 0.15 - 0.75 GHz out				
Spurious, Out of Band	< -40 dBm, .05 - 0.149 and 0.751 to 1.3 GHz out				
Intermodulation	< -50 dBC for two carriers each at -15 dBm out				
Frequency Response	± 1.5 dB, 0.15 - 0.75 GHz out; ± 0.5 dB, 40 MHz BW				
Frequency Sense	Non-inverting				
LO Characteristics					
LO Frequency	Varies with Bands, Dual Conversion				
Frequency Accuracy	External Ref. input; ± 1 ppm max. over temp internal reference; design goal				
10 MHz Level (In or Out)	+3 dBm ± 3 dB				
Phase Noise @ F (Hz) >	100 MHz	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-60	-70	-80	-95	-105
Controls, Indicators					
Band Select Switch	Rotary Switch Selects Bands 1-4 (Front panel SP4T Switch)				
INT/Auto/Ext Switch	Selects internal or external 10 MHz (Rear panel DP3T Switch)				
External 10 MHz	Yellow LED, indicates external 10 MHz Reference Selected				
PLL Alarm	Red LED; External Contact Closure				
Power	Green LED				
Other					
RF Connector	SMA (female), Standard				
IF Connector	BNC (female), 50Ω, Standard				
10 MHz Connectors	BNC (female), 75Ω Connector; works with 50Ω or 75Ω				
Alarm Connector	DB9 - NO or NC contact closure on Alarm				
Size	19 inch, standard chassis, 1.75" high x 14.0" deep				
Power	100-240 ±10% VAC, 47- 63 Hz, 25 watts maximum				
**+10°C to +40°C; Specifications subject to change without notice				2014 Cross Technologies, Inc.	

2.0 Installation

2.1 Mechanical

The 2116-41-109# consists of a PCB and an RF assembly housed in a 1 RU (1 3/4 inch high) by 14 inch deep chassis. A switching, ± 12 , +24, +5 VDC power supply provides power for the assemblies. The 2116-41-109# can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2116-41-109# is assembled.

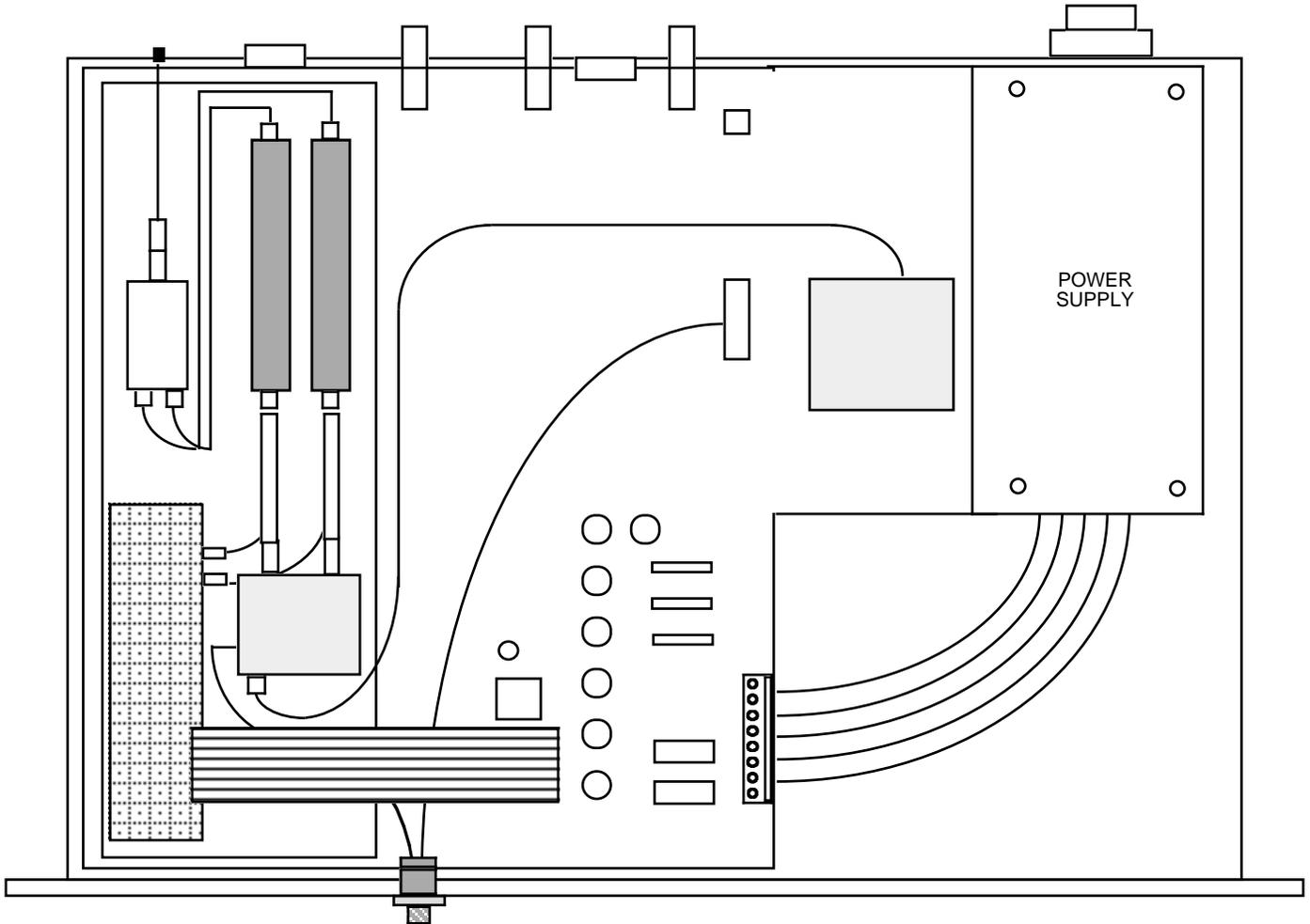


FIGURE 2.0 2116-41-109# Mechanical Assembly

2.2 Rear Panel Input/Output Signals

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

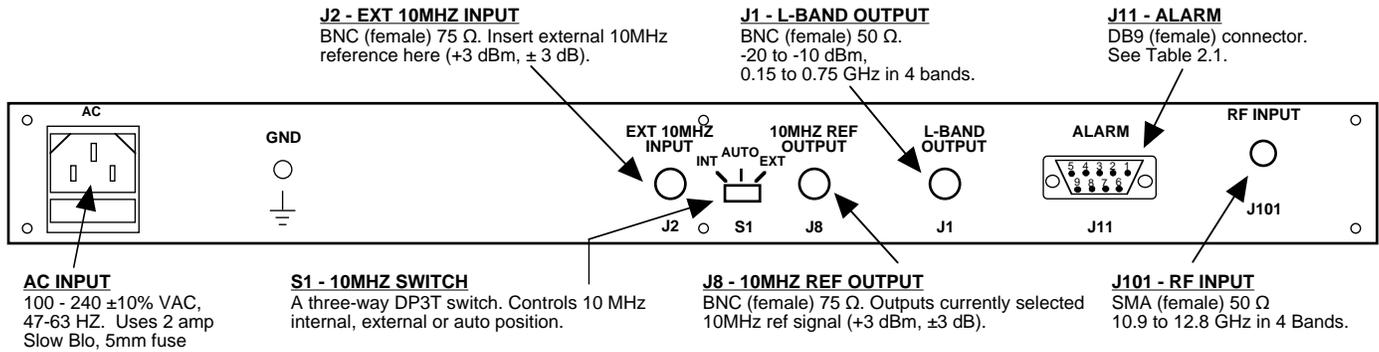


FIGURE 2.1 2116-41-109# Rear Panel I/O's

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

2.3 Front Panel Indicators

Figure 2.2 shows the front panel indicators.

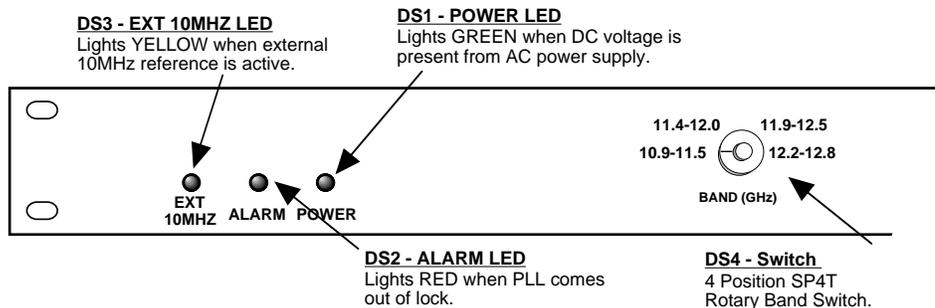


FIGURE 2.2 2116-41-109# Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2116-41-109# Downconverter

1. Connect a -10.9 to -12.8 dBm signal for 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 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).
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.

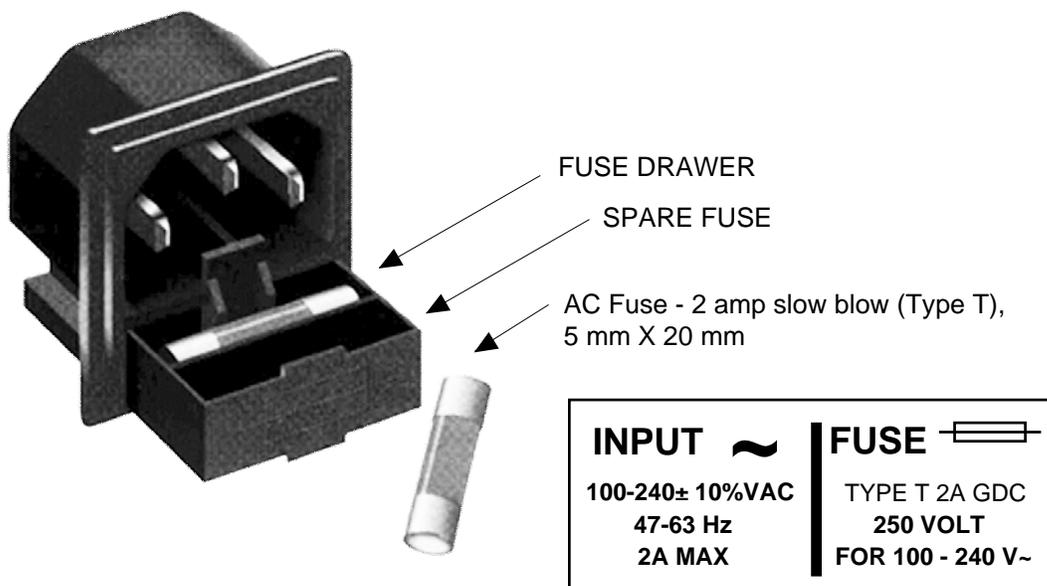


FIGURE 2.3 Fuse Location and Spare Fuse

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 units 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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