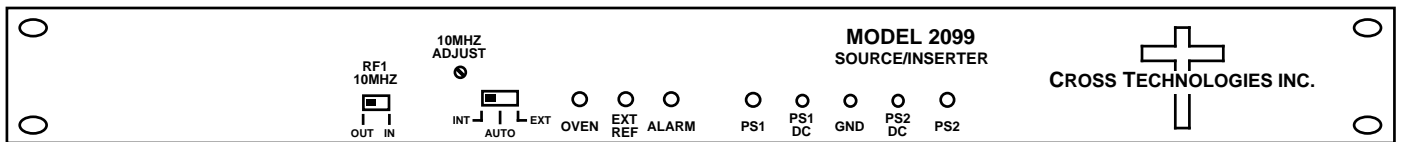


# Instruction Manual

# Model 2099-1748 10MHz Source Inserter

June 2009 Rev A



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# INSTRUCTION MANUAL

## MODEL 2099-1748 10MHz Source/Inserter

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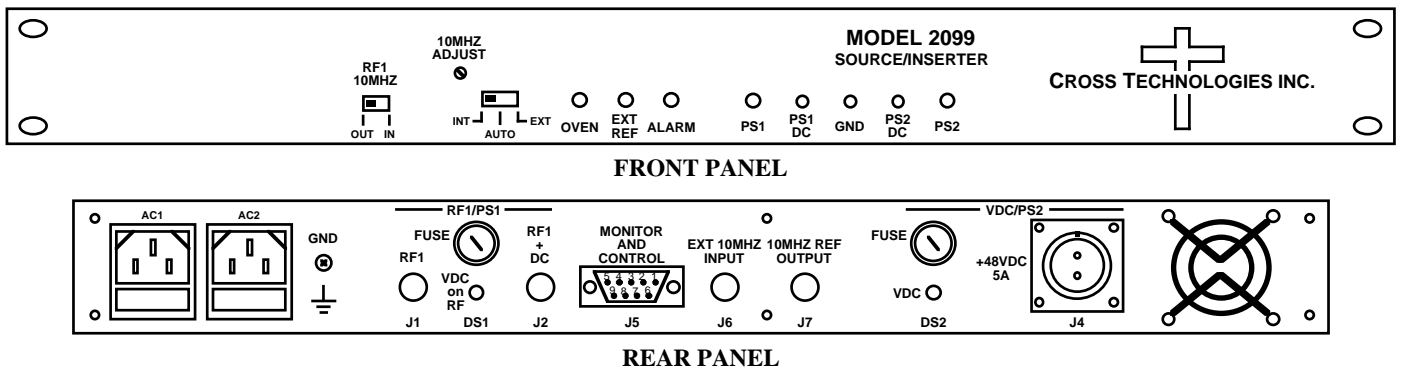
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# MODEL 2099-1748 10MHz Source/Inserter

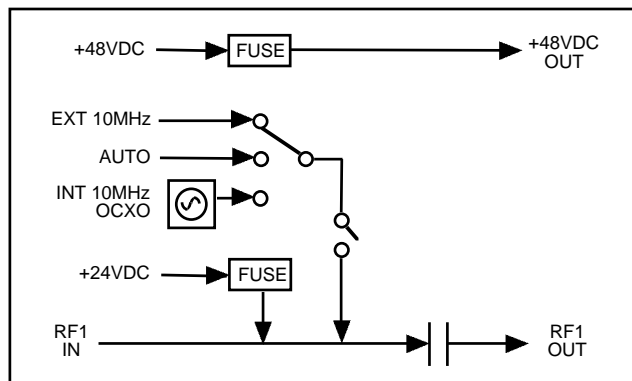
## 1.0 General

### 1.1 Equipment Description

The 2099-1748 10MHz Source/Inserter is a 10MHz,  $\pm 0.01$  ppm oven controlled crystal oscillator (OCXO) with circuitry to insert the 10MHz signal and DC voltage (PS1) on the L-band, RF1 line. A DC connector also provides a +48VDC, 5A output (PS2). Two front panel switches switch the 10MHz reference in or out on RF1 and select internal, external or auto 10MHz. Front panel LEDs indicate DC power (green), alarm (red), external 10MHz (yellow), and OCXO oven warm-up (yellow). Rear panel LEDs indicate the presence of voltage on either RF1 or the DC connector. A summary alarm contact closure or open on alarm is available on a DB9 connector. Connectors are BNC female for RF and 10MHz output and external input signals, and an Amphenol MS connector provides the +48VDC, 5A DC output from PS2. +24VDC can be inserted on the RF1 line, and +48VDC is available on the DC connector by installing separate fuses for each. The unit is powered by 100-240  $\pm 10\%$  VAC, 47-63 Hz supply, and housed in a 1RU x 15"D chassis.



**FIGURE 1.1 Front and Rear Panels**



**FIGURE 1.2 Block Diagram**

## 1.2 Technical Characteristics

**TABLE 1.1 Equipment Specifications\***

### -----10 MHz REFERENCE-----

#### Oscillator

Frequency	10 MHz
Stability	± 0.01 ppm max over temp
Aging	± 0.001 ppm per day • ± 0.1 ppm per year
Warm Up	± 0.1 ppm, 4 minutes • ± 0.01 ppm, 1 hour
Tuning Adjustment	± 1 ppm

Phase Noise @ Freq	10Hz	100Hz	1kHz	10kHz
dBc/Hz	-110	-140	-155	-160

#### Output Characteristics (on L-band RF)

Level	+2 dBm ± 2 dB
Harmonics	<-30 dBC, <-40 dBC typ
Level to non-insert end	<-20 dBm, <-30 dBm typ

#### Input/Output Characteristics (on BNC connectors)

Impedance, Return Loss	50Ω / 75Ω, 18 dB
Level	+3 dBm ± 3 dB
Harmonics (Output)	< -30 dBC, < -40 dBC typ.

### -----L-BAND INSERTION-----

#### RF Input/Output Characteristics

Impedance	50Ω
Return Loss	> 12 dB
Frequency	950 - 2150 MHz
Insertion Loss	1 ± 0.5 dB
Frequency Response	±1.0 dB, 950 - 2150 MHz; ± 0.5 dB, 36 MHz BW

#### DC Power Characteristics

Voltage/Current, PS1/RF1	+24 VDC, 2.5 A max.
Voltage/Current, PS2/MS	+48 VDC, 5.0 A max.
Load Regulation	Call for other voltages ±5 %

### -----CHASSIS/OTHER-----

#### Controls & Indicators

INT/EXT/AUTO 10 MHz	front panel SP3T switch
RF1 10 MHz Insert	front panel SPDT switch
Power	Green LEDs
Alarm	Red LED
Oven Warm-up	Yellow LED
External Reference	Yellow LED
VDC on RF1/MS	Yellow LEDs

#### Other

RF Connectors	BNC, 50Ω (female) (BNC, 75Ω, <b>option B</b> ) (Type F, 75Ω, <b>option F</b> )
10 MHz Connectors	BNC, 50Ω/75Ω (female)
Alarm Connector	DB9 (female) - NO or NC contact closure on Alarm
Size	19 inch, 1RU standard chassis • 1.75"H x 16.0"D
Power	100-240 ±10% VAC, 47-63 Hz, 90 Watts max.

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

## 1.3 Monitors

### Alarm monitoring

**Connector:** Rear panel, DB-9 female

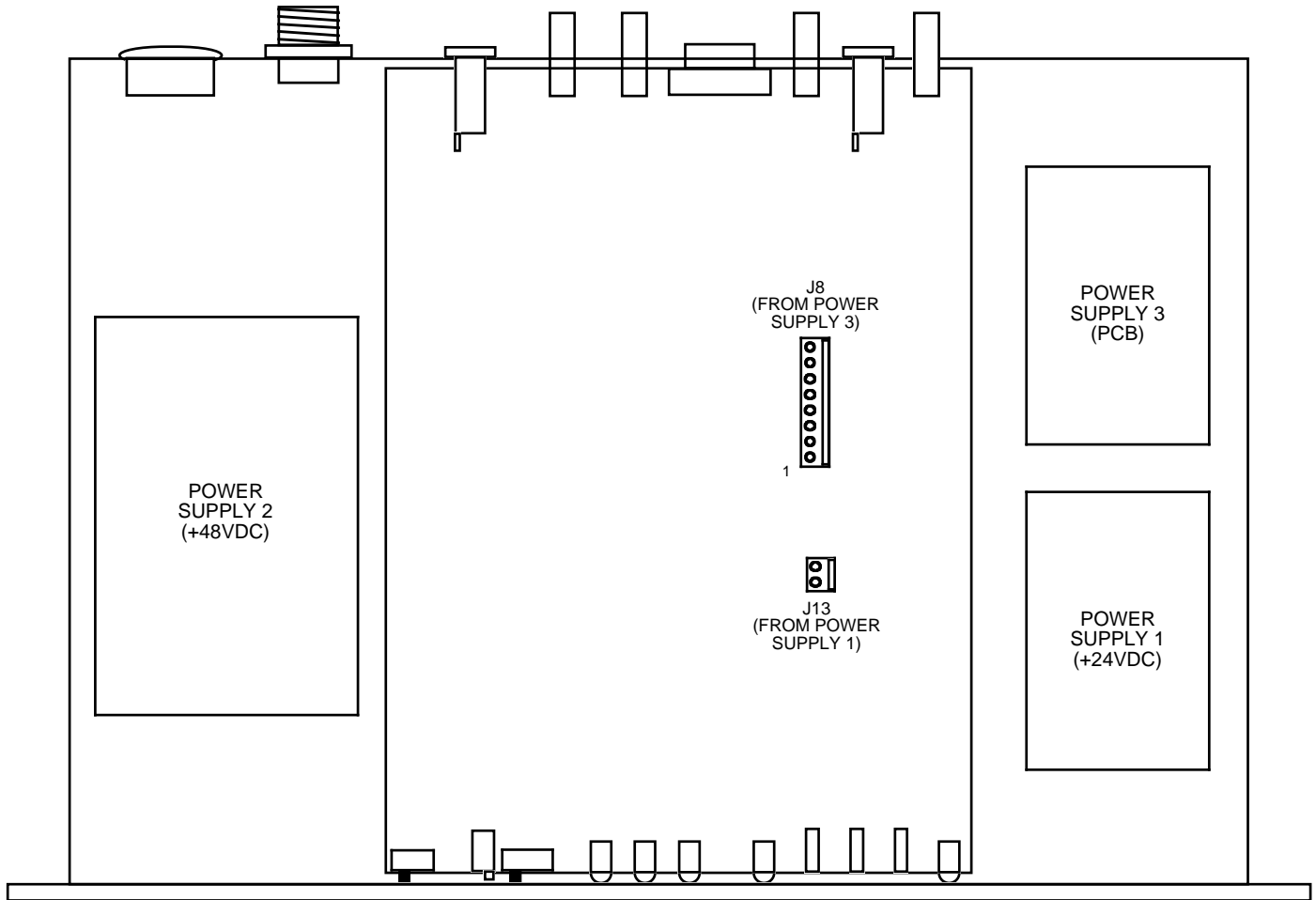
<b>J5 Pinouts (RS-232C/422/485)</b>	
<b>Pin</b>	<b>Function</b>
1	Alarm = Logic 0 (Gnd) if power supply PS2 (+48VDC) is < 36VDC*
2	Alarm = Logic 0 (Gnd) if power supply PS1 (+24VDC) is < 15VDC*
3	Alarm = Logic 0 (Gnd) if 10MHz currently selected (INT or EXT) is not present*
4	Not Connected
5	GROUND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Connected
9	Alarm Relay: Normally Closed

\*Internally pulled up to +5V (Logic 1) when not alarmed.

## 2.0 Installation

### 2.1 Mechanical

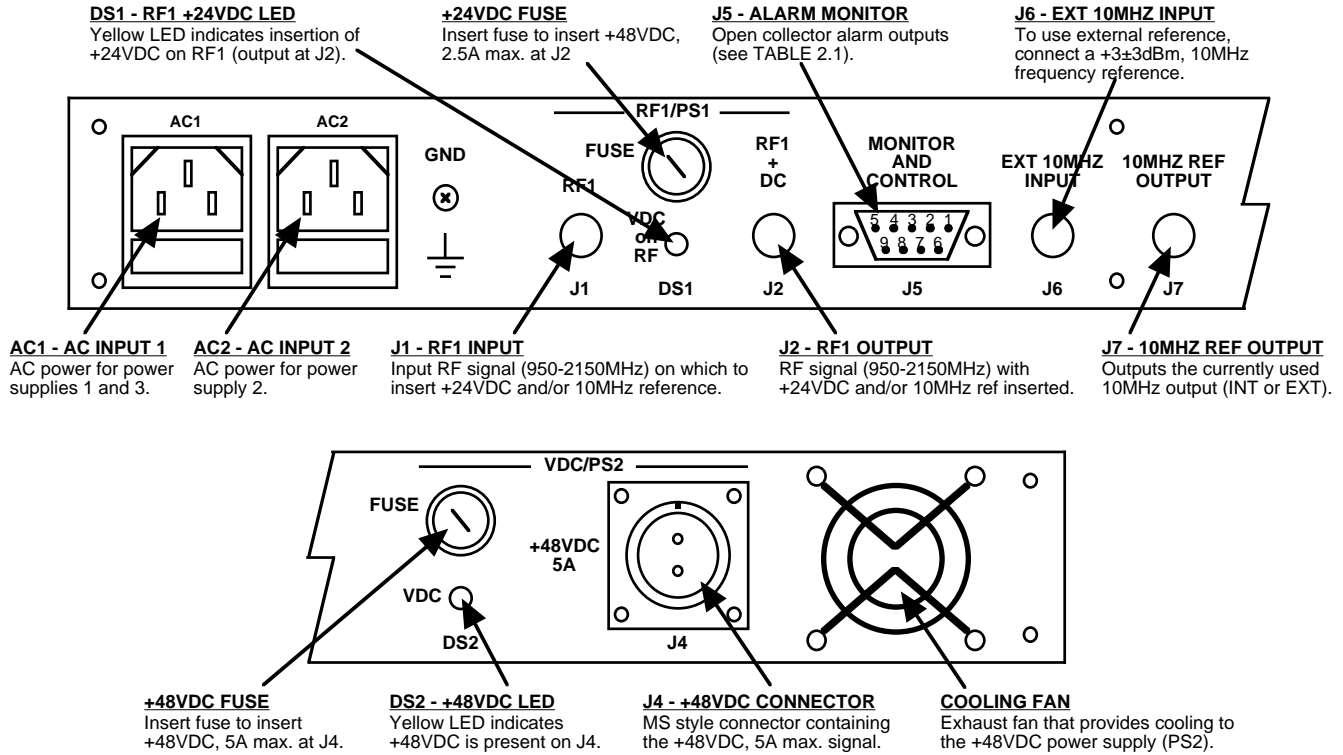
The 2099-1748 consists of one RF PCB housed in a 1 RU (1 3/4 inch high) by 16 inch deep chassis. Two switching,  $\pm 12$ , +24, +5 VDC power supplies provide power for the PCB and for the +24VDC, 2.5A insertion. A separate +48VDC power supply provides +48VDC, 5.0A to the MS connector on the rear panel. The 2099-1748 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2099-1748 is assembled.



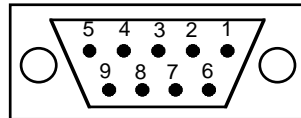
**FIGURE 2.1 Mechanical Assembly**

## 2.2 Rear Panel Inputs, Outputs, and Indicators

Figure 2.2 shows the input and output signals and indicators on the rear panel.



**FIGURE 2.2 Rear Panel Outputs**

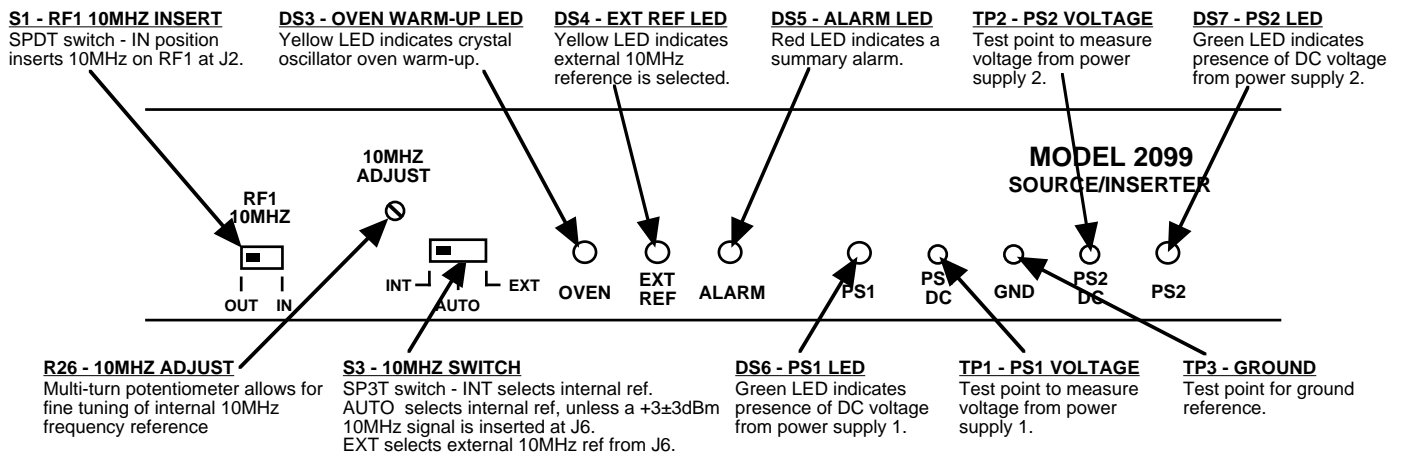


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\*Internally pulled up to +5V (Logic 1) when not alarmed.

## 2.3 Front Panel Controls and Indicators

Figure 2.3 shows the front panel controls and indicators.

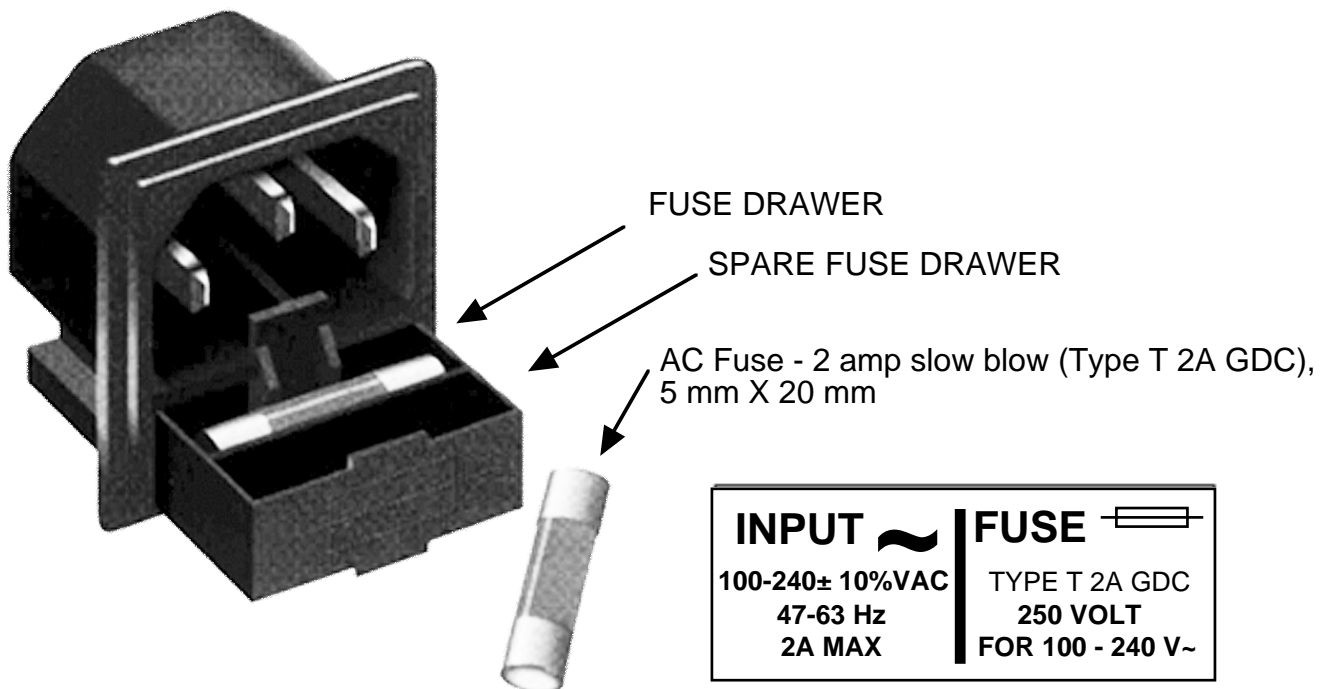


**FIGURE 2.3 Front Panel Controls and Indicators**

## 2.4 Installation / Operation

### 2.4.1 Installing and Operating the 2099-1748 10MHz Source/Inserter

1. Connect 950-2150 MHz signal to RF1 IN, J1 (Fig. 2.2).
2. Connect RF1+DC OUT, J2, to desired equipment (Fig. 2.2).
3. Connect +48VDC, J4, to desired equipment (Fig. 2.2).
4. If desired, insert external 10MHz, +3 ± 3 dBm signal into EXT REF INPUT, J6 (Fig. 2.2).
5. Select which reference mode to use (INT, AUTO, or EXT) using SP3T switch, S3 (Fig. 2.3).
6. Select whether or not to insert 10MHz on RF1 and make selection using SPDT switch, S1 (Fig. 2.3).
7. Monitor the 10MHz reference currently in use using 10MHz REF OUTPUT, J7 (Fig. 2.2).
8. Adjust the internal reference, if needed, using the 10MHz ADJUST potentiometer (Fig. 2.3).
9. Install 2.5A fast-blo fuse in +24VDC fuseholder if +24VDC, 2.5A max is to be inserted at RF1 OUTPUT, J2 (Fig. 2.2).
10. Install 5A slow-blo fuse in +48VDC fuseholder if +48VDC, 5A max is to be inserted on J4 (Fig. 2.2).
11. Connect 100-240 ±10% VAC, 47 - 63 Hz to AC1 and AC2 connectors on the rear panel (Fig. 2.2).
12. Be sure DS6 (PS1 DC, green) and DS7 (PS2 DC, green) are on (Fig. 2.3).
13. Monitor PS1 and PS2 voltage levels using provided test points (Fig. 2.3).
14. Wait for DS5 (OVEN, yellow) to go off to insure that the oscillator oven is stabilized (Fig. 2.3).
15. Make sure that DS5 (ALARM, red) is off and/or that there are no alarm contact closures at DB9 MONITOR connector, J5 (Figures 2.2 and 2.3).
16. **AC Fuses** - 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 2.4. There is a spare fuse in the near slot. If a fuse continues to open, the power supply is most likely defective.



**FIGURE 2.4 Fuse Location and Spare Fuse**



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