Instruction Manual

Model 2099-24

10MHz Source/Inserter, Redundant Power

October 2020, Rev. A

```
ALARM  ○—○              MENU      LNB1  +24.2V @  0.249A      ALARM ○    ○ EXT REF        MODEL 2099
DC ON  ○—○          ▲              LNB2  +23.8V @  0.251A      PSA   ○    ○ REMOTE       SOURCE / INSERTER
REF ON ○—○          ▼ ○                                       PSB   ○    ○ OVEN
       LNB1  LNB2    ◄ ►  EXECUTE                                                      CROSS TECHNOLOGIES INC.
```
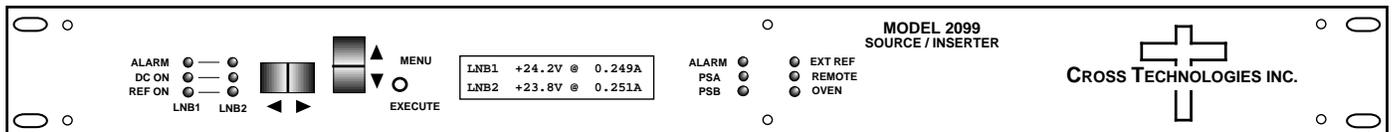
Data, drawings, and other material contained herein are proprietary to Cross Technologies, Inc.,

but may be reproduced or duplicated without the prior permission of Cross Technologies, Inc.

for purposes of operating the equipment. Printed in USA.

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

CROSS TECHNOLOGIES, INC.

6170 Shiloh Road
Alpharetta, Georgia 30005

(770) 886-8005
FAX (770) 886-7964
Toll Free 888-900-5588

WEB: www.crosstechnologies.com
E-MAIL: info@crosstechnologies.com

INSTRUCTION MANUAL

MODEL 2099-24 10MHz Source/Inserter, Redundant Power

<u>**WARRANTY**</u> - 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 not other warranties, express or implied, except as stated herein.

CROSS TECHNOLOGIES, INC.

6170 Shiloh Road
Alpharetta, Georgia 30005

(770) 886-8005
FAX (770) 886-7964
Toll Free 888-900-5588

WEB: www.crosstechnologies.com
E-MAIL: info@crosstechnologies.com

Model 2099-24
Model 2099-24 10MHz Source/Inserter, Redundant Power

1.0 General
1.1 Equipment Description

The 2099-24 10 MHz Source/Inserter provides a 10 MHz, ± 0.01 ppm oven controlled crystal oscillator (OCXO) with circuitry to insert the 10MHz signal and +24 on two L-band lines for two LNBs. Multi-function switches select +24 VDC LNB power for insertion on either/both LNB lines, internal or External (Option E) 10 MHz, and insertion of 10 MHz on the L-band lines. LEDs indicate DC power (green), Reference insertion (green), alarm (red), remote operation (yellow), and OCXO oven warm-up (yellow). The External Reference option (Option E) provides an external reference input which can be used to lock the internal 10 MHz source to a high stability external frequency reference or it may be inserted directly into the L-Band lines. Remote control allows remote configuration of front panel commands and monitoring LNB1 and LNB2 voltage and current. Parameter selection and each LNB voltage and current appear on the LCD display. Connectors are BNC female for RF and 10 MHz input and output signals. Redundant AC power is 100-240 ±10% VAC, 47-63 Hz. The chassis is 1 RU, 12" deep.
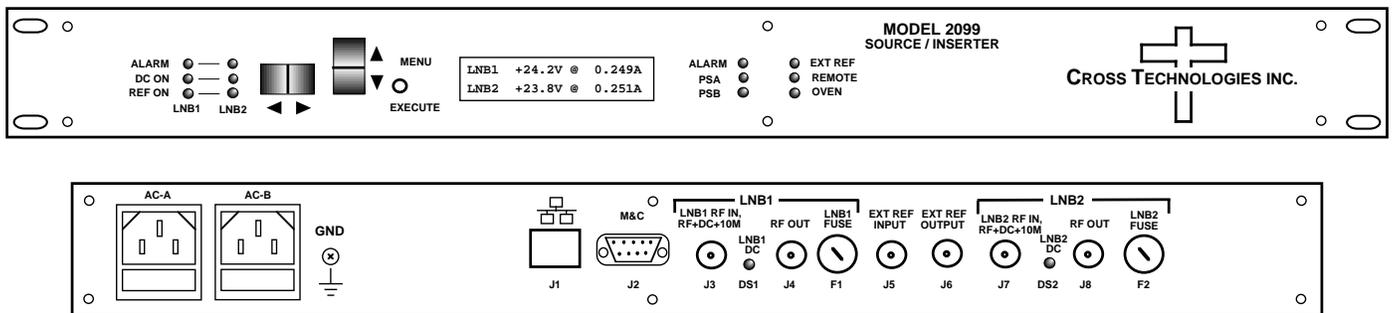
Front and Rear Panels (Shown with option - E)

FIGURE 1.1   Model 2099-24 Front and Rear Panels
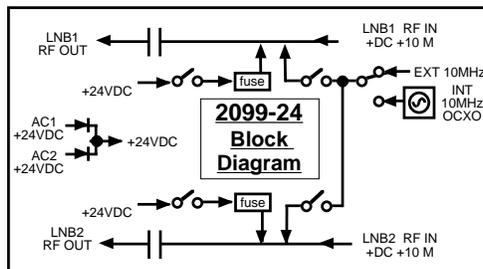
FIGURE 1.2   Model 2099-24 10MHz Source/Inserter Block Diagram

1.2 Technical Characteristics

TABLE 1.0   2099-24 10MHz Source/Inserter*

TABLE 1.0 2099-24 Source Inserter*			
10 MHz Reference		**L-Band Insertion**	
Output Characteristics (on L-Band RF)		**RF Input/Output Characteristics**	
Level	+2 dBm ±2 dB	Frequency	950 to 2150 MHz & 10 MHz
Harmonics	< -30 dBC, < -40 dBC Typ.	Impedance	50Ω
Level to non-insert end	< -20 dBm, < -30 dBm Typ.	Return Loss	> 12 dB, 0.95 to 1.5 GHz > 10 dB, 1.5 to 2.15 GHz
Input/Output Characteristics (on BNC Connectors)		Insertion Loss	< 1dB, 0.95 to 1.5 GHz < 2 dB, 1.5 to 2.15 GHz
Impedance, Return Loss	50Ω / 75Ω, 14 dB	Frequency Response	±1.0 dB, 950 to 2150 MHz; ±0.5 dB, 36 MHz BW
Level	+3 dBm ± 3 dB		
Harmonics (Output)	< -30 dBC, < -40 dBC Typ.	**LNB1, LNB2 DC Power Characteristics**	
Oscillator		Voltage/Current	+24 ±1 VDC, 0.5 A, max.
Stability	± 0.01 ppm max. over temp	Load Regulation	±5 %
Aging, per day	± 0.001 ppm		
Aging, per year	± 0.1 ppm		
Warm Up, 4 Minutes	± 0.1 ppm		
Warm Up, 1 Hour	± 0.01 ppm		
Tuning Adjust	± 0.5 ppm		

Phase Noise @ Frequency	10 Hz	100 Hz	1 kHz	10 kHz
dBC/Hz	110	140	149	149

Chassis / Other	
Control Indicators	
Internal/External 10 MHz Select	FP Switch or M&C Select; External Yellow LED
10 MHz Insert Select	FP Switch or M&C Select; Green LED
LNB1, LNB2 Insert	FP Switch or M&C Select; Green, Rear Yellow LED
LNB1, LNB2 Volts and Amps	Front Panel Display and M&C
Power, Alarm, Reference	Green LED, Red LED, Green LED
Oven, External Reference, Remote	Yellow LED, Yellow LED, Yellow LED
Other	
RF Connectors	BNC, 50Ω (female)
10 MHz Connectors	BNC, 50 (female) **(Works for 50Ω or 75Ω)**
Alarm/Remote Connector	DB9 (female) - NO or NC Closure on Alarm
Size	19 inch, 1 RU Chassis, 1.75" High X 12.0" Deep
Power, Redundant Standard	100 - 240 ±10% VAC, 47 - 63 Hz, 50 watts maximum

*10˚C to 40˚C; Specifications subject to change without notice   © Cross Technologies, Inc. 2016

1.2 Technical Characteristics Continued...

Options	
- E	External 10 MHz Reference, Auto Detect and Restore
Common Interface/Standard RS232	
- W8	Ethernet, with Web Browser
- W18	Ethernet, with Web Browser and SNMP
- W28	Ethernet, with TCP/IP, Telnet®
Connectors/Impedance	
- B	75Ω BNC
- F	75Ω F-Type
- NN	50Ω N-Type
- SS	50Ω SMA
*10˚C to 40˚C; Specifications subject to change without notice	© Cross Technologies, Inc. 2016

1.3 Monitor and Control Interface

A) Remote Serial Interface

Protocol: RS-232C/422/485, 9600 baud rate, no parity, 8 data bits, 1 start bit, and 1 stop bit.

M&C Cable Diagram - Cross Technologies Frequency Converters and Frequency Sources

Female DB-9   Male DB-9
PC Com Port

```
1                                                                        1
2  ◄─────────────────┐    ┌─────────────────►  2
3  ◄─────────────────┼────┼─────────────────►  3
4  ◄────────┐         │    │                     4
5  ◄────────┤         └────┼─────────────────►  5
6  ◄────────┘              │                     6
7  ◄────────┐              │                     7
8  ◄────────┘                                    8
9                                                9
```
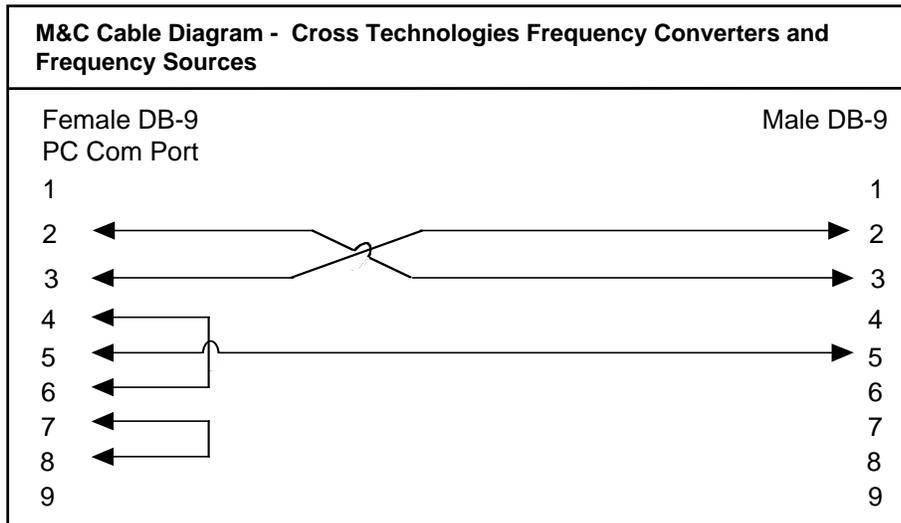
Connector: Rear panel, DB-9 female

TABLE 2.1 J19 Pinouts (DB9)	
Pin	Function
1	Rx- (RS 485)
2	Rx+ (RS-232C) (RS485)
3	Tx+ (RS-232C) (RS485)
4	Tx- (RS485)
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Open=ALARM
8	Not Used
9	Alarm Relay: Closed=ALARM

B) Status Requests

Table 1.1 lists the status requests for the 2099-24 10MHz Source/Inserter and briefly describes them.

* PLEASE NOTE: The two character {aa}(OO-31) prefix, in the table below,
  should be used ONLY when RS-485, (OPTION-Q), is selected.

Table 1.1 2099-24 Status Requests		
Command		**Description**
Get LNB1 DC Voltage Insert State	{aaSS}	returns {aaSSx}
		where: x = 1 if DC voltage is inserted on the LNB1 loop through.
		x = 0 if DC voltage is disabled on the LNB1 loop through.
Get LNB1 10MHz Reference Insert State	{aaSD}	returns {aaSDx}
		where: x = 1 if the 10 MHz reference is inserted on the LNB1 loop through.
		x = 0 if the 10 MHz reference is disabled on the LNB1 loop through.
Get LNB2 DC Voltage Insert State	{aaSL}	returns {aaSLx}
		where: x = 1 if DC voltage is inserted on the LNB2 loop through.
		x = 0 if DC voltage is disabled on the LNB2 loop through.
Get LNB2 10MHz Reference Insert State	{aaSB}	returns {aaSBx}
		where: x = 1 if the 10 MHz reference is inserted on the LNB2 loop through.
		x = 0 if the 10 MHz reference is disabled on the LNB2 loop through.
Get LNB1 Inserted Voltage and Current	{aaSJ}	returns {aaSJxxxxx,yyyyy}
		where: xxxxx = Measured DC voltage inserted on the LNB1 loop through.
		where: yyyyy = Measured DC current inserted on the LNB1 loop through.
Get LNB2 Inserted Voltage and Current	{aaSK}	returns {aaSKxxxxx,yyyyy}
		where: xxxxx = Measured DC voltage inserted on the LNB2 loop through.
		where: yyyyy = Measured DC current inserted on the LNB2 loop through.
Get 10 MHz Reference Operating Mode	{aaSM}	returns {aaSMx}
(Option E Only)		where: x = 1 if the mode is Internal Reference.
		x = 2 if the mode is External Pass. (option -E only)
		x = 3 if the mode is External Pass Auto. (option -E only)
		x = 4 if the mode is External Lock.(option -E only)
		x = 5 if the mode is External Lock Auto. (option -E only)
Get IP address (ethernet optional)	{Si}	returns {aaSixxx.xxx.xxx.xxx}
		where xxx.xxx.xxx.xxx = IP address
Get subnet mask (ethernet optional)	{Ss}	returns {Ssxxx.xxx.xxx.xxx}
		where xxx.xxx.xxx.xxx = subnet mask

B) Status Request (continued from page 7...)

Table 1.1 2099-24 Status Requests (continued...)		
Command	**Syntax***	**Description**
Get alarm status (ethernet optional)	{SA}	returns {SA}
		where a = LNB Alarm State (0 for alarm off; 1 for alarm on)
		b = LNB alarm state (0 for alarm off; 1 for alarm on)
		c = Summary alarm state (0 for alarm off; 1 for alarm on)
Get all monitored statuses	{Sa}	returns{Sabcdefghijklmn}
		where:
		b = DC CONV A status (0 = ok, 1 = voltage too high, 2 = voltage too low)
		c = DC CONV B status (0 = ok, 1 = voltage too high, 2 = voltage too low)
		d = +18V PSA status (0 = ok, 1 = voltage too high, 2 = voltage too low)
		e = +18V PSB status (0 = ok, 1 = voltage too high, 2 = voltage too low)
		f = LNB1 V status (0 = ok, 1 = voltage too high, 2 = voltage too low)
		g = LNB1 I status (0 = ok, 1 = current too high)
		h = LNB2 V status (0 = ok, 1 = voltage too high, 2 = voltage too low)
		i = LNB2 I status (0 = ok, 1 = current too high)
		j = Internal Reference Mode status(0 = ok, 1 = internal reference low and Internal Reference Mode is selected)
		k = External Reference Mode status(0 = ok, 1 = external reference low and External Pass Reference Mode is selected)
		l = External Pass Auto Reference Mode status(0 = ok, 1 = external reference low and External Pass Auto Reference Mode is selected)
		m = External Lock Reference Mode status(0 = ok, 1 = external reference low, 2 = pll cannot lock)
		n = External Lock Auto Reference Mode(0 = ok, 1 = external reference low, 2 = pll cannot lock)
Get product/model info	{Sv}	returns {Sv2099-24y..yverZZZZ}
		where 2099-24 = product model
		y..y = list of options, if any
		"ver" = separates model & options from firmware version
		ZZZZ = firmware version (e.g., 4.00)
Get Reference Frequency offset	{aaSO}	returns {aaSOxxxxx}
		where xxxxx = offset value

C) Commands

Table 1.2 lists the commands for the 2099-24 10MHz Source/Inserter and briefly describes them. After a command is sent the 2099-24 10MHz Source/Inserter sends a return ">" indicating the command has been received and executed.

General Command Format - The general command format is {aaCND...}, where:
  { = start byte
  aa = address (RS-485 only **option -Q**)
  C = 1 character, either C (command) or S (status)
  N = 1-digit command or status number, 1 through 9
  D = 1 character or more of data (depends on command)
  } = stop byte

* PLEASE NOTE: The two character {aa}(00-31) prefix, in the table below,
  should be used ONLY when RS-485, (option Q) is selected.

Table 1.2 2099-24 Commands		
Command	**Syntax***	**Description**
Set LNB1 DC Voltage Insert	{aaCSx}	where: x = 1 to enable DC Voltage on the LNB1 loop through.
		x = 0 to disable DC Voltage on the LNB1 loop through.
Set LNB1 10 MHz Reference Insert	{aaCDx}	where: x = 1 to enable the 10 MHz reference on the LNB1 loop through.
		x = 0 to disable the 10 MHz reference on the LNB1 loop through.
Set LNB2 DC Voltage Insert	{aaCLx}	where: x = 1 to enable DC Voltage on the LNB2 loop through.
		x = 0 to disable DC Voltage on the LNB2 loop through.
Set LNB2 10 MHz Reference Insert	{aaCBx}	where: x = 1 to enable the 10 MHz reference on the LNB2 loop through
		x = 0 to disable the 10 MHz reference on the LNB2 loop through.
Set 10 MHz Reference Operating Mode	{aaCMx}	where: x = 1 to set the mode to Internal Reference.
(Option E only)		x = 2 to set the mode to External Pass.
		x = 3 to set the mode to External Pass Auto.
		x = 4 to set the mode to External Lock.
		x = 5 to set the mode to External Lock Auto.
Clear Fault (External Lock Auto Mode)	{aaCFx}	where : x = 1 to clear a FAULT condition.
Set Reference Frequency Offset	{aaCOxxxxx}	where : xxxxx = offset value
		range: -2000 to +2000
* PLEASE NOTE: The Address (aa) should only be used when RS-485 is selected.		

2.0 Installation

2.1 Mechanical

The 2099-24 10MHz Source/Inserter consists of one RF PCB housed in a 1 RU (1 3/4 inch high) by 12 inch deep chassis. Redundant switching, +24 VDC power supplies provides power for the assemblies. The 2099-24 10MHz Source/Inserter can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2099-24 10MHz Source/Inserter is assembled.
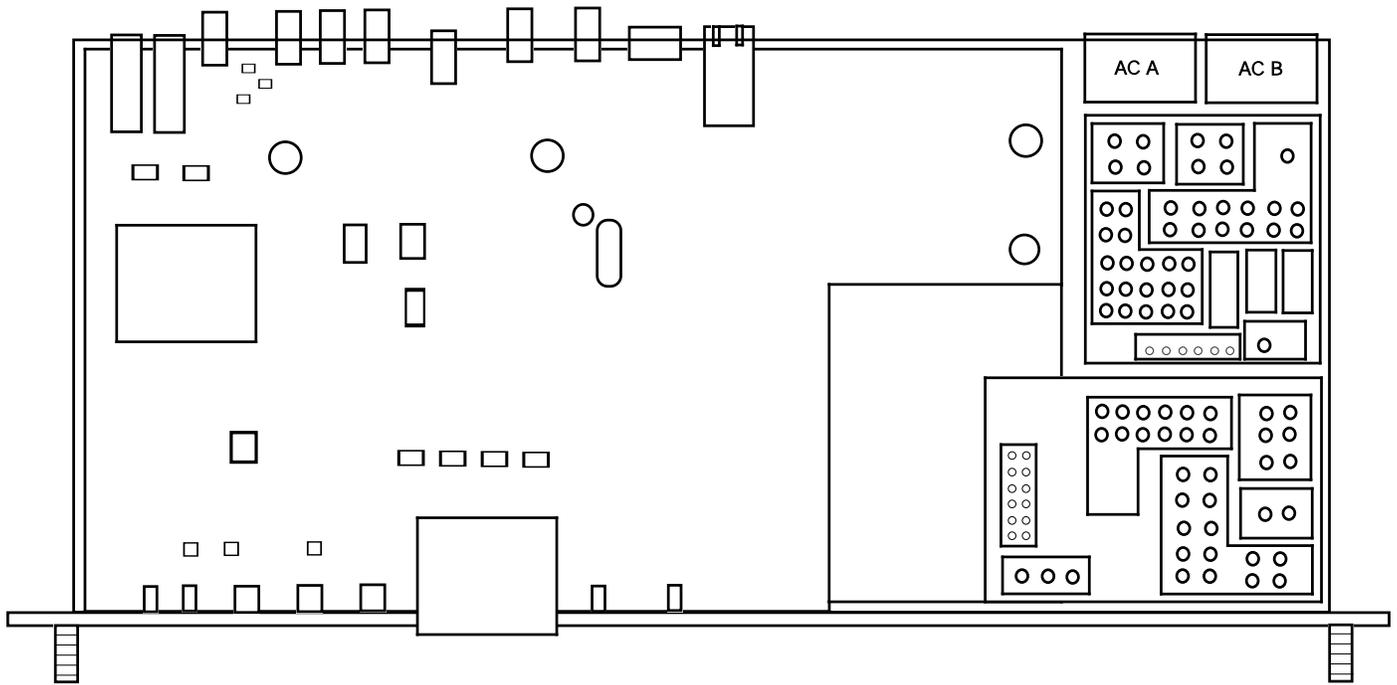
FIGURE 2.0   2099-24 10MHz Source/Inserter Mechanical Assembly

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

AC-A & AC-B POWER IN
AC input for switching
power supplies A & B.
100-240 ±10% VAC, 47-60 Hz.

J1- ETHERNET CONNECTION
RJ45 Ethernet Connector
(Optional)

J2 - MONITOR AND CONTROL
DB9 female connector.
See Table 2.1.

J6 10MHz REF OUTPUT
10MHz reference output,
+3 dBm ± 3 dB. 50Ω/75Ω
BNC female connector
(option -E).

J7 LNB2, RF OUT
950-2150 MHz. Capacitively
coupled and looped from
LNB1 RF input. 50Ω BNC
female connector.

J8 LNB2, RF INPUT
950-2150 MHz input from
LNB1. Provides LNB voltage
and 10MHz ref. insertion.
50Ω BNC female connector.

F2 - LNB1 FUSE
3/4A Fast Blo,
1/4" Fuse.

J3 LNB2, RF INPUT
950-2150 MHz input from
LNB1. Provides LNB voltage
and 10MHz ref. insertion.
50Ω BNC female connector.

J4, RF OUT
950-2150 MHz. Capacitively
coupled and looped from LNB2
RF input. 50Ω BNC
female connector.

**J5 - EXTERNAL
REFERENCE INPUT
(Option -E)**
External frequency reference input
+3 dBm ± 3 dB, BNC, female connector.

DS2 LNB1 ALARM DC
Lights yellow when LNB1
voltage is present on the
RF IN (J7) center pin.

DS1 - LNB2 ALARM DC
Lights yellow when LNB1
voltage is present on the RF IN
(J3) center pin.

F1 - LNB2 Fuse
3/4A Fast Blo,
1/4" Fuse

FIGURE 2.1   2099-24 Rear Panel Outputs
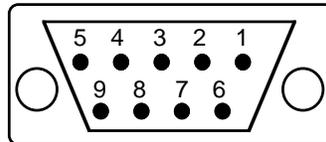
TABLE 2.1 J19 Pinouts (DB9)	
Pin	Function
1	Rx- (RS 485)
2	Rx+ (RS-232C) (RS485)
3	Tx+ (RS-232C) (RS485)
4	Tx- (RS485)
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Open=ALARM
8	Not Used
9	Alarm Relay: Closed=ALARM

2.3 Front Panel Indicators -The following are the front panel indicators.

DS1 - LNB1
• <u>Alarrm</u> - Indicates voltage insertion out of range (or fuse alarm).
• <u>DC ON</u> - Indicates DC presence on LNB1 RF output.
• <u>REF ON</u> - Indicates 10 MHz insertion on LNB1 RF output.

S3- MENU EXECUTE BUTTON
Press this to get into Program mode and press again to execute any changes.

LCD DISPLAY
Display shows Current Mode LNB1 and LNB2 Voltage and Current

DS3 -
• <u>Summary Alarrm</u> - Indicates a problem with an internal subsystem or a problem with the external reference input.
• <u>PSA</u> - AC power on power supply 'A'..
• <u>PSB</u> - AC power on power supply 'B'..

```
ALARM       o  —  o          MENU
DC ON       o  —  o                         LNB1 +24.2V @  0.249A          ALARM   o        o  EXT REF
REF ON      o  —  o                         LNB2 +23.8V @  0.251A          PSA     o        o  REMOTE
           LNB1  LNB2                                                     PSB     o        o  OVEN
              ◄ ►              EXECUTE
```

DS2 - LNB2
• <u>Alarrm</u> - Indicates voltage insertion out of range (or fuse alarm).
• <u>DC ON</u> - Indicates DC presence on LNB2 RF input.
• <u>REF ON</u> - Indicates 10 MHz insertion on LNB2 RF input.

S1 - HORIZ. TOGGLE
Horizontal toggle switch that controls which values are being adjusted. Does not function in the normal display mode

S2 - VERT. TOGGLE
Vertical toggle switch that controls values in the Menu items when in program mode. Does not function in the normal display mode

DS4 -
<u>External Reference</u>
Indicates ref. pass or ext. ref. lock has been selected. (option -E)
<u>Remote</u>
Indicates remote communication is enabled.
<u>Oven</u>
Indicates internal reference oven is actively heating. NOTE: Unit wiil not be within specified frequency tolerance until indicator is extinguished.

FIGURE 2.2   2099-24 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2099-24 10MHz Source/Inserter

    1. PLEASE NOTE: Unit must have 1 RU Air Space above and 1 RU Air Space below.

2. Connect 100-240 ±10% VAC, 47-63 Hz to AC-A and AC-B connectors (Figure 2.1).

3. Be sure PSA and PSB LEDs (green, POWER) are on (Figure 2.2).

4. Be sure the ALARM LED) is off and/or contact closure at DB9 ALARM connector, J2, is not in an alarm condition.

5. Wait for DS4 LED (yellow, OVEN) to go off to insure that the oscillator oven is stabilized.

6. (Option -E only) Choose one of the five (5) modes (Internal, Ext Pass, Ext Pass Auto, Ext Lock, or Ext Lock Auto) in which to operate the unit.

7. 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.

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.


FUSE DRAWER

SPARE FUSE

AC Fuse - 5 amp slow blow (Type T),
5 mm X 20 mm

INPUT ∿	FUSE ▭
100-240± 10%VAC	TYPE T 5A GDC
47-63 Hz	**250 VOLT**
2A MAX	**FOR 100 - 240 V~**
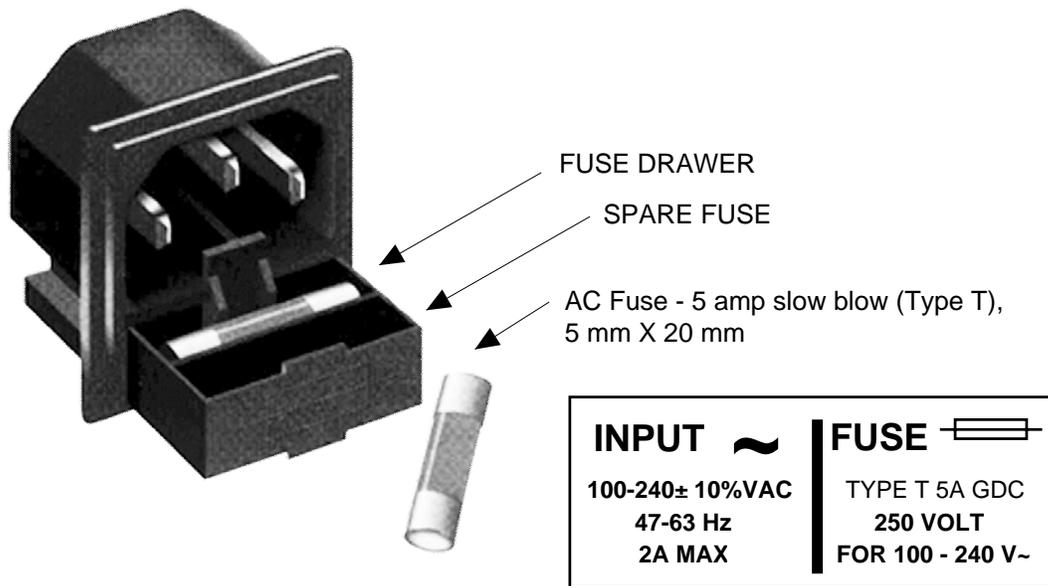
FIGURE 2.3   Fuse Location and Spare Fuse

2.5 Menu Settings

2.5.1 Functions - This section describes operation of the front panel controls. There are three operator switches, the LCD display and alarm indicator LEDs. All functions for the equipment are controlled by these components. The functions are (see Figure 2.4):

> **Power Up**
> **Normal Display**
>
> **Menu 1**   Select Reference Mode (option E)
> **Menu 2**   Select LNB1 DC insert On/Off
> **Menu 3**   Select LNB1 reference insert On/Off
> **Menu 4**   Select LNB2 DC insert On/Off
> **Menu 5**   Select LNB2 Reference insert On/Off
> **Menu 6**   Adjust Internal Reference Frequency Offset
> **Menu 7**   Select Remote Operation On/Off
> **Menu 8**   Select Remote Interface (232, 422, or 485)
> **Menu 9**   Select RS485 Address
> **Menu 10**   Measured 24 VDC From Power Supplies AC-A & AC-B
>
>
> **Save Menu** When "R" is selected from any above menu or at the end.

Alarm indications appear on the LED (see Figure 2.2).

All program changes must start with the operation of the Menu/Execute switch and must also end with the operation of the Menu/Execute switch verified by the "**SAVE SETTINGS?**" Menu. If this sequence is not followed, none of the changes will take effect. No program changes will be evident until they are verified at the "**SAVE SETTINGS?**" Menu.

2.5.2 Power-On Settings

<u>NOTE</u>: THE LAST STATUS OF A UNIT IS RETAINED EVEN WHEN POWER IS REMOVED. WHEN POWER IS RESTORED, THE UNIT WILL RETURN TO IT'S PREVIOUS SETTINGS.

When power is first applied, the LCD display goes through three steps.
      1. The LCD goes black to show all segments are functioning.
   2. The software version will be displayed.

```
2099-24
4.0
```

      3. The present LNB1 and LNB2 inserted voltage and current are shown.

```
LNB1   +24.2V @ 0.249A
LNB2   +23.8V @ 0.251A
```

     The unit is now operational and ready for any changes the operator may desire.

2.5.3 Control Switches

1. <u>Menu/Execute</u> - Any change to the programming of the unit must be initiated by pressing the Menu/Execute switch and completed by pressing the Menu/Execute switch.
2. <u>Horizontal Switch</u> - This switch is mounted so its movement is horizontal and moves the cursor left or right.
3. <u>Vertical Switch</u> - This switch is mounted so its movement is vertical and will toggle settings such as ON/OFF and RS232/422/485. In the case of the LEVEL setting, the vertical switch will increase or decrease the digit that is selected (within the limits of operation).

Figure 2.4   Menu Display and Sequence

Power Up 1:
(Units with ethernet option)

ON POWER UP (1)

```
= = =  IP Addr  = = =
192.168.123.002
```

Power Up 2:

ON POWER UP (2)

```
2099-24W28
4.0
```

Normal Display

NORMAL DISPLAY

```
LNB1 +24.2V @ 0.249A
LNB2 +23.1V @ 0.251A
```

PUSH BUTTON

PUSHING MENU/EXECUTE SEQUENCE

Menu 1 Reference
Mode Select (option -E)

```
REF MODE =          R
INTERNAL
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 2 Select LNB1
DC Insert On/Off

```
LNB1 +24.2 VDC      R
INSERT OFF
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 3 Select LNB1
Reference Insert On/Off

```
LNB1 REFERENCE      R
INSERT = ON
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 4 Select LNB2
DC Insert On/Off

```
LNB2 +23.8          R
INSERT = OFF
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 5 Select LNB2
Reference Insert On/Off

```
LNB2 REFERENCE      R
INSERT = ON
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 6 Adjust Internal
Reference Frequency Offset

```
INTERN FREQ         R
OFFSET = +0000
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 7 Select Remote
 Operation On/Off

```
REMOTE ON           R
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 8 Select Remote
Interface On/Off

```
INTERFACE           R
RS232
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 9 Set RS485
Address

```
RS485 ADDRESS =     R
00
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Menu 10 Measured 24 VDC
From Power Supplies A&B

```
+24V PSA=+23.9 VDC   R
+24V PSB=+23.9 VDC
```
SCROLL <>
SCROLL ⬍   PUSH BUTTON

Save? When "R" is selected
from any above menu or at the end.

```
SAVE SETTINGS?     YN
```
SCROLL <>   PUSH BUTTON

(NOTE: See next page for possible alarm conditions)

Alarm Conditions

If any alarm is on then the status of nine possible alarm conditions will be displayed at the end of the menu.

	Normal (No Alarm Condition)	Alarm Condition
STATUS 1:	PSA 24V ok	PSA 18V high PSA 18V low
STATUS 2:	PSB 24V ok	PSB 18V high PSB 18V low
STATUS 3:	LNB1 V Insert ok LNB1 V Insert off	LNB1 v insert high LNB1 v insert low
STATUS 4:	LNB1 i Insert ok LNB1 i Insert off	LNB1 i insert high LNB1 i insert low
STATUS 5:	LNB2 v Insert ok LNB2 v Insert off	LNB2 v insert high LNB2 v insert low
STATUS 6:	LNB2 I Insert ok LNB2 I Insert off	LNB2 I insert high LNB2 I insert low
STATUS 7:	Reference ok	Internal Ref low External Ref low Ref PLL Not Locked

3.0 Alarm Operations

LNB Power Supply Alarms:

1. **+24V PSA (LNB1 V1A Monitor)**
   This is the +24V DC voltage from power supply A. The summary alarm indicator and contact closure will be set if this voltage is greater than 25V or less than 23V. The unit's Power Supply AC-1 input must be detected before this voltage is monitored for alarm purposes.

2. **+24V PSB (LNB2 V1B Monitor)**
   This is the +24V DC voltage from power supply B. The summary alarm indicator and contact closure will be set if this voltage is greater than 25V or less than 23V. The unit's Power Supply AC-B input must be detected before this voltage is monitored for alarm purposes.

3. **LNB1 V Monitor**
   This is the DC voltage that is inserted at the LNB1 RF loop through. The LNB1 alarm indicator and alarm contact closure will be set if the voltage is too high or too low. If +24V is selected then the unit will alarm if the voltage is greater than 25V or less than 23V.

4. **LNB1 I Monitor**
   This is the current that is measured at the LNB1 RF loop through. The LNB1 alarm indicator and alarm contact closure will be set if the current is greater than 600 milliamps.

5. **LNB2 V Monitor**
   This is the DC voltage that is inserted at the LNB2 RF loop through. The summary alarm indicator and contact closure will be set if the voltage is greater than 25V or less than 23V.

6. **LNB2 I Monitor**
   This is the current that is measured at the LNB2 RF loop through. The summary alarm indicator and contact closure will be set if the current is greater than 600 milliamps.

10 MHz Reference Alarms

1. **Internal Reference Mode (option -E)**

   The summary alarm indicator and contact closure will be set if the internal reference is not detected by the internal reference power detector. The external reference indicator will always be off in this mode.

2. **External Pass Reference Mode (option -E)**

   The summary alarm indicator and contact closure will be set if the external reference power is less than -5 dBm, +/- 1 dBm. The external reference indicator will always be on in this mode.

3. **External Pass Auto Reference Mode (option -E)**

   The summary alarm indicator and contact closure will be set if the external reference power is less than -5 dBm, +/- 1 dBm. The external reference indicator will always be on in this mode.

4. **External Lock Reference Mode (option -E)**

   The summary alarm indicator and contact closure will be set if the external reference power is less than -5 dBm, +/- 1 dBm. The summary alarm indicator and contact closure will be set if the internal reference cannot lock to the external reference. The external reference indicator will always be on in this mode.

5. **External Lock Auto Reference Mode (option -E)**

   The summary alarm indicator and contact closure will be set if the external reference power is less than -5 dBm, +/- 1 dBm. The summary alarm indicator and contact closure will be set if the internal reference cannot lock to the external reference. The external reference indicator will always be on in this mode.

4.0 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 (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.

CROSS TECHNOLOGIES, INC.

6170 Shiloh Road
Alpharetta, Georgia 30005

(770) 886-8005
FAX (770) 886-7964
Toll Free 888-900-5588

WEB: www.crosstechnologies.com
E-MAIL: info@crosstechnologies.com

Printed in USA