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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 2005-20P 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 no other warranties, express or implied, except as stated herein.
MODEL 2005-20P Downconverter

1.0 General
1.1 Equipment Description
The 2005-20P Downconverter, for loop-back applications, converts a 2000 to 2500 MHz signal to 70 MHz or 140 MHz IF in 1 MHz steps with selection of high side LO (C = inverted) or low side LO (Ku = non-inverted) and 70 or 140 MHz output over the 2.0 - 2.5 GHz range.

Featuring low phase noise, these units are used to loop 2.0 - 2.5 GHz receivers to 70 or 140 MHz modulators for test purposes. The input frequency is selected with four BCD switches which control the synthesized local oscillator (LO) signal. The 2.0 - 2.5 GHz input is mixed with this synthesized LO to the 70 or 140 MHz IF signal. Front panel LEDs light when DC power is applied (green) and when a PLL alarm occurs (red). The mixer output is applied to the output attenuator providing a nominal gain of +5 dB (high gain) or -15 dB (low gain). Connectors are 50Ω BNC (female) for the IF input and for the RF output (other connector options are available). Wall power supply options are -P for 120 VAC, 60Hz, and -P4 is 100-240 ±10% VAC. The 2005 can be mounted on a 1 3/4” X 19 “ rack mount panel (option -R).

![FIGURE 1.1 Block Diagram](image1)

![FIGURE 1.2 Front and Rear Panel](image2)
1.2 Technical Characteristics

**TABLE 1.0 2005-20P Downconverter Specifications***

**Input Characteristics**
- Impedance 50Ω
- Return Loss 12 dB
- Frequency Range 2.0 to 2.5 GHz
- Level -10 to -30 dBm
- 1dB compression -5 dBm

**Output Characteristics**
- Impedance 50Ω
- Return Loss 15 dB
- Frequency 70 or 140 MHz center, ± 20 MHz

**Channel Characteristics**
- Gain -15 dB ± 3 dB (LOW GAIN)
  +5 dB ± 3 dB (HI GAIN)
- Spurious Response < -40dBC max, < -45dBC typ; **OUTPUT NOT FILTERED**
- Frequency Response ± 2 dB, 2.0 - 2.5 GHz; ± 0.5 dB, any 10MHz increment

**Synthesizer Characteristics**
- Frequency Accuracy ± 25 kHz max
- Frequency Step 1.0 MHz minimum

<table>
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<tr>
<th>Phase Noise @ Freq</th>
<th>100 Hz</th>
<th>1kHz</th>
<th>10kHz</th>
<th>100kHz</th>
<th>1MHz</th>
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<tbody>
<tr>
<td>dBC/Hz</td>
<td>-70</td>
<td>-70</td>
<td>-80</td>
<td>-90</td>
<td>-100</td>
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**Indicators**
- DC Power Green LED
- PLL Alarm Red LED

**Other**
- RF, IF Connectors BNC (female)
- Size, Bench Top 4.7” wide X 1.75” high X 6.5” deep
- Size, Rack Mount 19 inch standard chassis 1.75”high X 7.0” deep (option -R)
- AC Power 120 VAC, 60 Hz, 10W max wall mount power supply (option -P) or 100-240 ±10% VAC, 47-63 H, wall mount power supply (option -P4)

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*+10 to +40 degrees C; Specifications subject to change without notice.*
2.0 Installation

2.1 Mechanical

The 2005 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. The unit derives +DC from the RF out center conductor (+14 to +24 VDC) or the wall power supply (+15V unregulated, option -P, -P4). See Figure 2.3.

2.1.1 Cleaning Instructions

Wipe the exterior with a dry, soft cloth. Use no detergent or cleaning chemicals.

2.2 Front Panel Controls/Indicators - Figure 2.1 shows front panel controls and indicators for the 2005-20P.

2.3 Rear Panel Input/Output Signals - Figure 2.2 shows the input and output signals to the 2005-20P.

FIGURE 2.1 2005-20P Front Panel Controls and Indicators

FIGURE 2.2 2005-20P 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 2.3).
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 in the extrusion and that the front panel controls go through the front panel holes.
5. Install four (4) rear panel screws.

![Diagram of the 2005 Assembly Drawing](image)

**FIGURE 2.3 2005 Assembly Drawing**

2.5 Installation / Operation
2.5.1 Installing and Operating the 2005-20P
1. If using the receiver LNB voltage to power the 2005-10, be sure +14 to +24 VDC is on the RF center conductor. If using the wall power supply (options -P or -P4), connect the power supply to the DC POWER connector and either 120 VAC (-P) or 100-240 ±10% VAC (-P4) (Figure 2.2).
2. Select either C or KU band (SW6) and either 70 or 140 MHz IF (SW5) using the front panel switches (Figure 2.1).
3. Select either HI or LOW GAIN using the switch (SW7) on the rear panel (Figure 2.1).
4. Connect a -10dBm max RF signal to RF In, J2 (Figure 2.2).
5. Connect the IF Out, J1, to the modulator under test (Figure 2.2).
6. Set BCD switches, SW1 to SW4, to the desired frequency (Figure 2.1).
7. Be sure DS1 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.1).
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 servicable 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 RE-INSTALLED prior to Top Cover screw replacement. FAILURE TO DO this may cause INGRESS and/or EGRESS emission problems.