

Instruction Manual

Model 4116-24T11

Translator, S-Band to L-Band

Weather Resistant* Unit

June 2014, Rev. C



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INSTRUCTION MANUAL

MODEL 4116-24T11 Translator, S-Band to L-Band

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MODEL 4116-24T11 Translator, S-Band to L-Band, Weather Resistant*

1.0 General

1.1 Equipment Description

The 4116-24T11 Translator converts 2.2 - 2.4 GHz to 0.95 - 1.15 GHz. Front panel LEDs provide indication of DC Power, and PLL Alarm. The S-band to L-band gain is +30 dB, maximum. Connectors are Type N female for the L-band out, S-band in and S-band in Monitor and SMA female for the external 10 MHz reference input. Gain, mute, and internal 10 MHz frequency are controlled by the M&C (Ethernet and/or Status/Control). In AUTO, the 10 MHz reference stays in external if the external level is in the +2 to +8 dBm range. The 4116 is powered by a 100-240 \pm 10% VAC power supply, and mounted in a 8"W X 6"H X 16"D Weather Resistant* enclosure.

NOTE: *Weather Resistant enclosures are designed to be water resistant for installation in an outdoor enclosure/antenna hut OR mounted outdoors on an antenna assembly at their specified temperature ranges. They are designed to be located "out in the elements" (water, sleet, snow, etc.) but they are *not* designed to be "submerged under" water. If an extended temperature range is required, there is an **Extended Temperature** option (**Option W21**; -30°C to +60°C) available at an additional cost. Contact Cross for quote.

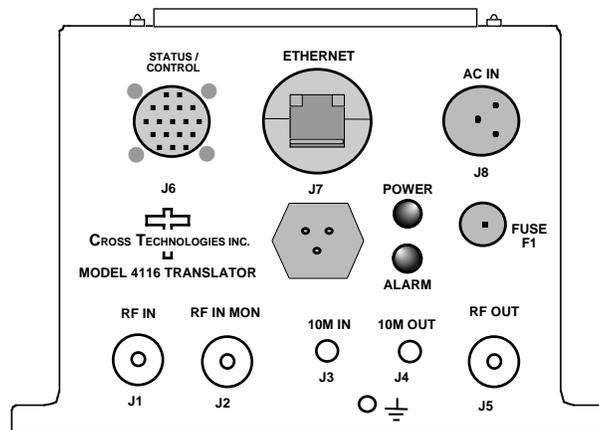


FIGURE 1. Model 4116-24T11, Translator Front Panel

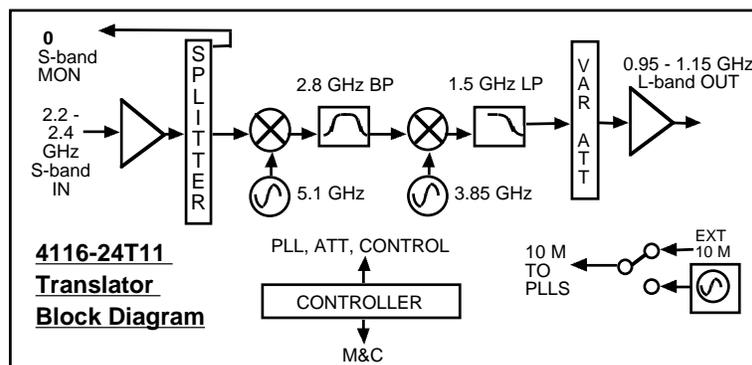


FIGURE 1A. Model 4116-24T11 Translator, Block Diagram

1.2 Technical Characteristics

| TABLE 1.0 4116-24T11 Translator Specifications** | | | | | |
|---|--|------|-------|--------|------|
| Input Characteristics | | | | | |
| Input Impedance/Return Loss | 50Ω/14 dB | | | | |
| Frequency | 2.2 to 2.4 GHz | | | | |
| Noise Figure, Maximum | 15 dBm at maximum gain | | | | |
| Input Level Range | -50 to -30 dBm | | | | |
| Output Characteristics | | | | | |
| Impedance/Return Loss | 50Ω / 14 dB, Mute & UnMute | | | | |
| Frequency | 0.95 to 1.15 GHz | | | | |
| Output Level Range | -20 to 0 dBm | | | | |
| Output 1 dB Compression | +10 dBm, maximum gain | | | | |
| Mute | >50 dB @ 0 dBm Output | | | | |
| Channel Characteristics | | | | | |
| Gain at Fc | +30 ±3 dB max., (+30 to 0 dB variable in 0.5±0.5 dB steps) | | | | |
| Input to Output Isolation | > 45 dB, minimum, at +20 dB gain | | | | |
| Spurious, Inband | SIGNAL RELATED <-60 typ., -55 min dBC in band, -15 to 0 dBm out; SIGNAL INDEPENDENT, <-60 dBm | | | | |
| Spurious, Out of band | LO <-60 dBm spurs, signal independent; 0.5 to .95 and 1.15 to 2.5 GHz out; LO= -80 dBm at input and output | | | | |
| Intermodulation | <-50 dBC for two carriers at 4 MHz spacing, each at -5 dBm out | | | | |
| Frequency Response | ±1.0 dB, over RF band; ± 0.5 dB, 40 MHz BW | | | | |
| Frequency Sense | Non-inverting | | | | |
| LO Characteristics | | | | | |
| LO Step Size | None; Fixed Translation | | | | |
| Frequency Accuracy | ± 0.05 ppm maximum over temp internal reference; external reference input | | | | |
| 10 MHz Level In/Mon | Input = +2 to +8 dBm in. Monitor Output = Input Level ± 1.0 dB, 50Ω | | | | |
| Phase Noise @ F (Hz) > | 100 MHz | 1kHz | 10kHz | 100kHz | 1MHz |
| dBC/Hz | -70 | -78 | -83 | -100 | -110 |
| Controls, Indicators | | | | | |
| Gain, 10M Frequency | Gain and internal 10 MHz frequency via Ethernet M&C or Status/Control Connector | | | | |
| PLL Alarm | Red LED, External Contact Closure | | | | |
| Power | Green LED | | | | |
| Other | | | | | |
| S-Band In, Mon. Connector | Type N (female), 50Ω (weather resistant) | | | | |
| L-Band Out Connector | Type N (female), 50Ω (weather resistant) | | | | |
| Cable Connector(s) (Weather Resistant) | Status/Control Connector , MS3112E14-18S; Mating Cable Connector, MS3116F14-18P. Ethernet Connector , RJF21B; Mating Cable Connector, RJF6G; Cable interface, Standard RJ45. AC Input Connector , Clipper Series, CL1M1102, Mating Cable Connector, CL1F1101. (Unless otherwise specified, the mating connector is provided preassembled onto a standard NEMA 5-15 U.S. power cord.) | | | | |
| 10 MHz Connectors | SMA (female), 50Ω (weather resistant) | | | | |
| Size | 8"W X 6"H X 16"D Weather Resistant* Enclosure | | | | |
| Power | 100-240 ±10% VAC, 47 - 63 Hz, 25 watts maximum / FCI Clipper Series CL1M1102 Connector | | | | |
| *+0 to +50 degrees C; Specifications subject to change without notice | | | | | |

2.0 Installation

The 4116-24T11 Translator consists of a 8” Wide X 6” High X 16” Deep, Weather Resistant* enclosure. A switching, ± 12 , +24, +5 VDC power supply provides power for the internal assemblies. The 4116-24T11 can be secured to a mounting plate using the 4 holes on the bottom of the front and rear panel. See Drawing 2.5 for mounting dimensions.



Figure 2.0: Model 4116-24T11 Translator

2.1 Connection to AC Input Power

The 4116-24T11 utilizes a pre-assembled AC power input cable as described below.

Table 2.0: 4116-24T11 AC Power Input Connector

| Table 2.0 4116-24T11 Power Input Connector, FCI Clipper Series, CL1M1102 & Crimp Pins | |
|---|---|
| Mating Connector Clipper Series, CL1F1101, Crimp Pins | |
| and CL101021 Backshell | |
| Pin | Input Connector Pin Description |
| 1 | 100-240 $\pm 10\%$ VAC, 47-63 Hz, 20 watts max. |
| 2 | Neutral |
| 3 | Ground |
| | |

2.2 Message Protocol

The serial format for the RS232/RS422/RS485 port is 9600 baud, 8 data bits, no parity, and 1 stop bit. All messages consist of ASCII printable characters so standard terminals and terminal emulator programs may be used to control and monitor the unit. All messages begin with the open bracket character “{” (ASCII 0x7B) and end with the close bracket character “}” (ASCII 0x7D). Messages consisting of commands to set or change operating parameters and modes of the unit begin with “C” (ascii 0x43) followed by a command specific character. Messages consisting of queries to report operating parameters and modes begin with “S” (ASCII 0x53) followed by a parameter specific character.

2.3 M&C Commands

The following tables summarize the commands and status queries applicable to the 4116-24T11 frequency converter.

* **PLEASE NOTE:** The two character {aa} prefix, shown in the table below, is present ONLY when RS485 is selected.

Table 2.1 - Model 4116-24T11 M&C Commands

| Table 2.1: Model 4116-24T11 M&C Commands | | |
|--|-------------|--|
| Command | Syntax | Description |
| Set Gain | {aaCGxxx} | where: |
| | | xxx = 3 characters |
| | | Range: 0 to +30 in 0.5 dB steps Example: {aaCG155} sets the gain to 15.5 dB |
| Set Serial Interface | {aaCIx} | where: |
| | | x = 0 to select RS232 |
| | | x = 1 to select RS422 |
| | | x = 2 to select RS485 |
| Set Mute | {aaCMx} | where: |
| | | x = 1 to mute the output |
| | | x = 0 to unmute the output |
| Set RS485 address | {aaCRxx} | where: |
| | | xx = 2 characters |
| | | Range: 20 to 0 |
| Set Int. 10 MHz reference offset | {aaCOxxxxx} | where: |
| | | xxxxx = 5 characters |
| | | Range: +2000 to -2000 |
| Set 10 MHz reference mode | {aaCEx} | where: |
| | | x = 1 to select internal reference |
| | | x = 2 to select external reference |
| | | x = 3 to select auto reference |

2.4 M&C Queries

Table 2.2 Model 4116-24T11 M&C Commands

| Table 2.3: Model 4116-24T11 M&C Queries | | |
|--|---------------|---|
| Command | Syntax | Description |
| Gain | {aaSG} | Returns {aaSGxxx} where: |
| | | xxx = 3 characters |
| | | Range: 0 to 30.0 in 0.5 dB steps |
| | | Example: {aaSG155} indicates the current gain setting is +15.5 dB |
| 10 MHz reference | {aaSE} | Returns {aaSEx} where: |
| | | x = 1 if Internal 10 MHz reference is selected |
| | | x = 2 if External 10 MHz reference is selected |
| | | x = 3 if Auto 10 MHz reference is selected |
| Serial Interface | {aaSI} | Returns {aaSIx} where: |
| | | x = 0 if RS232 is selected |
| | | x = 1 if RS422 is selected |
| | | x = 2 if RS485 is selected |
| RS485 address | {aaSR} | Returns {aaSAxx} where: |
| | | xx = 2 characters |
| | | Range: 0 to 31 |
| | | |

continued on page 8...

Table 2.3 Model 4116-24T11 M&C Commands (Continued from page 7)

| Table 2.3: Model 4116-24T11 M&C Queries - Continued... | | |
|--|--------|---|
| Command | Syntax | Description |
| Int. 10 MHz reference offset | {aaSO} | Returns {aaSOxxxxx} where: |
| | | xxxxx = 5 characters |
| | | Range: +2000 to -2000 |
| Summary Alarm | {aaSA} | Returns {aaSAx} where: |
| | | x = 0 if no summary alarm, x = 1 if summary alarm |
| | | |
| Internal Temperature | {aaST} | Returns {aaSTxxx} where: |
| | | xxx = 3 characters |
| | | Range (-99 to +99) degrees Celsius |
| Model and firmware revision | {aaSV} | returns {aaSVxxxxxxxxxyyyy} where: |
| | | xxxxxxxx = unit model number |
| | | yyyy = unit firmware rev. |
| Unit Status | {aaSS} | returns {aaSSwxyz} where: |
| | | w = summary alarm: 0 = off, 1 = on |
| | | x = ref. source: 1 = internal, 2 = external |
| IP Address | {aaSi} | returns {aaSixxx.xxx.xxx.xxx} where: |
| | | the xxx.xxx.xxx.xxx = the unit's IP address. |
| | | |
| Subnet Mask | {aaSs} | returns {aaSsxxx.xxx.xxx.xxx} where: |
| | | the xxx.xxx.xxx.xxx = the unit's Subnet mask. |
| | | |
| Mute | {aaSM} | returns {aaSMx} where: |
| | | x = 0 if mute is off |
| | | x = 1 if mute is on |

2.5 ETHERNET Interface Installation and Operation

The 4116-24T11 Translator is equipped with a 10/100 Base-T compatible Ethernet interface for control and monitoring of its operating parameters. An HTML script interface allows the user to monitor and control the converter using a standard web browser. SNMP (Simple Network Management Protocol) is also supported. Contact Cross Technologies for the SNMP MIB file.

2.5.1 Methods of Connection

Directly Connected to a PC:

For control from a local PC, attach the 4116-24T11's Ethernet port to the Ethernet network connector on the PC using a crossover RJ-45 cable.

LAN Connection

For LAN connections, attach the 4116-24T11 Ethernet port to the LAN using a normal RJ-45 cable. Use any PC on the LAN to connect to the 4116-24T11.

2.5.2 Ethernet Configuration

Each 4116-24T11 must be configured with an appropriate IP address, Netmask, and Gateway assigned by your network manager. The 4116-24T11 is set at the factory with a static address which is 192.168.123.2. The device server in the 4116-24T11 has a built in HTTP based configuration manager that is used to configure network settings. To access the configuration manager open a web browser and enter the IP address of the 4116-24T11 in the browser's address field. The window shown in Figure 2-A will appear. As delivered, there is no password set. Choose your user name and password here or leave those fields blank and click OK to proceed to the configuration manager webpage.



Figure 2-A Password Screen

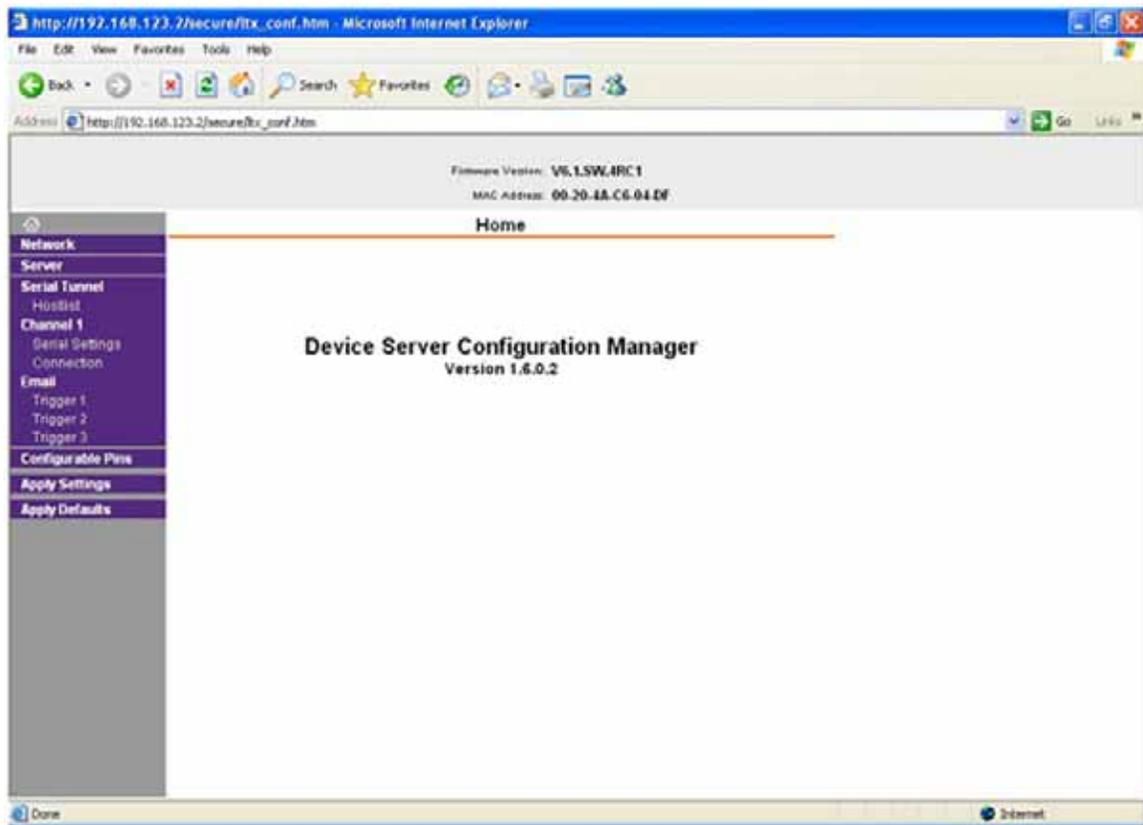


Figure 2-B Configuration Manager Screen

In the left frame of the configuration manager click on Network to display the Network Settings screen. Enter the IP address, Subnet mask, and Gateway address with delimiter dots (example: 192.168.192.47). Click apply settings in the left frame to apply the new settings in the network device.

2.5.3 Webpage M & C

Enter the following address in a web browser to access the M & C webpage:

http://<ip address of 41xx>/serial/0/setup.htm where <ip address> is the IP address of the unit.

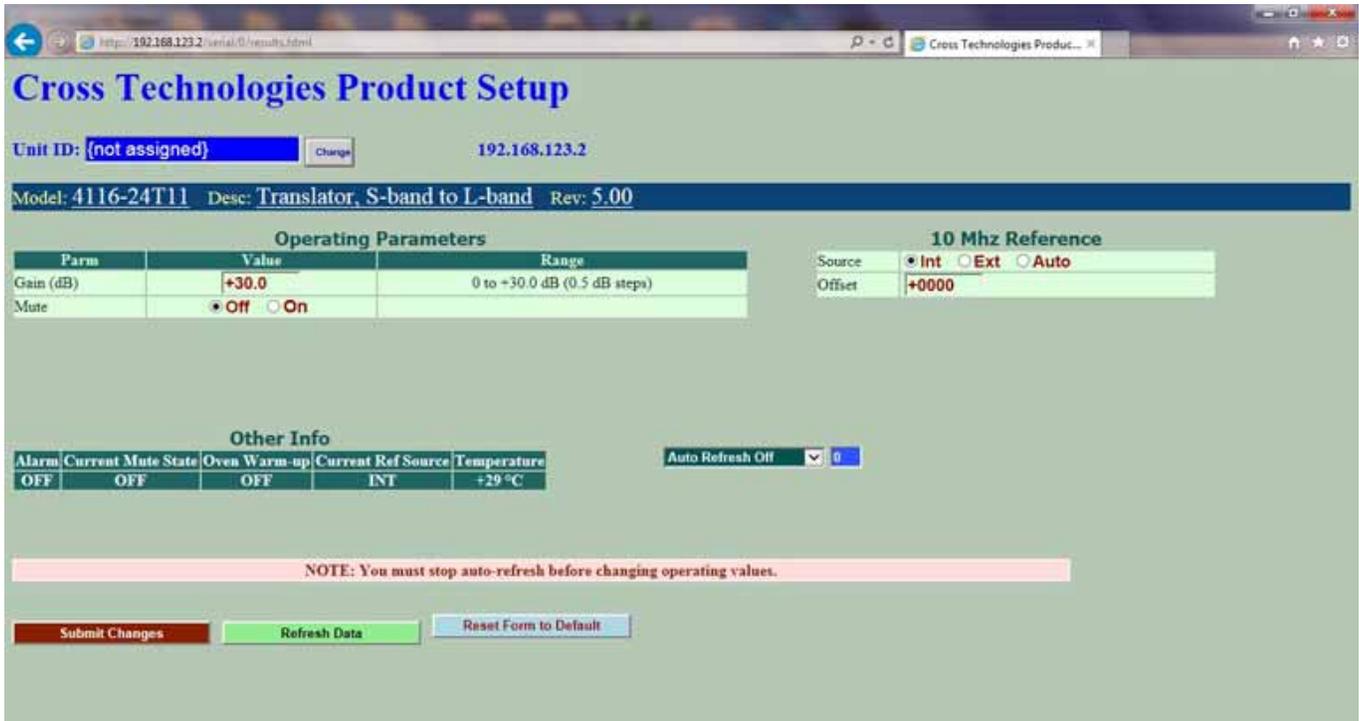


Figure 2-C: Model 4116-24T11 Webpage

2.5.4 SNMP Configuration

Setting of SNMP parameters such as Community Write and Community Read strings requires a *Telnet*[®] connection to port 9999. The following instructions explain how to establish such a *Telnet*[®] connection using Windows XP's Hyper Terminal utility .

Start the Hyper Terminal application and select "New Connection" from the "File" drop down menu.

The next screen is a "Connect To" dialog box. Select TCP/IP (Winsock) from the "Connect" drop down menu.

Enter the IP address of the 4116-24T11 in the "Host address:" field and 9999 in the "Port number" field.

Figure 2-E shows an example of the Hyper Terminal settings required to access the SNMP configuration menu.

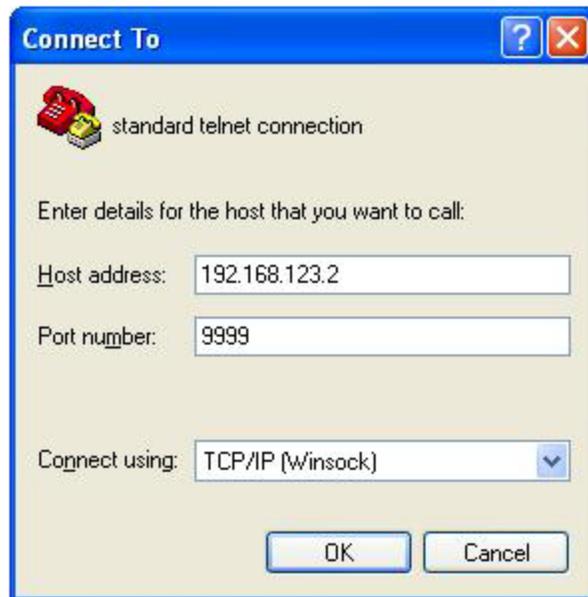
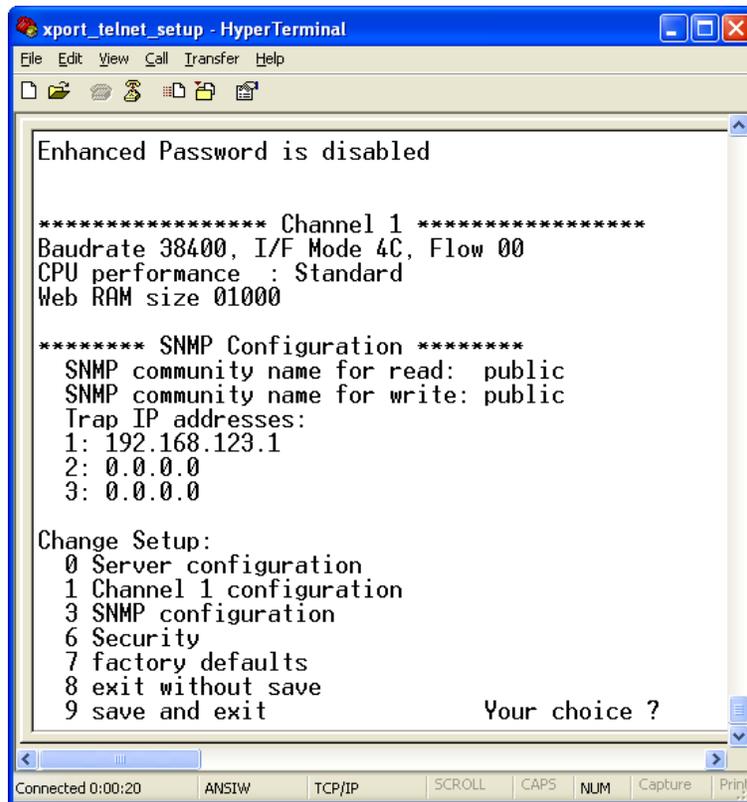


Figure 2-E: Telnet® Settings in Hyper Terminal

Once the *Telnet*® connection is established you will be prompted to “Press Enter for Setup Mode”. Press enter and a menu of device server configuration options will appear (see Figure 2-F). Select menu item 3, “SNMP configuration.” You will be prompted to enter SNMP community read and write strings. After setting your desired community strings you will be prompted to “Enter IP addresses for SNMP traps.” You must enter at least one and up to four IP addresses of SNMP managers that will access the unit. This is required even though SNMP traps are not implemented. The unit will not process SNMP SET and GET requests from an SNMP manager unless the IP address associated with that manager is entered in the device server.

Figure 2-F: Device Server Configuration Menu



```
xport_telnet_setup - HyperTerminal
File Edit View Call Transfer Help
Enhanced Password is disabled

***** Channel 1 *****
Baudrate 38400, I/F Mode 4C, Flow 00
CPU performance : Standard
Web RAM size 01000

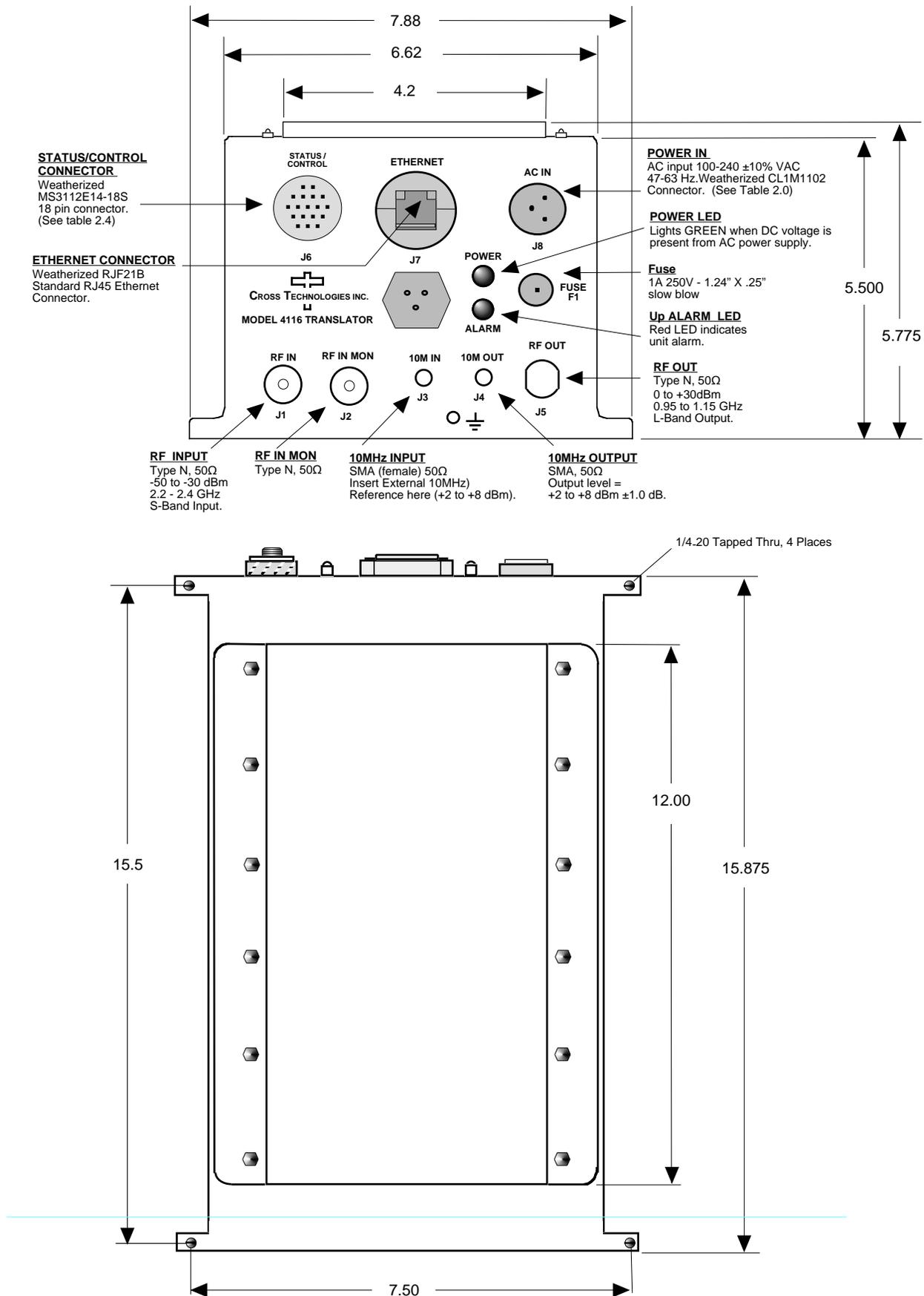
***** SNMP Configuration *****
SNMP community name for read: public
SNMP community name for write: public
Trap IP addresses:
1: 192.168.123.1
2: 0.0.0.0
3: 0.0.0.0

Change Setup:
0 Server configuration
1 Channel 1 configuration
3 SNMP configuration
6 Security
7 factory defaults
8 exit without save
9 save and exit

Your choice ?

Connected 0:00:20 ANSIW TCP/IP SCROLL CAPS NUM Capture Print
```

2.6 **Outline Drawing** shows the input and output connection on the front panel and top view of the 4116-24T11.



2.7 Physical Interface

All 4115 and 4116 units provide a RS232/RS422/RS485 interface port and a 10/100 Base-T Ethernet port. Both ports are available when the unit is installed and powered up. Commands may be sent to either port at any time and they will be processed in the order that they are received. The RS232/RS422/RS485 signals connect via a multipurpose MS3112E14-18S, 18 pin connector as shown in Figure 2.5.1 below.

The Ethernet signals connect via a standard RJ45 connector.

Table 2.4: Monitor and Control Connector

| Table 2.4 Monitor and Control Connector Pinout | |
|---|---------------------------------------|
| Connector part number MS3112E-14-18S | |
| Pin | Signal Description |
| A | Chassis Ground |
| N | Summary Alarm Normally Closed |
| P | Summary Alarm Common |
| R | Summary Alarm Normally Open |
| E | RS422/RS485 Data Out- |
| F | Signal Ground |
| C | RS422/RS485 Data In- |
| D | RS422/RS485 Data Out+, RS232 Data Out |
| B | RS422/RS485 Data In+, RS232 Data In |

NOTE: Planning Ethernet Access

It is recommended that IP knowledgeable customer personnel be consulted as a resource in the installation and use of the Ethernet access features of the Cross Technologies product.

2.8 Installation/Operation

Installing and Operating the 4116-24T11 Translator

1. Connect a -50 dBm to -30 dBm signal to RF In, (Drawing 2.6).
2. Connect the RF Output, to the external equipment.
3. Using the pre-assembled AC power input cable (furnished), connect 100-240 \pm 10% VAC, 47 - 63 Hz, 25 watts maximum, to AC IN connector on the front panel.
4. If a custom length power cable must be made, refer to description below for connections*.
5. Be sure DS1 (green, DC Power) is on and DS2 (red, Alarm) is off (Drawing 2.6).
6. Set the gain insuring that the output level is always in the range of -20 to 0 dB.
7. Select either INT (for internal 10 MHz ref), AUTO (for internal 10 MHz ref UNLESS a external 10 MHz, +2 to +8 dBm signal is connected to J2), or EXT (for external 10 MHz, +2 to +8 dBm reference that is inserted at J3) via Ethernet or serial command.
8. Check that a 10 MHz, signal is present at the 10 MHz REF OUTPUT at the same level as the input, \pm 0.5 dBm (J4 - Drawing 2.6).
9. AC Fuse - The fuse is a 1.25" x .25" - 1.5 amp (slow blow) and is inserted in the fuse F1 position.

NOTE: If a fuse continues to open, the power supply is most likely defective.



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