Instruction Manual

Model 2009-8487P
Up/DownConverter

November 2013, Rev. A

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

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1.0 General
1.1 Equipment Description

The 2009-8487P Up/DownConverter, for loop-back applications, converts a 8.487 GHz signal to or from 67 MHz with a low side local oscillator (LO) (non-inverted spectrum). Featuring low phase noise and high stability, this unit is used to down convert “clean” (having only this frequency) 8.487 GHz signal to 67 MHz or up convert 67 MHz to 8.487 GHz for test purposes. A synthesized local oscillator (LO) of 8.420 GHz converts the 8.487 GHz signal to 67 MHz when used as a Downconverter and the 67 MHz signal to 8.487 GHz when used as a Upconverter with a nominal gain of -15dB. Connectors are SMA (female) for the 67 MHz IF and the RF ports. Front panel LEDs light when DC power is applied (green) and when a PLL alarm occurs (red). The unit is powered by a 120 ±10% VAC wall mount power supply (suffix P) and other power supply options are available (option P4 or option -C). The 2009 can be mounted on an 1.75” X 19” rack mount panel (option R).

![Front and Rear Panels](image)

**FIGURE 1.1** Front and Rear Panels

![Block Diagram](image)

**FIGURE 1.2** Block Diagram
1.2 Technical Characteristics

TABLE 1.1  Model 2009-8487P Equipment Specifications

EQUIPMENT SPECIFICATIONS

RF Characteristics
- Impedance / Return Loss: 50Ω / 12 db
- Frequency: 8487 MHz ± 20 MHz
- Level, In, Downconverter: -30 to -5 dBm
- Level, Out, Upconverter: -30 to -20 dBm
- Input 1 dB compression: +5 dBm

IF Characteristics
- Impedance / Return Loss: 50Ω / 12 db
- Frequency: 67 MHz ± 20 MHz
- Level, In, Upconverter: -15 to -5 dBm
- Level, Out, Downconverter: -45 to -20 dBm

Channel Characteristics
- Gain at band center: -15 dB ±2 dB
- Spurious Response: <-40 dBC, ± 20 MHz of the center frequency
- Spectrum Sense: Non-inverting
- Frequency Response: ± 0.5 dB, ± 20 MHz of the center frequency

Synthesizer Characteristics
- Frequency Accuracy: ± 2.5 ppm maximum

<table>
<thead>
<tr>
<th>Phase Noise @ Freq</th>
<th>10Hz</th>
<th>1kHz</th>
<th>10kHz</th>
<th>100kHz</th>
<th>1MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>dBC/Hz</td>
<td>-70</td>
<td>-75</td>
<td>-80</td>
<td>-95</td>
<td>-110</td>
</tr>
</tbody>
</table>

Indicators
- DC Power: Green LED
- Alarm: Red LED

Other
- RF Connector: SMA (female), 50Ω
- IF Connector: SMA (female), 50Ω
- 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)
- Power: 120 ±10% VAC Wall Power Supply providing +15 to +18 VDC

Options
- C: No Power Supply. Use with Cross 2000-01 Power Supply
- P4: 100-240 ± 10% VAC Wall Power Supply
- R: 1RU Rack Mounting

*+10°C to +40°C; 2 km maximum elevation; 90% maximum humidity; Specifications subject to change without notice
2.0 Installation

2.1 Mechanical
The 2009-8487P 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 2009-8487P Assembly (-R option shown)

2.2 Indicators
Figure 2.2 shows front panel indicators.

FIGURE 2.2 Model 2009-8487P Front Panel Indicators
2.3 Input / Output Signals
Figure 2.3 shows the input and output signals to the 2009-8487P.

![Diagram of input and output signals](file.png)

**FIGURE 2.3  Model 2009-8487P 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 2009-8487P

1. For Option -P models, connect one end of the Wall Power Supply to the 2009-8487P DC Power In, J3, and the other end to 115 VAC, 60 Hz (Figure 2.3).
2. Connect a -5 dBm, maximum, signal to IF IN, J1 or RF IN, J2 (Figure 2.3).
3. Connect the IF OUT, J2, to the receiver under test (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.