

Instruction Manual

Model 4116-140T120 Multi-Band Block Translator Weather Resistant Unit

February 2022, Rev. 0



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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 4116-140-T120 Translator Weather Resistant

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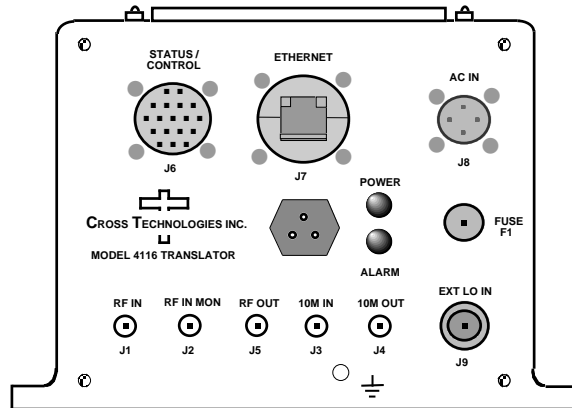
MODEL 4116-140-T120 Translator, Weather Resistant*

1.0 General

1.1 Equipment Description

The 4116-140T120 Translator converts the 12.75 - 14.0 GHz band to the 10.70 - 12.0 GHz band. Front panel LEDs provide indication of DC Power, and PLL Alarm. The RF to RF gain is +0 dB, maximum. Connectors are SMA female for the RF out, RF in and RF in Monitor (optional) and SMA female for the external reference input and reference output. Gain, LO frequency, and internal 10 MHz frequency are controlled by the Ethernet M&C or via the Status/Control connector. In AUTO, the 10 MHz reference stays in external if the external level is in the +2 to +8 dBm range (the selected 10 MHz is on the front panel 10 M OUT connector). The 4116 is powered by a 100-240 ±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.



Model 4116-140-T120 Translator, Front Panel

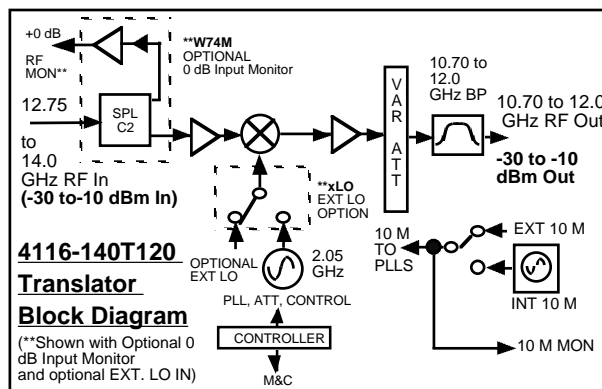


FIGURE 1 Model 4116-140-T120 Translator Block Diagram

1.2 Equipment Specifications

TABLE 1.0 4116-140-T120 Translator Specifications**

Input Characteristics

Impedance/Return Loss	50Ω/18dB
Frequency (GHz)	12.75 - 14.0 GHz
Noise Figure, Max.	20 dB at max gain
Input Level Range Fc	-30 to -10 dBm; +8 dBm no-damage input

LO Harmonically-related Fixed Spur Frequencies - Out of Band

BAND NO.	OUT RANGE (GHz)	TRANSLATE RANGE (GHz)	2XLO Fixed Spurs (25 dBC at -10 in) (5 dBC at -30 in)
1	10.70-12.0	2.01-2.09	10.25, 12.30, Out of Band

Output Characteristics

Impedance/Return Loss	50Ω/18 dB
Frequency (GHz)	10.70 - 12.0 GHz
Output Level Range, Fc	-30 to -10 dBm
Output 1 dB compression	+0 dBm, at Fc

Band Chart - Frequencies, LOs, LO Harmonically-related Fixed Spur:

BAND NO.	IN RANGE (GHz)	OUT RANGE (GHz)	LO (GHz)	Fixed Spurs (25 dBC at -20 in) (5 dBC at -40 in)
1	7.90-8.40	7.25-7.75	0.65	7.15, 7.80

Channel Characteristics

Gain	+0 ±2 dB max., (+0 to -30 dB variable in 0.5±0.5 dB steps), at Fc
Input to Output Isolation	> <u>60 dBC, min., 12.75 - 14.0 GHz</u>
Spurious, Inband	> 40 dBC signal-related, < -50 dBm signal independent; at -10 dBm out
Spurious, LO	< -60dBm LO; 5X,LO 6XLO, 25dBC (> 30 dBC typ.) at -10 dBm out (See Chart)
2 Tone intermod	> 45 dBC, > 50 dBC typ. (@-13 dBm in, -13 dBm out, each)
Frequency Response	±1.5 dB max., over RF band; ± 0.5 dB, 40 MHz BW
Frequency Sense	Non-inverting

LO Characteristics

LO Frequency	2.050 GHz, tunable from 2.01 to 2.09 GHz in 1 MHz steps; Option X10054 - 1 kHz Tuning step
Frequency Accuracy	± 0.05 ppm max. over temp internal reference; ext. ref. input
10 MHz level In/Mon	+2 to +8 dBm in; Monitor Output = input level ± 1.0 dB, 50 ohms

Phase Noise @ F (Hz) >	100	1K	10K	100K	1M
Specification dBC/Hz	65	75	85	95	110
Spec w / X10054 dBC/Hz	75	85	90	105	115

TABLE 1.0 4116-140-T120 Multi-Band Block Translator Specifications (continued)...

Controls, Indicators	
Gain, LO, 10M Frequency	Gain, band select and internal 10 MHz frequency via Ethernet M&C or Status/Control Connector
PLL, Alarm	Red LED, External Contact Closure
Power	Green LED
Other	
RF In, Mon. Out Connector	Type SMA (female), 50Ω
10 MHz Connectors	SMA (female), 50Ω
Status/Control Connector	MS3116F14-18P; RJ45 Weather Resistant* Ethernet Connector
Weather Resistant* Connectors	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.)
Size	8" Wide X 6" High X 16" Deep, Weather Resistant* Enclosure.
Power	100-240 ±10% VAC, 47 - 63 Hz, 25 watts max./FCI Clipper Series CL1M1102 connector.
**+0 to +50 degrees C; Specifications subject to change without notice.	

***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.

2.0 Installation

The 4116-140-T120 Multi-Band Block Translator consists of a 8” W x 6” H x 16” D Weather Resistant enclosure.

A switching, ± 12 , +24, +5 VDC power supply provides power for the internal assemblies. The 4116-140-T120 can be secured to a mounting plate using the 4 holes on the bottom of the front and rear panels. See Figure 2.5 for mounting dimensions.

2.0.1 Connection to AC Input Power

The 4116-140-T120 utilizes a pre-assembled AC power input cable as described below.

4116-140-T120 Power Input Connector, FCI Clipper Series, CL1M1102 & Crimp Pin	
Mating Connector FCI 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

2.1 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.

2.2 M&C Commands

The following tables summarize the commands and status queries applicable to the 4116-140-T120 Block Translator.

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

Table 2.0: Model 4116-140-T120 M&C Commands		
Command	Syntax	Description
Set Gain	{aaCGxxx}	where:
		xxx = 3 characters
		Range: 000 to -300 (00.0 to -30.0 in 0.5 dB steps)
Set Serial Interface	{aaC x}	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 output
Set RS485 address	{aaCRxx}	where:
		xx = 2 characters
		Range: 00 to 31
Set Int. 10 MHz reference offset	{aaCOxxxxx}	where:
		xxxxx = 5 characters
Set 10 MHz reference mode	{aaCEx}	Range: +2000 to -2000 where:
		x = 1 to select internal reference
		x = 2 to select external reference
		x = 3 to select auto reference
Set external LO (option xLO)	{aaCLx}	where: x = 0 to select internal L0 x = 1 to select external L0
Set Translation Frequency	{aaCFxxxxxxx}	where: xxxxxxx = translation frequency (kHz) Range 2010 000 to 2090000 1 MHz steps standard, 1 kHz steps option X 10054

2.3 M&C Queries

Table 2.1 Model 4116-140-T120 M&C Queries

Table 2.1 Model 4116-140-T120 M&C Queries (continued from page 7)

Command	Syntax	Description
Gain	{aaSG}	Returns {aaSGxxx} where: xxx = 3 characters Range: 0 to 200 (in 0.5 dB steps) Example: {aaSG-145} indicates the current gain setting is 14.5 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: 00 to 31
Mute	{aaSM}	Returns {aaSMx} where: x = 0 if mute is off x = 1 if mute is on
External L0	{aaSL}	Returns {aaSLx} where: x = 0 if mute is off x = 1 if mute is on
Translation Frequency	{aaSF}	Returns {aaSFxxxxxxx} where: xxxxxxx = translation frequency in KHz

2.4 ETHERNET Interface Installation and Operation

The 4116-140-T120 Multi-Band Block 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.

2.4.1 Methods of Connection

Directly Connected to a PC:

For control from a local PC, attach the 4116-140-T120's Ethernet port to the Ethernet network connector on the PC using a crossover RJ-45 cable.

LAN Connection

For LAN connections, attach the 4116-140-T120 Ethernet port to the LAN using a normal RJ-45 cable. Use any PC on the LAN to connect to the 4116-140-T120.

2.4.2 Ethernet Configuration

Each 4116-140-T120 must be configured with an appropriate IP address, Netmask, and Gateway assigned by your network manager. The 4116-140-T120 is set at the factory with a static address that is written on a tag attached to the unit. The device server in the 4116-140-T120 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 4116-140-T120 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

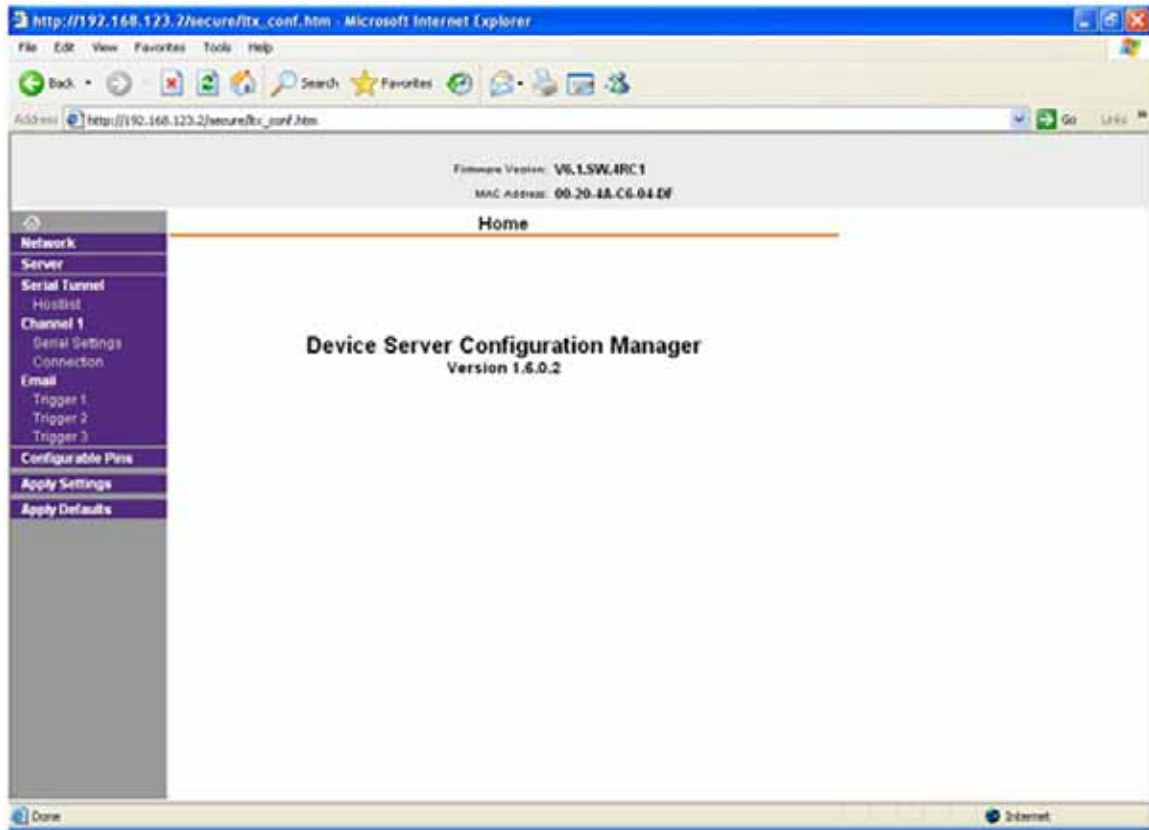


Figure 2-B: Configuration Manager Screen

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).

2.4.3 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 (page 11) shows the product setup web page from a model 4116-140-T120 frequency converter.

The screenshot shows a web browser window with the address bar displaying "192.168.123.2/serial/0/results.html". The page title is "Cross Technologies Product Setup".

Unit ID: {not assigned} 192.168.123.2

Model: 4116-140T120 Desc: Ku-Band Block Translator Rev: 5.20

Frequency/LO Select		10 Mhz Reference	
Input	Output	Source	<input checked="" type="radio"/> Int <input type="radio"/> Ext <input type="radio"/> Auto
12750 – 14000 MHz	10700 – 12000 MHz	Offset	+0000
Translation Frequency (MHz)	2050.000		
External LO	<input type="radio"/> OFF <input checked="" type="radio"/> ON		

Gain/Mute		Other Info	
Gain	-14.0 (-30.0 to 0 dB in 0.5 dB steps)	Alarm Status	Current Ref Source
Mute	<input checked="" type="radio"/> OFF <input type="radio"/> ON	OFF	INT

Submit Changes Refresh Data Reset to Default Values

Figure 2-C: Model 4116-140-T120 Product Setup Web Page

2.4.4 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 4116-140-T120 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.

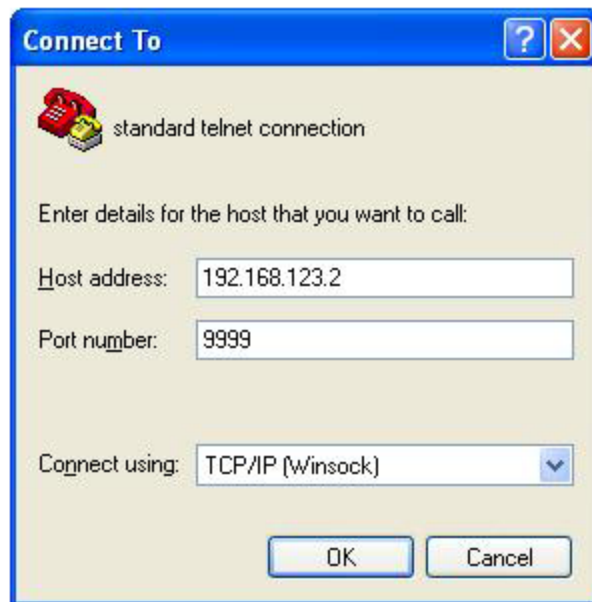


Figure 2-E: Telnet® Settings in Hyper Terminal

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

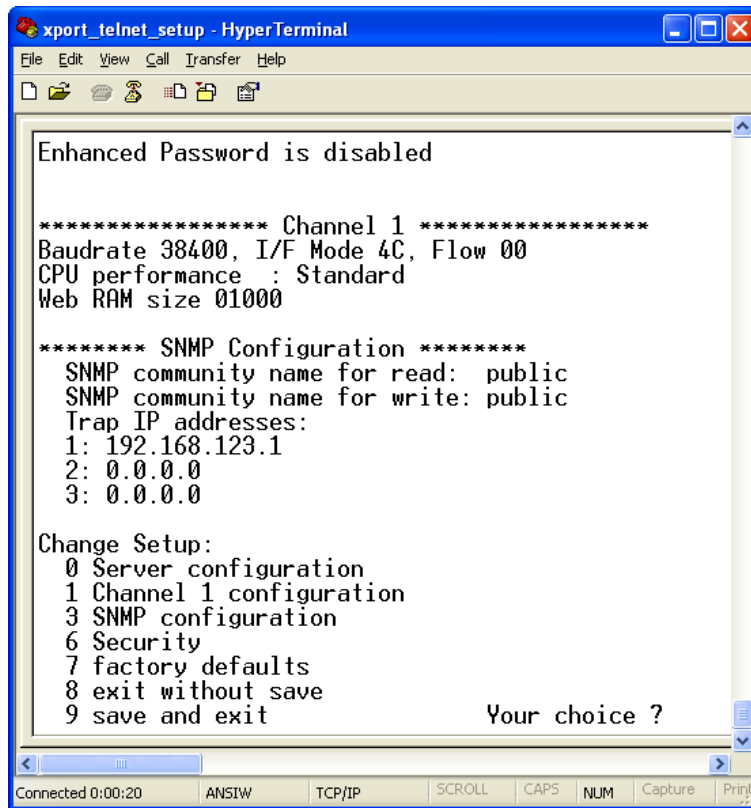
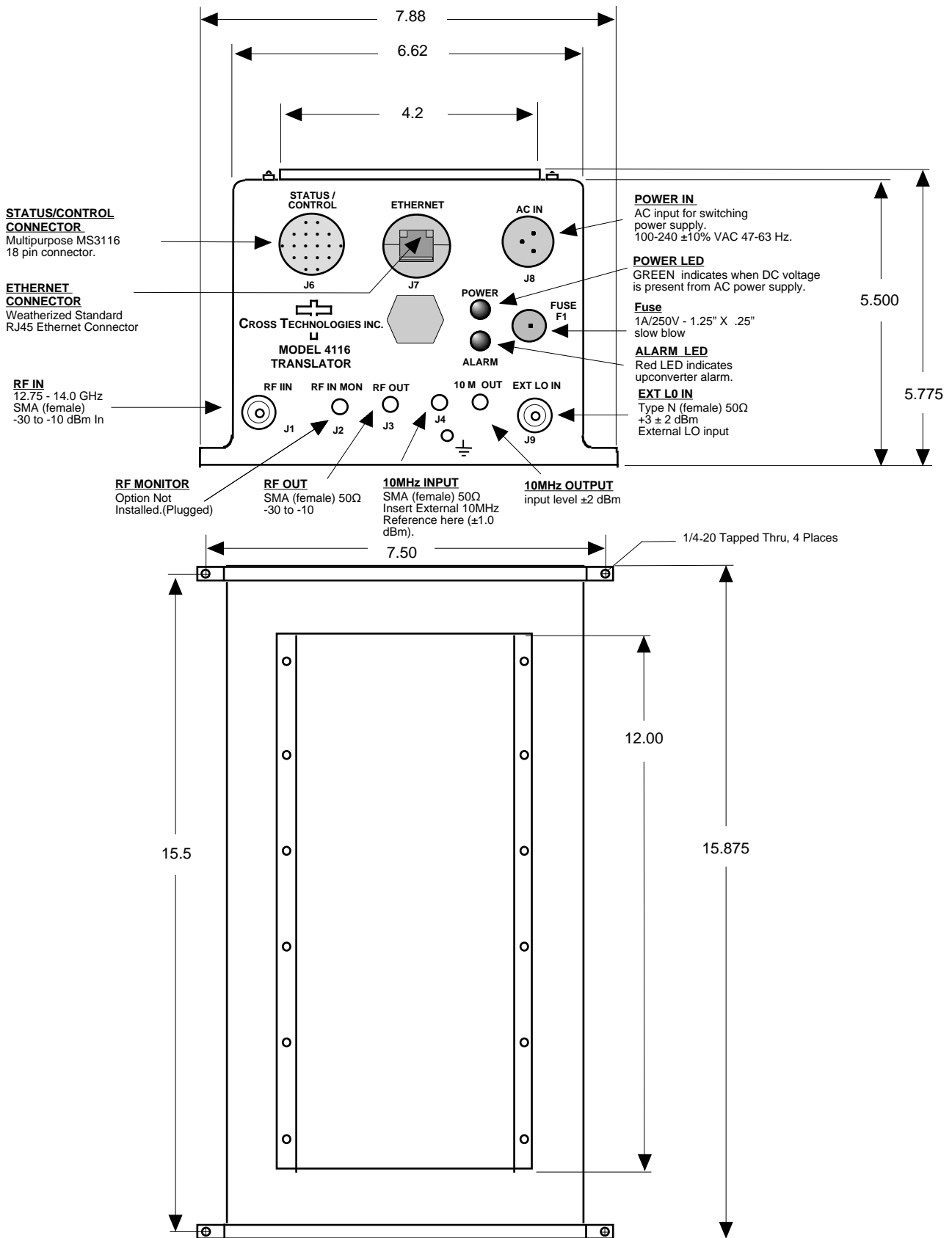


Figure 2.5 Shows the input and output connections on the front panel and the top view of the 4116-140-T120:



2.6 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 MS3116, 18 pin connector as shown in Figure 2.5. The Ethernet signals connect via a standard RJ45 connector.

Table 2.5.1: Monitor and Control Connector

Monitor and Control Connector Pinout	
Pin	Signal Description
	Connector part number MS3112E14-18S
Mating	Cable Connector part number MS3116F14-18P
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.

2.7 Installation/Operation

Installing and Operating the 4116-140-T120 Multi-Band, Block Translator

1. Connect a -30 dBm to -10 dBm signal to RF IN (Figure 2.5).
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 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 (Figure 2.5).
6. Set the gain so that the output level is always within the range -30 to -10 dBm (See Tab. 2.0 and 2.5.1).
7. Select either INT (for internal 10 MHz ref), AUTO (for internal 10 MHz ref UNLESS an external 10 MHz, +2 to +8 dBm signal is connected to J2), or EXT (for external 10 MHz, +2 to +8 dBm ref. that is inserted at J2) via Ethernet or serial command (See Table 2.0 and 2.5.1).
8. Check that a 10 MHz, signal is present at the 10 MHz REF OUTPUT at the same level as the input, \pm 1.0 dB (J4 - Figure 2.5).
9. AC Fuse - The fuse is a 1.25" x 0.25" - 1.0 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.

CAUTION: When checking or replacing the fuse, do not over tighten the fuse holder cap.

This can displace the cap's O-ring and the weatherproof seal will be lost.

4116-140-T120 AC Power Input Connections	
Connector, Clipper Series, CL1M1102 and crimp pins	
Mating Connector, Clipper Series, CL1F1101 and crimp pins	
Pin	Input Connector Pin Description
1	100-240 \pm 10% VAC, 47-63 Hz, 20 watts max.
2	Neutral
3	Ground



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