

# **INSTRUCTION MANUAL**

## **MODEL 2005-22 Test Downconverter**

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## MODEL 2005-22 Test Downconverter

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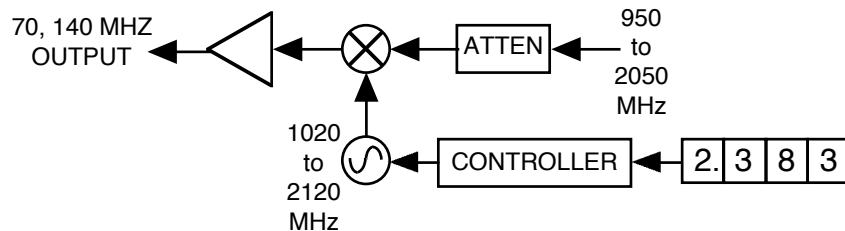
## MODEL 2005-22 Test Downconverter

### 1.0 General

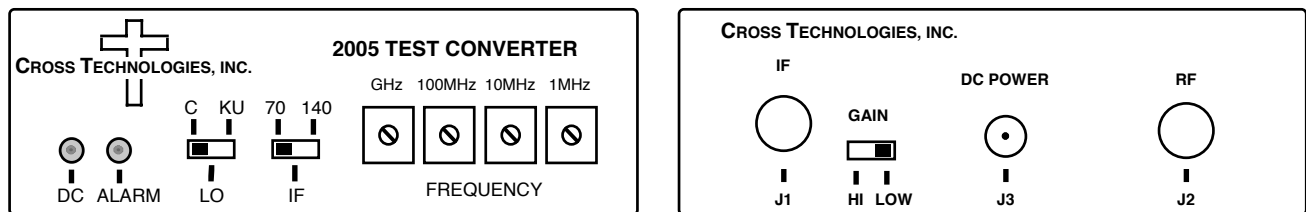
#### 1.1 Equipment Description

The 2005-22P Test Downconverter converts a 950 to 2050 MHz signal to 70 MHz in 1 MHz steps with a high side 1020 to 2120 MHz LO (C, inverted spectrum) and 1070 to 2050 MHz to 70 MHz with low side 1020 to 1980 MHz LO (Ku, non-inverted spectrum). Over a limited frequency range, the 2005-22P also operates with a 140 MHz output (see Section 2.5.2, page 7).

Featuring low phase noise, these units are used to loop 0.95 - 2.05 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 0.95 - 2.05 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 +0 dB (high gain) or -20 dB (low gain). Connectors are 75Ω BNC (female) for the IF input and 75Ω Type F (female) for the RF output (other connector options are available). Wall power supply options are **-P** for 120 VAC, 60Hz, and **-P4** is 90-260 VAC. The 2005 can be mounted on a 1 3/4" X 19" rack mount panel (**option -R**).



**FIGURE 1.1 Block Diagram**



**FIGURE 1.2 Front and Rear Panel**

## 1.2 Technical Characteristics

**TABLE 1.0 2005-22 Downconverter Specifications\***

### Input Characteristics

Impedance	75Ω
Return Loss	10 dB
Frequency Range	0.95 to 2.05 GHz, Inverted, 70 MHz out
Level	-10 to -30 dBm
1dB compression	-5 dBm

### Output Characteristics

Impedance	75Ω
Return Loss	15 dB
Frequency	70 or 140 MHz center, ± 20 MHz

### Channel Characteristics

Gain	-20 dB ± 3 dB (LOW GAIN) +0 dB ± 3 dB (HI GAIN)
Spurious Response	< -40dBC max, < -45dBC typ; <b>OUTPUT NOT FILTERED</b>
Frequency Response	± 3 dB, 0.95 - 2.05 GHz; ± 0.5 dB, any 10MHz increment

### Synthesizer Characteristics

Frequency Accuracy	± 25 kHz max					
Frequency Step	1.0 MHz minimum					
Phase Noise	@ Freq	100Hz	1kHz	10kHz	100kHz	1MHz
	dBC/Hz	< -70	< -70	< -80	< -90	< -100

### Indicators

DC Power	Green LED
PLL Alarm	Red LED

### Other

RF, IF Connectors	Type F (female), 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 ( <b>option -R</b> )
Power	+14 to +24 VDC, 180 ma on RF Out
AC Power	120 ±10% VAC, 60 Hz, 10W max wall mount power supply ( <b>option -P</b> )

\*+10 to +40 degrees C; Specifications subject to change without notice

## 2.0 Installation

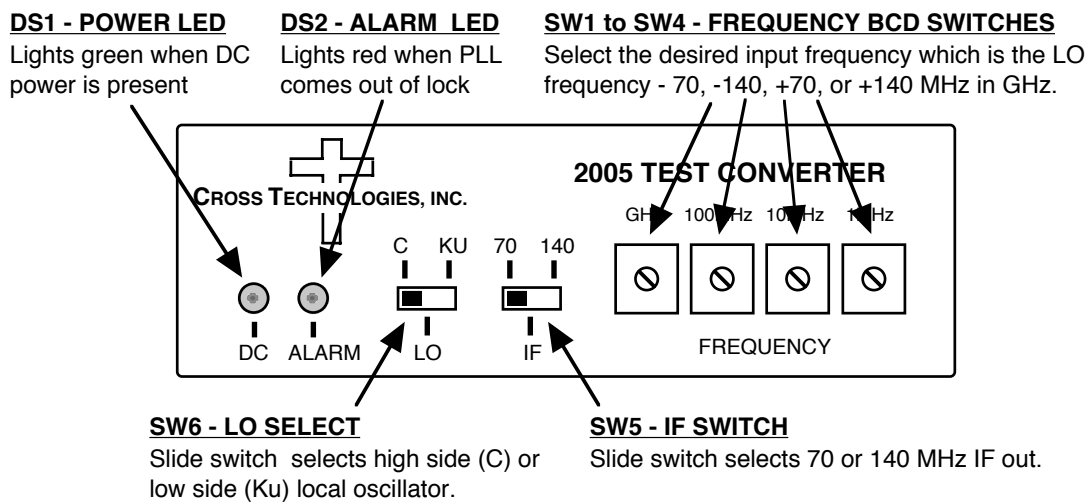
### 2.1 Mechanical

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

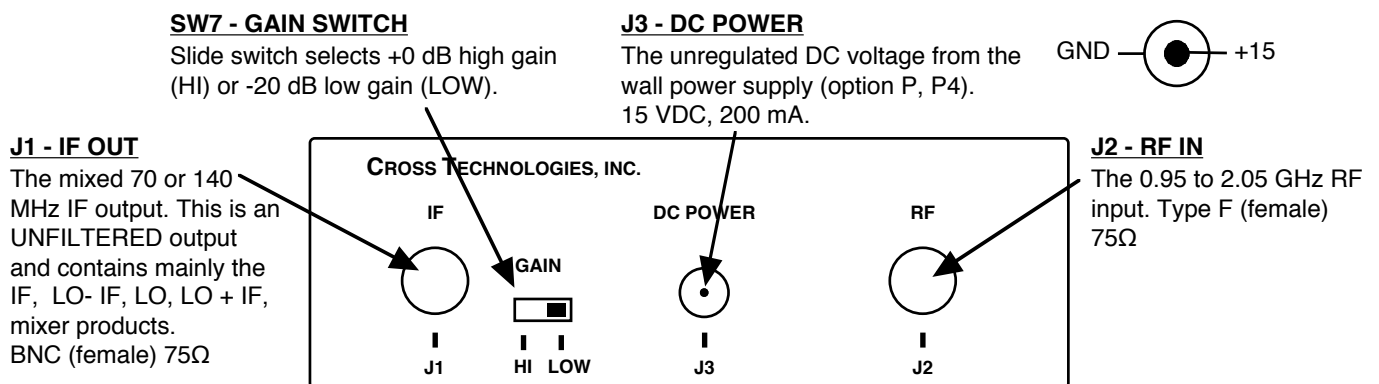
Wipe the exterior with a dry, soft cloth. Use no detergent or cleaning chemicals.

### 2.2 Front Panel Controls/Indicators - Figure 2.1 shows front panel controls and indicators for the 2005-22.



**FIGURE 2.1 2005-22 Front Panel Controls and Indicators**

### 2.3 Rear Panel Input/Output Signals - Figure 2.2 shows the input and output signals to the 2005-22.

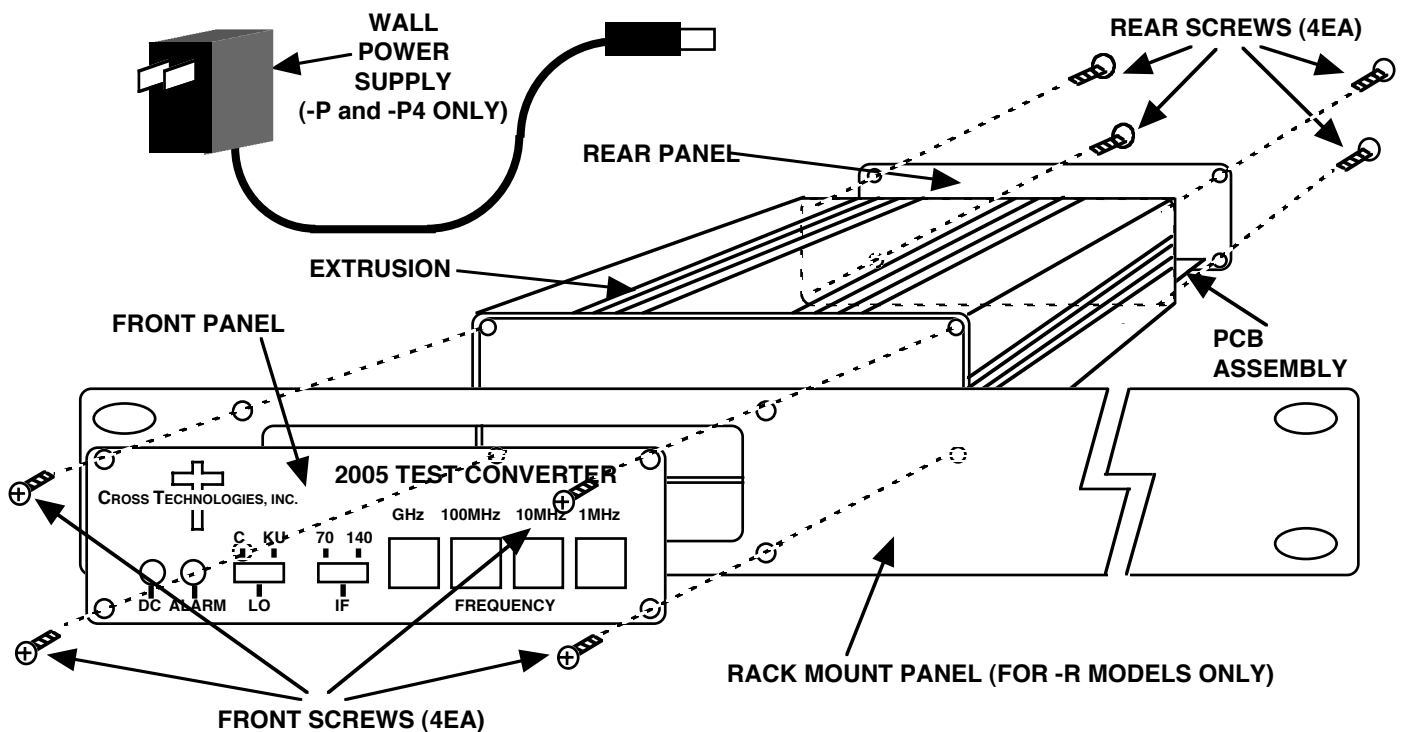


**FIGURE 2.2 2005-22 Rear Panel Inputs and Outputs**

## 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.



**FIGURE 2.3 2005 Assembly Drawing**

## 2.5 Installation / Operation

### 2.5.1 Installing and Operating the 2005-22

1. If using the receiver LNB voltage to power the 2005-22, 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 90-260 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 2.2).
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).

**2.5.2 LO and IF for the 2005-22** - The **2005-22** operates over it's full 950 to 2050 MHz range with high side LO and 70 MHz input. Normally, LNB's use high side LO for C-band and low side LO for Ku-band. Also, note that there will be a spectrum inversion of the input IF modulation with the high side LO. Although the **2005-22** operates over it's full 950 to 2050 MHz range with high side LO and 70 MHz output only, it can be set for low side LO and 140 MHz operation over a limited range as Table 2.1 shows. The PLL will alarm if you try to operate the **2005-02** outside the allowable frequency range shown.

<b>TABLE 2.1 2005-22 TEST DOWNCONVERTER FREQUENCY RANGE FOR VARIOUS SETTINGS</b>			
<b>LO-Side</b>	<b>IF (MHz)</b>	<b>LO Range (MHz)</b>	<b>Allowable Frequency Range (MHz)</b>
C-HIGH	70	1020-2120	950-2050
Ku-LOW	70	1020-1980	1090-2050
C-HIGH	140	1090-2120	950-1980
Ku-LOW	140	1020-1910	1160-2050

**2.5.3 Selecting High Side LO (-C), Low Side LO (-Ku), 70MHz or 140 MHz Input** - To select High Side LO, Low Side LO, 70MHz or 140 MHz Input set SW5 and SW6 on the front panel (see Figure 2.1) to the desired position.

**2.5.4 Selecting the Gain** - The gain of the 2005 can be selected for +0 dBm (HI gain) or -20 dBm (LOW gain) with SW7 on the rear panel (see Figure 2.2).

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