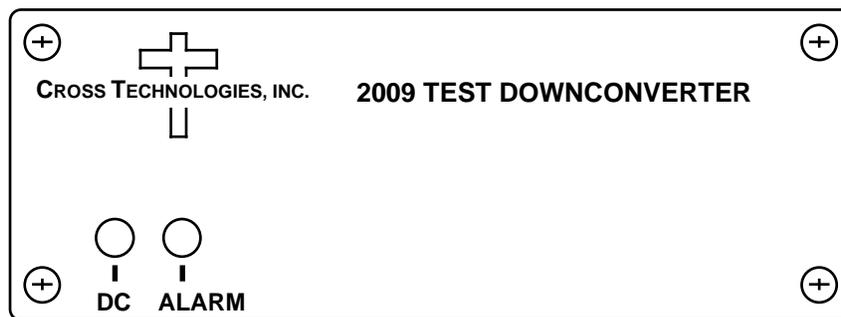


# Instruction Manual

# Model 2009-38 Downconverter

November 2013, Rev. B



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# INSTRUCTION MANUAL

## MODEL 2009-38 Downconverter

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**WARRANTY** - The following warranty applies to all Cross Technologies, Inc. products.

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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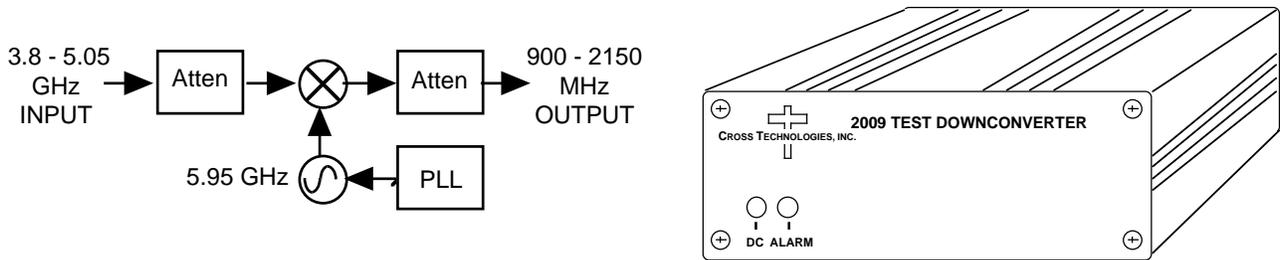
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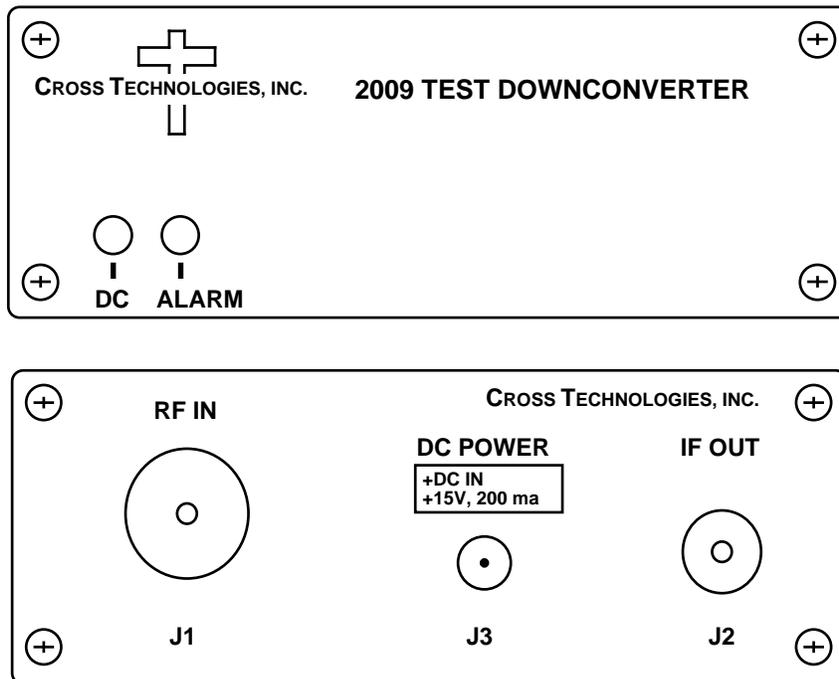
# MODEL 2009-38 DOWNCONVERTER

## 1.0 General

**1.1 Equipment Description** - The 2009-38 Downconverter for loop-back applications converts a 3.8 - 5.05 GHz signal to 900 - 2150 MHz with a high side local oscillator (LO) (inverted spectrum). With low phase noise, this unit down converts “clean” (having only this frequency) 3.8 - 5.05 GHz signals to 900 - 2150 MHz for test purposes. The 3.8 - 5.05 GHz input is mixed with a synthesized local oscillator (LO) signal to 900 - 2150 MHz. The mixer output goes to the output attenuator providing a nominal gain of -40 dB. Connectors are 75 ohm F female for the 900 - 2150 MHz output and 50 ohm N, female for the RF input. Front panel LEDs show DC power is applied (green) and if a PLL alarm occurs (red). DC power is provided by the LNB voltage from the receiver under test or by an external wall mount power supply (**option -P**, 115 VAC or **option -P4**, 100-240 ±10% VAC). **Option -C** has no power supply and is powered by an external power supply like the Cross model 2000-01. The 2009 can be mounted on an 1 3/4” X 19” rack mount panel (**option -R**).



**FIGURE 1.1 Model 2009-38 Block Diagram and Chassis**



**FIGURE 1.2 Model 2009-38 Front and Rear Panels**

## 1.2 Technical Characteristics

**TABLE 1.1 Model 2009-38 Equipment Specifications\***

### Input Characteristics

Input Impedance/RL	50 $\Omega$ /10 db
Frequency	3.8 to 5.05 GHz
Input Level	-20 to +15 dBm
Input 1 dB compression	+20 dBm

### Output Characteristics

Impedance/RL	75 $\Omega$ /10 db
Frequency	900 to 2150 MHz

### Channel Characteristics

Gain at band center	-40 dB $\pm$ 2 dB
Spectrum Sense	Invert
Spurious Response	< -40 dBC, 900 to 2150 MHz
Frequency Response	$\pm$ 2 dB, 900 to 2150 MHz; $\pm$ 0.5 dB, any 10 MHz increment

### Synthesizer Characteristics

LO Frequency	5.95 GHz
Frequency Accuracy	$\pm$ 4ppm max

Phase Noise @ Freq	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-85	-90	-95	-110

### Indicators

DC Power	Green LED
Alarm	Red LED

### Other

Input Connector	Type N, female
Output Connector	Type F, female
Size, Bench Top	4.7" wide X 1.75" high X 6.5" deep
Size, Rack Mount(-R)	19 inch standard chassis 1.75"high X 7.0" deep (optional -R)
Power	+16 to +20 VDC, 280 ma on IF OUT connector (-P) 120 $\pm$ 10% VAC, 60 Hz, 15 W max, wall mount power supply (-P4)100-240 $\pm$ 10% VAC, 47-63 Hz, 15W max, wall mount power supply

### Models

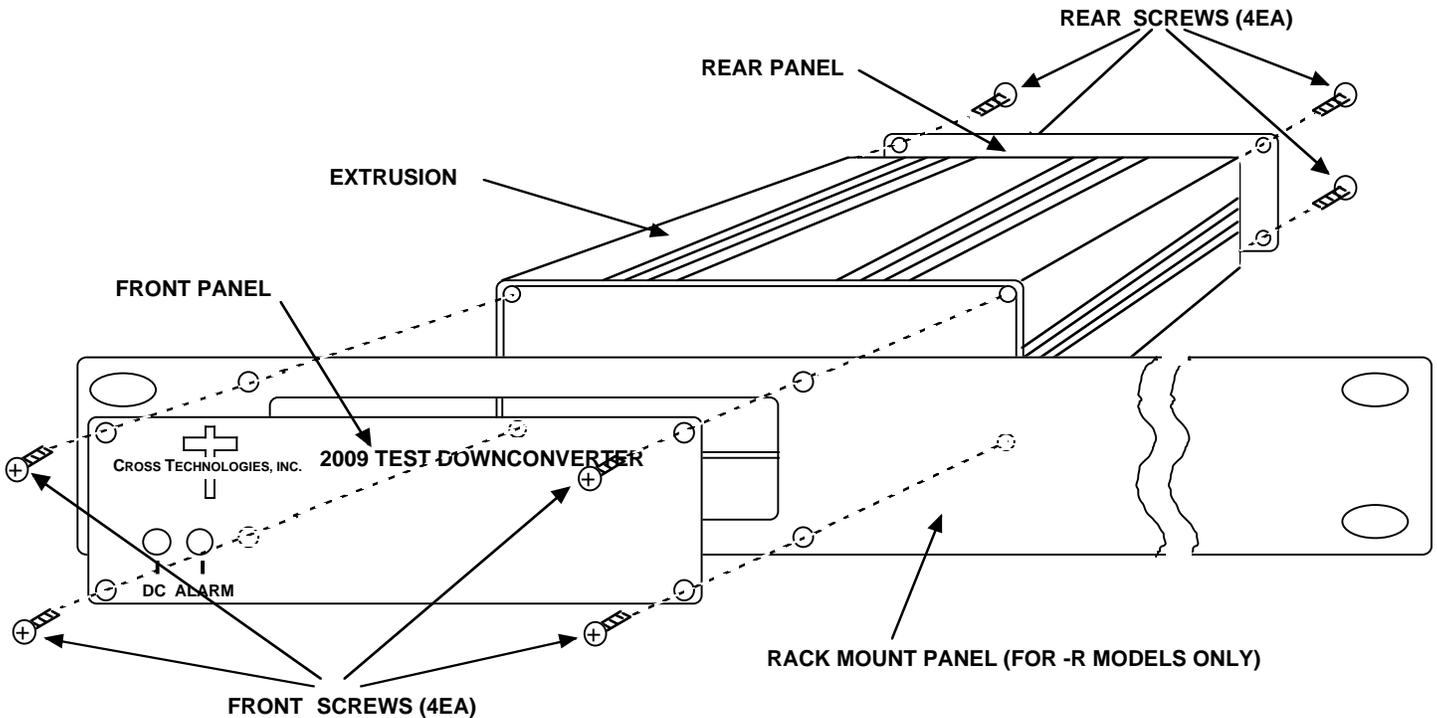
2009-38	3.8-5.05 GHz in, 900-2150 MHz out, uses rcvr LNB voltage to IF out
2009-38C	3.8-5.05 GHz in, 900-2150 MHz out, use with 2000-01 power supply
2009-38P	3.8-5.05 GHz in, 900-2150 MHz out, 115 VAC wall power supply
2009-38P4	3.8-5.05 GHz in, 900-2150 MHz out, 100-240 $\pm$ 10% VAC wall power supply

\*+10 to +40 degrees C; 2000 meters max elevation; 80% max humidity; Specifications subject to change without notice.

## 2.0 Installation

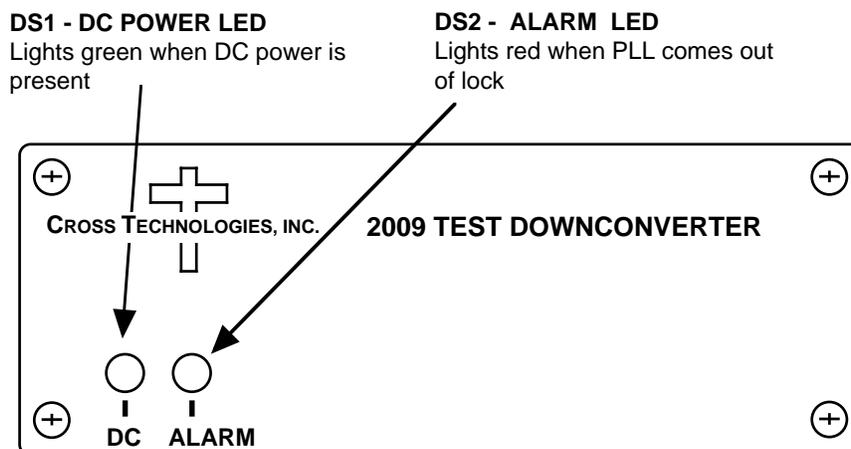
**2.1 Mechanical** - The 2009-38 is packaged in an aluminum extrusion. The **-R option** is mounted on a 1 3/4" X 19" panel that can be mounted to a rack using the 4 holes at the ends (See Figure 2.1).

**2.1.1 Cleaning Instructions** - Wipe the exterior with a dry, soft cloth. Use no detergent or cleaning chemicals.



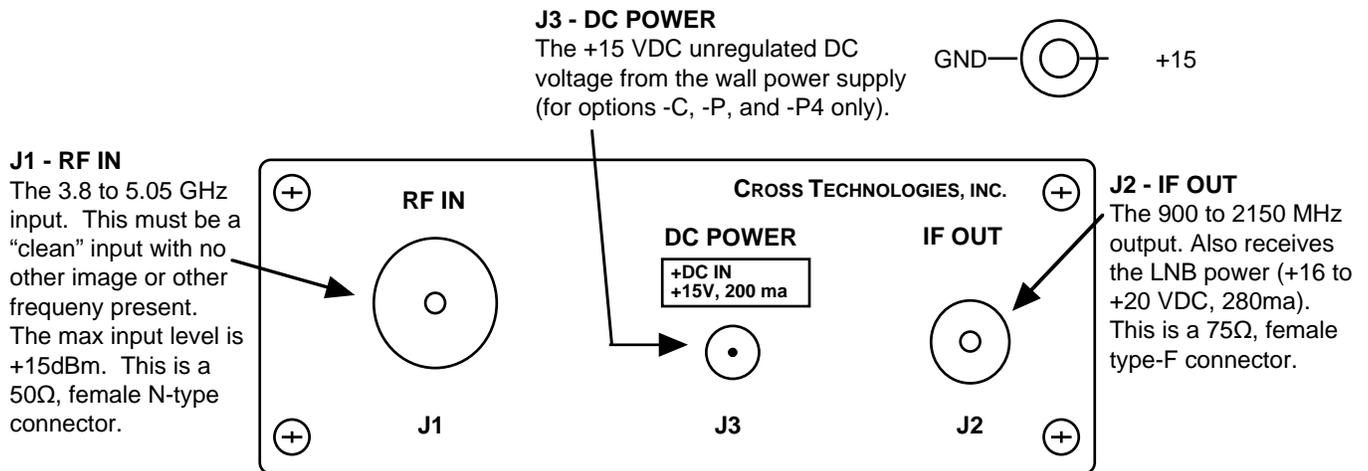
**FIGURE 2.1 Model 2009-38 Assembly (-R option shown)**

**2.2 Front Panel Indicators** - Figure 2.2 shows front panel indicators.



**FIGURE 2.2 Model 2009-38 Front Panel Indicators**

## 2.3 Rear Panel Input/Output Signals - Figure 2.3 shows the input and output signals to the 2009-38.



**FIGURE 2.3 Model 2009-38 Rear Panel Inputs and Outputs**

**2.4 Accessing the PC Card** - There are NO USER JUMPERS or other on-card controls. ALTHOUGH IT IS NOT RECOMMENDED AND MAY VOID THE WARRANTY the following shows how to remove the printed circuit board (PCB) from the extrusion:

- 1.) **Always remove power** when installing or removing the PCB from the extrusion
- 2.) Remove four (4) **rear panel screws** (see Figure 2.1).
- 3.) **Gently** pull the rear panel and PCB assembly completely out of the extrusion.
- 4.) To install the PCB, **gently** push the rear panel and PCB assembly completely into the extrusion (make sure the shield goes in the lower channel and the PCB in the next channel above that) and that the front panel indicators line up with the front panel holes.
- 5.) Install four (4) **rear panel screws**.

## 2.5 Installation / Operation

### 2.5.1 Installing and Operating the 2009-38

- 1.) Connect the IF OUT to the receiver under test (+16 to +20 VDC, 280 ma power is provided by the LNB voltage from the receiver under test). For **-P** and **-P4** models, connect one end of the Wall Power Supply to the 2009 DC POWER input, J3, and the other end to 115 VAC, 60 Hz (**-P**) or 100-240 ±10% VAC, 47-63 Hz (**-P4**) (Figure 2.3). For **-C** models, connect the DC cable from the 2000-01 power supply to the DC POWER input, J3.
- 2.) Connect a +15 dBm, maximum, signal to RF IN, J1 (Figure 2.3).
- 3.) Connect the IF OUT, J2, to the receiver under test, if you have not already done so (Figure 2.3).
- 4.) Be sure DS1 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).

### 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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