# Instruction Manual

# Model 2117-8485

## Up/Downconverter

**November 2019**




When ordering parts from Cross Technologies, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

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**INSTRUCTION MANUAL**

# MODEL 2117-8485 Up/Downconverter

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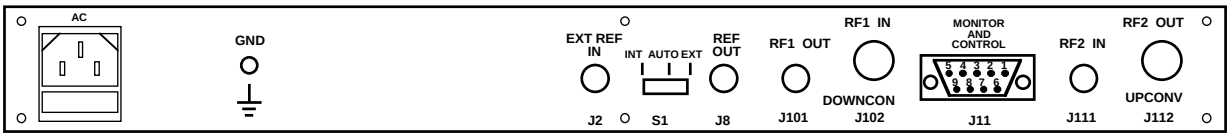
# MODEL 2117-8485 Up/Downconverter

## 1.0 General

The 2117-8485 Up/Downconverter converts 1.80 - 1.90 GHz to 8.40 - 8.50 GHz and 8.40-8.50 GHz to 1.50 - 1.60 GHz, with non-inverting spectrums. Front panel LEDs provide indication of DC Power, External 10 MHz, and PLL Alarm. The gain is +20 dB for the upconverter and -20 dB for the downconverter. Connectors are Type N female for the RF output and input, BNC female for the L-band input and output and external reference input and reference output. A three-way switch controls which 10 MHz reference is being used. 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. The 2117 is powered by a 100-240 ± 10% VAC power supply, and in a 1 3/4" X 19" X 19" rack mount chassis.


**FRONT PANEL**




**REAR PANEL**

**FIGURE 1.1 Model 2117-8485 Front and Rear Panels**

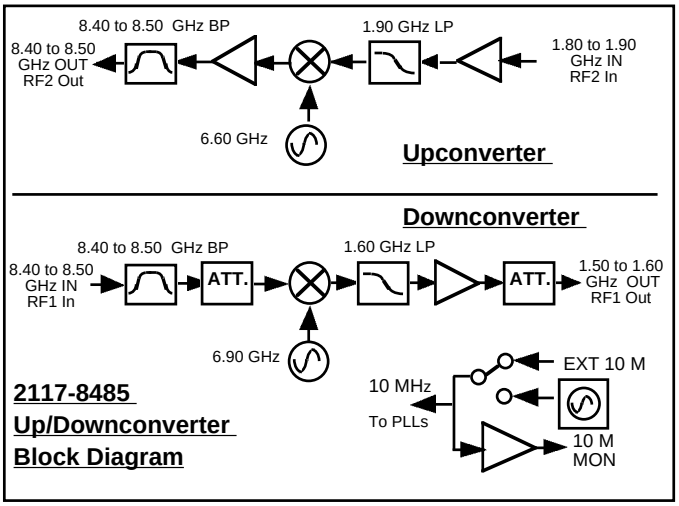



**FIGURE 1.2 Model 2117-8485 Up/Downconverter Block Diagram**

## 1.2 Technical Characteristics

### TABLE 1.0 2117-8485 Up/Downconverter Specifications*

| EQUIPMENT SPECIFICATIONS* | | |
|---|---|---|
| **Input Characteristics** | **UP** | **DOWN** |
| Impedance/Return Loss | 50Ω/14 dB | 50Ω/14 dB |
| Frequency | 1.80-1.90 GHz | 8.40-8.50 GHz |
| Noise Figure, Max. | 20 dB @ max gain | 25 dB @ max gain |
| Input Level range | -40 to -20 dBm | -20 to 0 dBm |
| **Output Characteristics** | | |
| Impedance/Return Loss | 50 Ω /14 dB | 50 Ω /14 dB |
| Frequency (GHz) | 8.40-8.50 GHz | 1.50-1.60 GHz |
| Output Level Range | -20 to 0 dBm | -40 to -20 dBm |
| 1 dB comp, max gain | +10 dBm | -10 dBm |
| Mute @ 0 dBm out | >50 dB | N/A |
| **Channel Characteristics** | | |
| Gain, max. at Fc, fixed | +20 ±2 dB | -20 ±2 dB |
| Image Rejection | >60 dBC | >60 dBC |
| Spurious, Inband, sig. rel. | <-50 dBC, 0dBm | <-50 dBC, -5dBm |
| Spurious, Inband, sig. ind. | <-50 dBC, Gmax | <-50 dBC, Gmax |
| Spurious, Out of band | <-50 dBm, Gmax | <-50 dBm, Gmax |
| 2 tone 4MHz; Max -10 ea | <-50 dBC,Gmax | <-50 dBC,Gmax |
| Frequency Resp. band | ±1.5 dB | ±1.5 dB |
| Frequency Resp. 40 MHz | ± 0.5 dB | ± 0.5 dB |
| Frequency Sense | non-inverting | non-inverting |

### LO Characteristics

| | |
|---|---|
| LO Frequency | Downconverter - 6.90 GHz; Upconverter - 6.60 GHz |
| Frequency Accuracy | ± 0.01 ppm max over temp internal reference; external reference input |
| 10 MHz Level | +3 dBm, ± 3dB, 75 ohms, External In or Internal out |

| Phase Noise @ Freq (Hz) | 100 MHz | 1kHz | 10kHz | 100kHz | 1MHz |
|---|---|---|---|---|---|
| dBC/Hz | -70 | -80 | -85 | -100 | -110 |

### Controls, Indicators

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

### Other

| | |
|---|---|
| RF1 In, RF2 Out | N-Type (female), 50Ω |
| RF1 Out, RF2 In | N-Type (female), 50Ω |
| 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, 50 watts maximum |

### Options

| | |
|---|---|
| Connector Options | See TABLE 2.2 |

*+10˚C to +40˚C; Specifications subject to change without notice.

## 2.0 Installation

**2.1 Mechanical** - The 2117-8485 consists of one RF PCB 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 2117-8485 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2117-8485 is assembled.

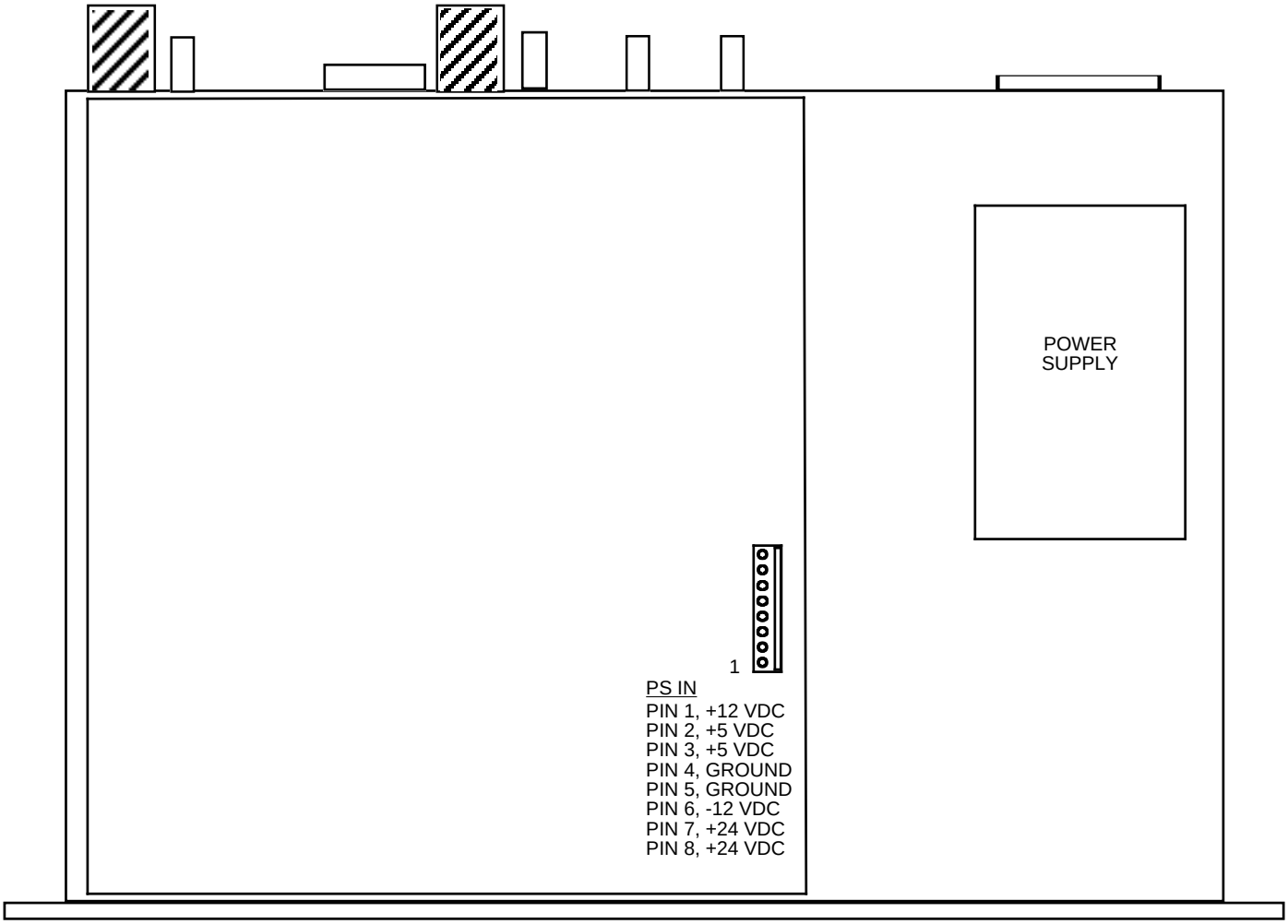
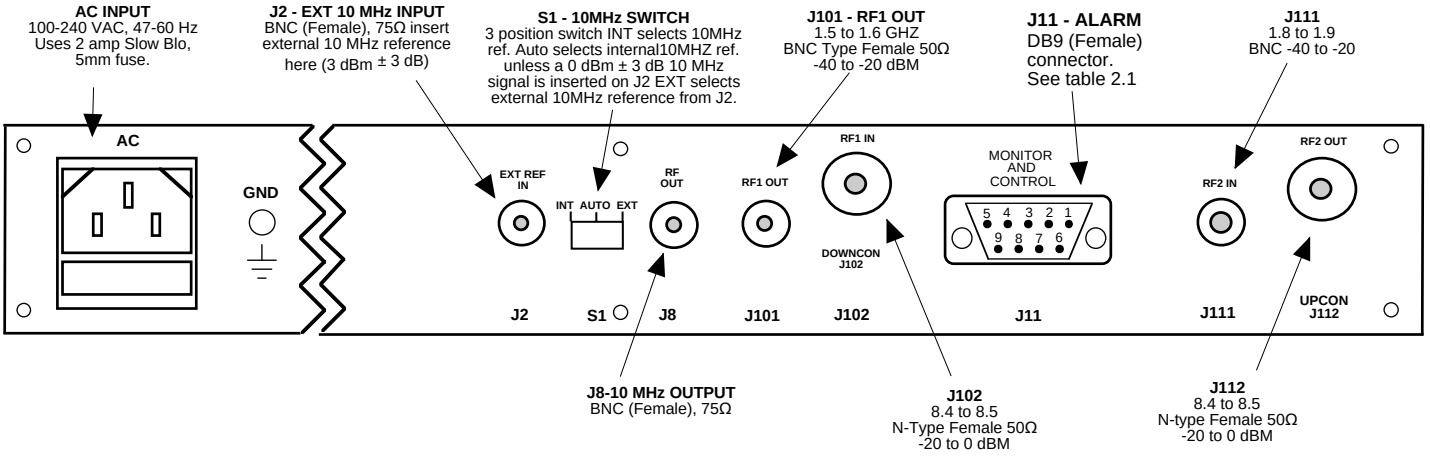
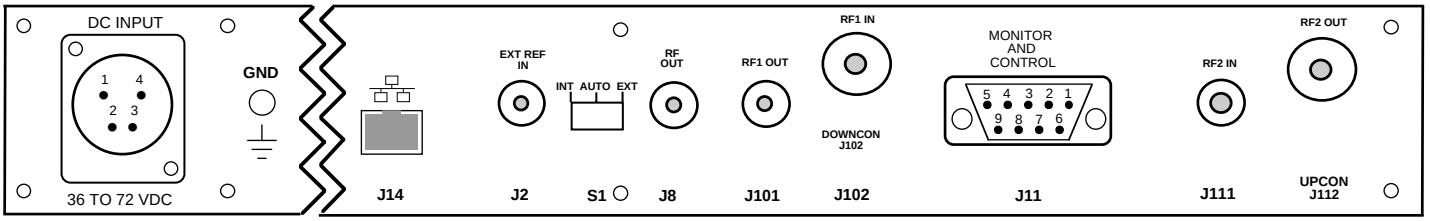



**FIGURE 2.0 2117-8485 Mechanical Assembly**

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




**Shown below (Option P48)** - Rear Panel Input/Output Signals
with Option P48, 48 VDC nominal 36-72 VDC, 2.5A maximum.



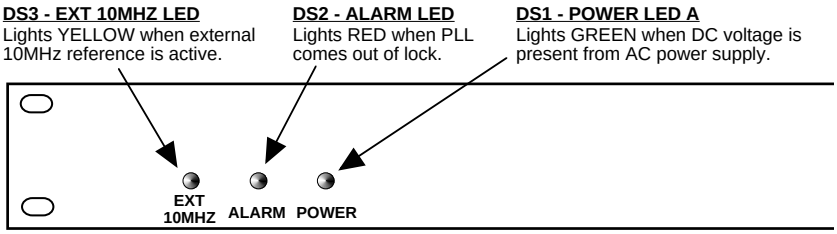




**FIGURE 2.2 2117-8485 Front Panel Controls and Indicators**

| 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 |

**FIGURE 2.1 2117-8485 Rear Panel I/O's**

| TABLE 2.3 DC1 Pinouts | |
|---|---|
| Pin# | Function |
| 1 | Minus DC input |
| 2 | NC |
| 3 | Plus DC input |
| 4 | NC |
| Shell | Ground |

**FIGURE 2.3 2117-8485 DC1 Pinouts**

| TABLE 2.2 | Available Options |
|---|---|
| P48 = | 48 VDC Nominal 36-72 VDC, 2.5A max. |
| R = | Redundant AC Power Supply |
| | **Available Connector Options** |
| NF | 50Ω N-Type (RF), 75Ω F-Type (L-Band) |
| N | 50Ω N-Type (RF), 75Ω BNC (L-Band) |
| NN | 50Ω N-Type (RF), 50Ω N-Type (L-Band) |
| SS | 50Ω SMA (RF), 50Ω SMA (L-Band) |

**FIGURE 2.2 2117-8485 Available Options**

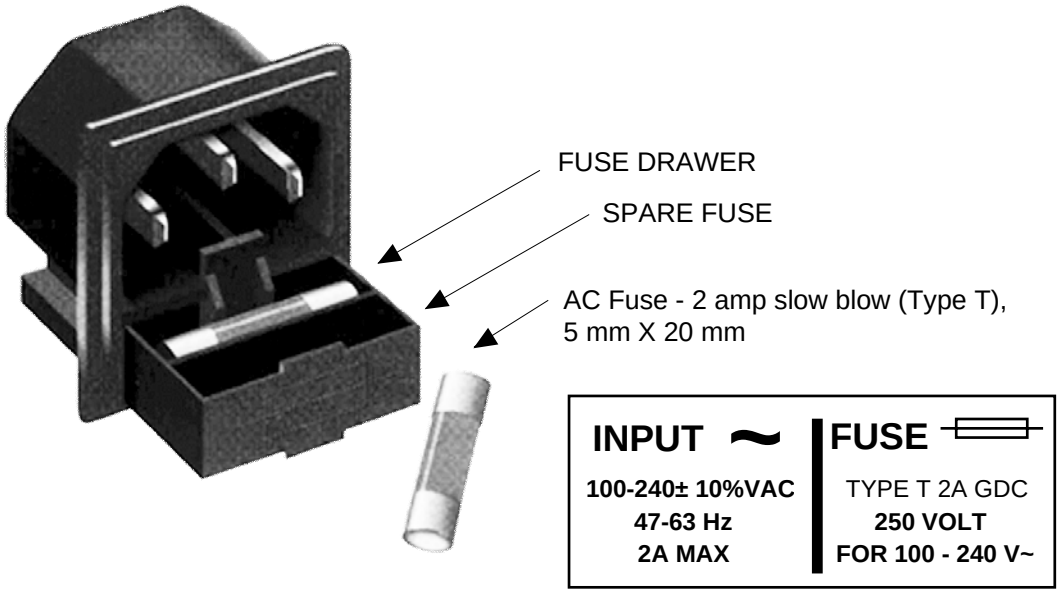



**FIGURE 2.3 Fuse Location and Spare Fuse**

## 2.4 Installation / Operation

### 2.4.2 Installing and Operating the 2117-8485 Downconverter

1.) Connect -20 dBm to 0 dBm signal 8.4 to 8.5 GHz, RF1 INPUT, J102 (Figure 2.1).
2.) Connect RF1 OUT, J101 to the external equipment.
3.) Connect 100-240 ± 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 10 MHz) is on (Figure 2.2).
7.) Check that a 10MHz, 0 dBm ±3 dB signal is present at the 10 MHz 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

### 2.4.3 Installing and Operating the 2117-8485 Upconverter

1. Connect a -40 dBm to -20 dBm signal 1.8 to 1.9 GHz, RF2 IN, J111 (Figure 2.1).
2. Connect 1.8 - 1.9 GHz to RF2 OUTPUT, J112, to the external equipment.
3. Connect 100-240 ±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, 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 ±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.

**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.

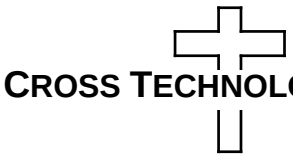
**C**. **Elevated Operating Ambient Temperature** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack may be greater than room ambient temperature. Therefore, consideration should be given to Tmra. (Maximum Recommended Ambient Temperature)

**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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