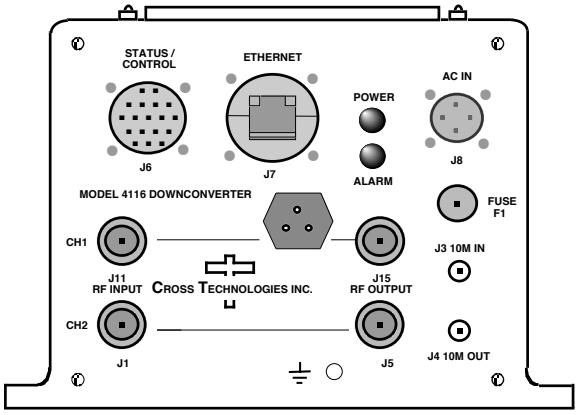
Instruction Manual

Model 4116-22-8085

Multi-Band Block Translator

Weather Resistant Unit

May 2023, Rev. 0



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INSTRUCTION MANUAL

MODEL 4116-22-8085 Multi-Band Translator, Weather Resistant

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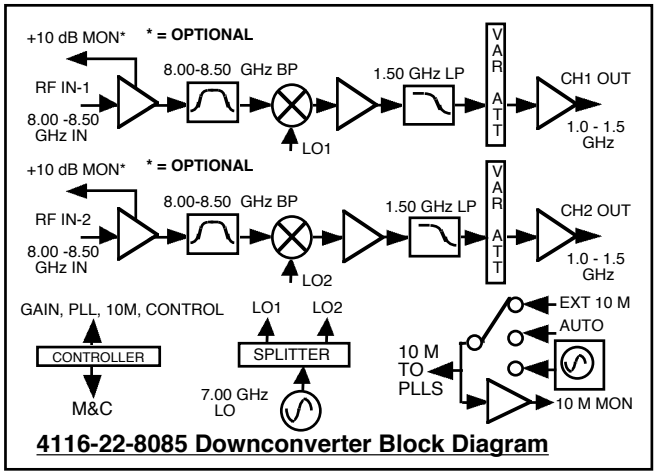
MODEL 4116-22-8085 Translator, Weather Resistant*

1.0 General

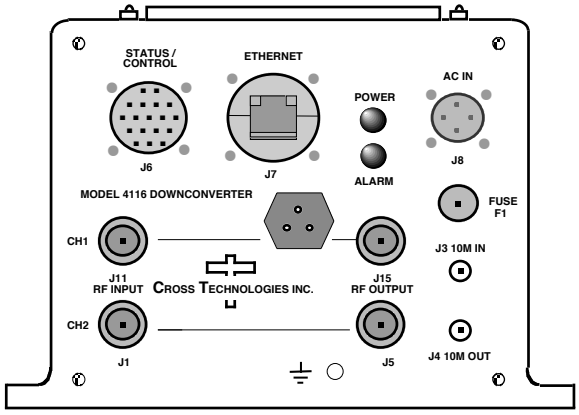
1.1 Equipment Description

The 4116-22-8085 Block Downconverter, 8.00-8.50 GHz, 2 Channel, converts two RF channels to 1.0 - 1.5 GHz with a common LO of 7.00 GHz. Front panel LEDs provide indication of DC Power, and PLL Alarm. The RF to L-band maximum gain is +35 ±2 dB, (+35 to +5 dB variable in 0.5 ±0.5 dB steps). Connectors are Type N female for RF IN and OUT, optional RF INPUT monitor, and SMA female for the external reference input and reference output. Gain and internal/external 10 MHz frequency select 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. It is powered by a 100-240 ± 10% VAC power supply, and is 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.



4116-22-8085 Downconverter Block Diagram



Model 4116-22-8085 Multi-Band Translator, Front Panel

1.2 Technical Characteristics

TABLE 1.0 4116-22-8085 Multi-Band Block Translator Specifications**

Input Characteristics (all channels)

Impedance/Return Loss	50Ω/14 dB
Frequency	8.00 to 8.50 GHz
Noise Figure, Max.	15 dB at Fc, Gmax
Input Level range	-55 to -35 dBm, Fc

Output Characteristics (all channels)

Impedance/Return Loss	50 Ω /14 dB
Frequency	1.0 - 1.5 GHz
Output Level Range	-20 to 0 dBm, Fc, Gmax
Output 1 dB compr.	+10 dBm, at Fc, Gmax

Channel Characteristics (all channels)

Gain **at F_C**	+35 dB ±2 dB max., (+35 to +5 dB variable in 0.5 ±0.5 dB steps), Fc
Image Rejection	> 60 dB, min
Spurious, Inband	SIGNAL RELATED <-60 dBc in band, 0 dBm out; SIGNAL INDEPENDENT,<-60 dBm, (1.0 - 1.5 GHz) Gmax
Spurious, Out of band	<-50 dBm spurious, signal independent; 0.5-1.0 and 1.5- 2.5 GHz out, Gmax
Intermodulation	<-55 dBc for two carriers at Fc ± 2 MHz spacing, each at -10 dBm out, Gmax
Frequency Response	±1.5 dB, 1.0 - 1.5 GHz out; ±0.5 dB, 40 MHz BW, Gmax
Frequency Sense	Non-inverting

LO Characteristics (all channels)

LO Frequency	7.00 GHz, Fixed
Frequency Accuracy	± 0.05 ppm max over temp internal reference; ext. ref. input
10 MHz level In/Mon	Input=+2 to +8 dBm in; Monitor Output = Input Level ± 1.0 dB, 50 ohms

Phase Noise @ F (Hz) >	*100*	*1K*	*10K*	*100K*	*1M*
dBc/Hz	*70*	*80*	*85*	*95*	*110*

Controls, Indicators

Gain, 10M Freq.	Gain and internal/external 10 MHz frequency select via Ethernet (w/SNMP) M&C or Status/Control Connector.
Power; PLL Alarm	Green LED ; Red LED, External contact closure

Other	
RF In / RF Out Connector	Type N (female)
10 MHz Connectors	SMA (female), 50Ω
Weather Resistant* Connectors	**Status/Control Connector,** MS3112E14-18S; Mating Cable Connector, MS3116F14-18P. **Ethernet Conector**, 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 maximum.
**+0 to +50 degrees C; Specifications subject to change without notice.	

TABLE 1.0 4116-22-8085 Multi-Band Block Translator Specifications (continued)

***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 4116-22-8085 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 4116-22-8085 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 4116-22-8085 utilizes a pre-assembled AC power input cable as described below.

4116-22-8085 Power Input Connector, FCI Clipper Series, CL1M1102 & Crimp Pins	
Mating Connector FCI Clipper Series, CL1F1101, Crimp Pins and CL101021 Backshell	
Pin	Input Connector Pin Description
1	100-240 ±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 4116-22-8085 Multi-Band 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 4116-22-8085 M&C Commands

Command	Syntax	Description
Set CH1 Gain	{aaCGxxx}	where:
		xxx = 3 characters
		Range: 50 to 350 (5.0 to 35.0 in 0.5 dB steps)
		example: {CG155} will set CH1 gain to 15.5 dB
Set CH2 Gain	{aaCHxxx}	where:
		xxx = 3 characters
		Range: 50 to 350 (5.0 to 35.0 in 0.5 dB steps)
		example: {CH155} will set CH1 gain to 15.5 dB
Set CH1 Mute	{aaCMx}	where:
		x = 1 to mute CH1 rf out
		x = 0 to unmute CH1 rf out
Set CH2 Mute	{aaCNx}	where:
		x = 1 to mute CH2 rf out
		x = 0 to unmute CH2 rf out
Set Serial Interface	{aaCIx}	where:
		x = 0 to select RS232
		x = 1 to select RS422
		x = 2 to select RS485
Set RS485 address	{aaCRxx}	where:
		xx = 2 characters
		Range: 00 to 31
Set Int 10 MHz reference offset	{aaCOxxxxx}	where:
		xxxxx = 4 or 5 characters
		Range: +2000 to -2000
Set 10 MHz reference mode	{aaCEx}	where:
		x = 1 to select Internal 10 MHz reference
		x = 2 to select External 10 MHz reference
		x = 3 to select Auto 10 MHz reference

2.3 M&C Queries

Table 2.1 Model 4116-22-8085 M&C Queries

Command	Syntax	Description
Get CH1 Gain	{aaSG}	returns {aaSGxxx} where:
		xxx = 3 characters
		Range: 50 to 350 (5.0 to 35.0 in 0.5 dB steps)
		example: {SG155} when CH1 gain is set to 15.5 dB
Get CH2 Gain	{aaSH}	returns {aaSHxxx} where:
		xxx = 3 characters
		Range: 50 to 350 (5.0 to 35.0 in 0.5 dB steps)
		example: {SH155} when CH2 gain is set to 15.5 dB
Get CH1 Mute	{aaSM}	returns {aaSMx} where:
		x = 1 character
		x = 1 if CH1 rf out is muted
		x = 0 if CH1 rf out is not muted
Get CH2 Mute	{aaSN}	returns {aaSNx} where:
		x = 1 character
		x = 1 if CH2 rf out is muted
		x = 0 if CH2 rf out is not muted
Get Serial Interface	{aaSI}	Returns {aaSIx} where:
		x = 0 if RS232 is selected
		x = 1 if RS422 is selected
		x = 2 if RS485 is selected
Get RS485 address	{aaSR}	Returns {aaSRxx} where:
		xx = 2 characters
		Range: 00 to 31
Get Int 10 MHz reference offset	{aaSO}	Returns {aaSOxxxxx} where:
		xxxxx = 5 characters
		Range: +2000 to -2000
Get 10 MHz reference mode	{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

2.4 ETHERNET Interface Installation and Operation

The 4116-22-8085 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 supported. Contact Cross Technologies for the SNMP MIB file. The device can also be controlled through a direct TCP/IP connection.

2.4.1 Methods of Connection

Directly Connected to a PC:

For control from a local PC, attach the 4116-22-8085's Ethernet port to the Ethernet network connector on the PC using a crossover RJ-45 cable.

LAN Connection

For LAN connections, attach the 4116-22-8085 Ethernet port to the LAN using a normal RJ-45 cable.
Use any PC on the LAN to connect to the 4116-22-8085.

2.4.2 Ethernet Configuration

Each 4116-22-8085 must be configured with an appropriate IP address, Netmask, and Gateway assigned by your network manager. The 4116-22-8085 is set at the factory with a static address of **192.168.123.2.**

Configuration through a web browser

The device server in the 4116-22-8085 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 4116-22-8085 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

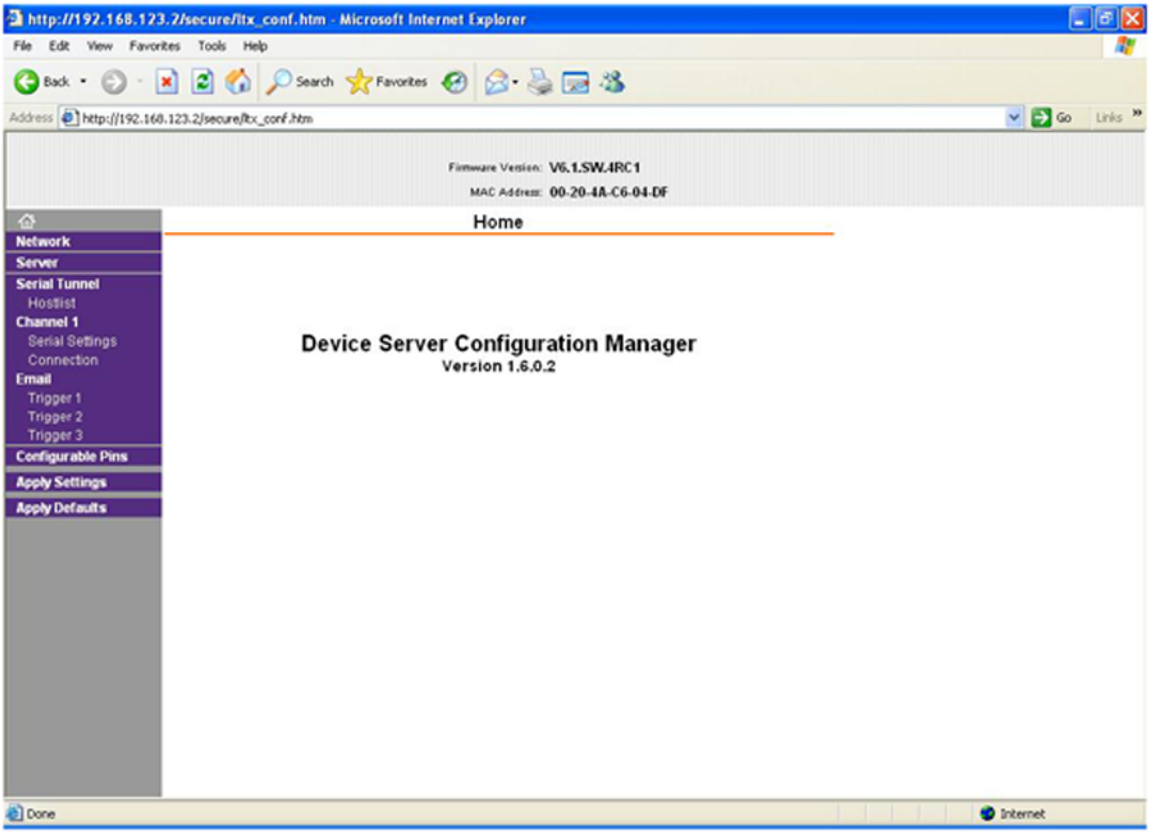


Figure 2-B: Configuration Manager Screen

In the left frame of the configuration manager click on Network to display the Network Settings screen. See figure 2-C.

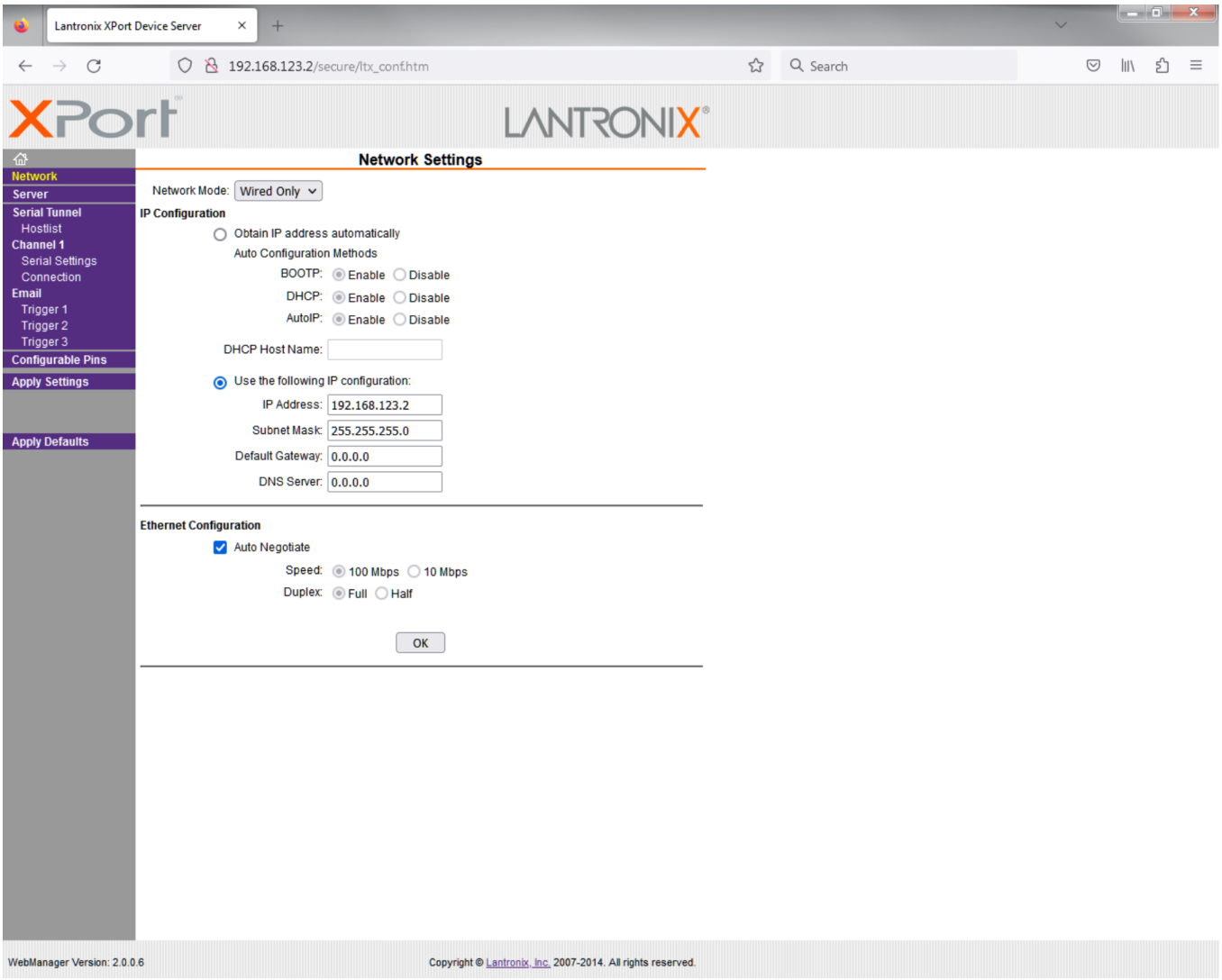


Figure 2-C: Network Settings Screen

Enter the desired network settings, i.e. IP address, subnet mask, and gateway. Click "OK" then click "Apply Settings".

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-D (page 12) shows the product setup web page from a model 4116-22-8085 frequency converter.

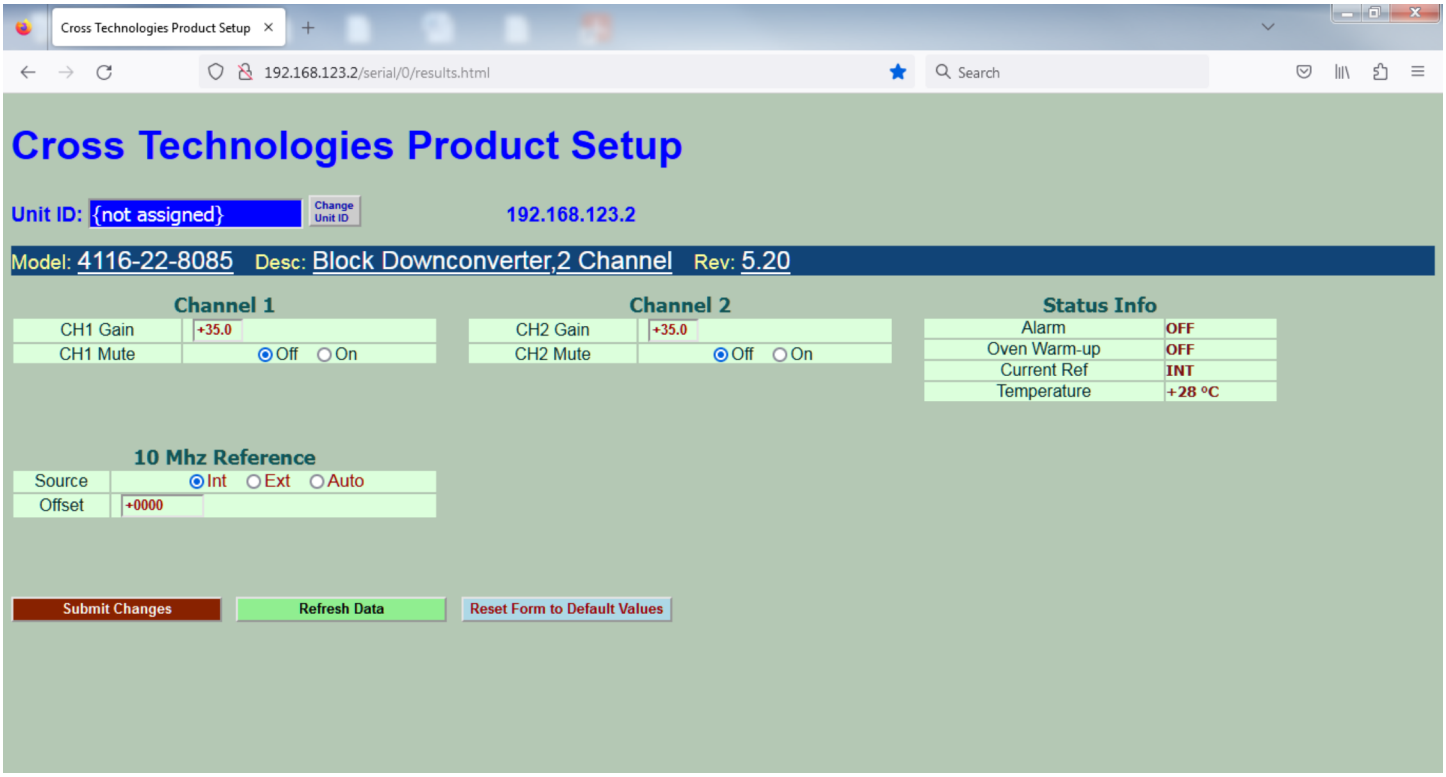


Figure 2-D: Model 4116-22-8085 Product Setup Web Page

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 4116-22-8085 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.

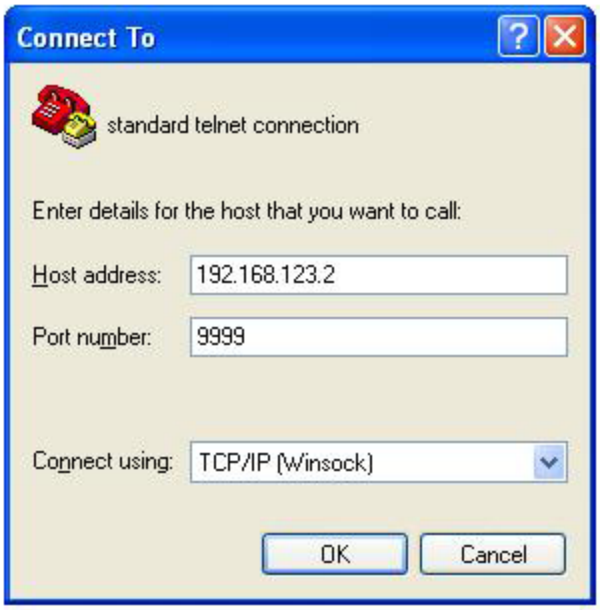


Figure 2-E: Telnet® Settings in Hyper Terminal

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

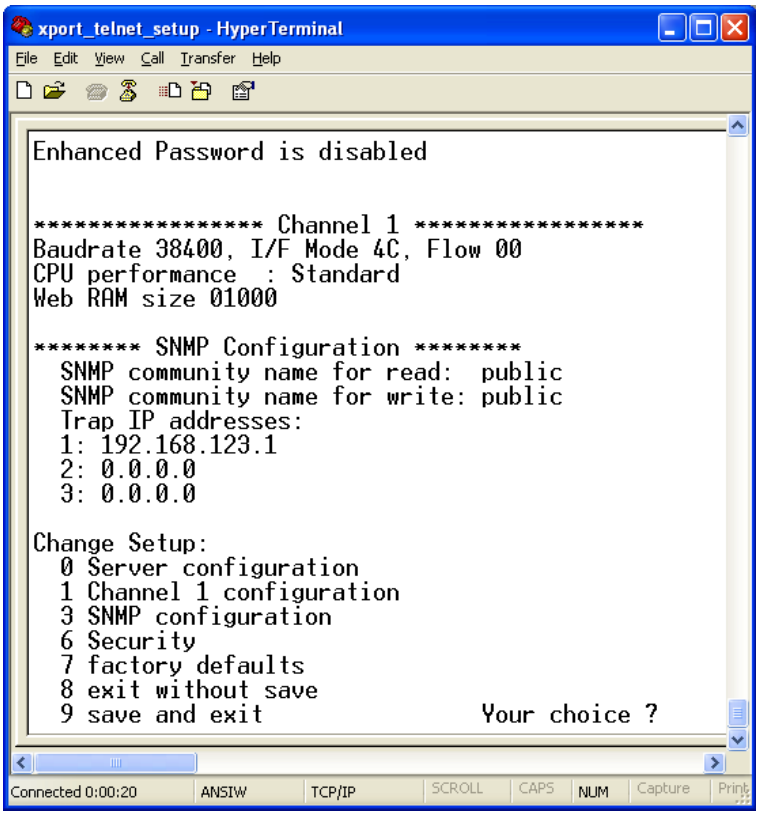
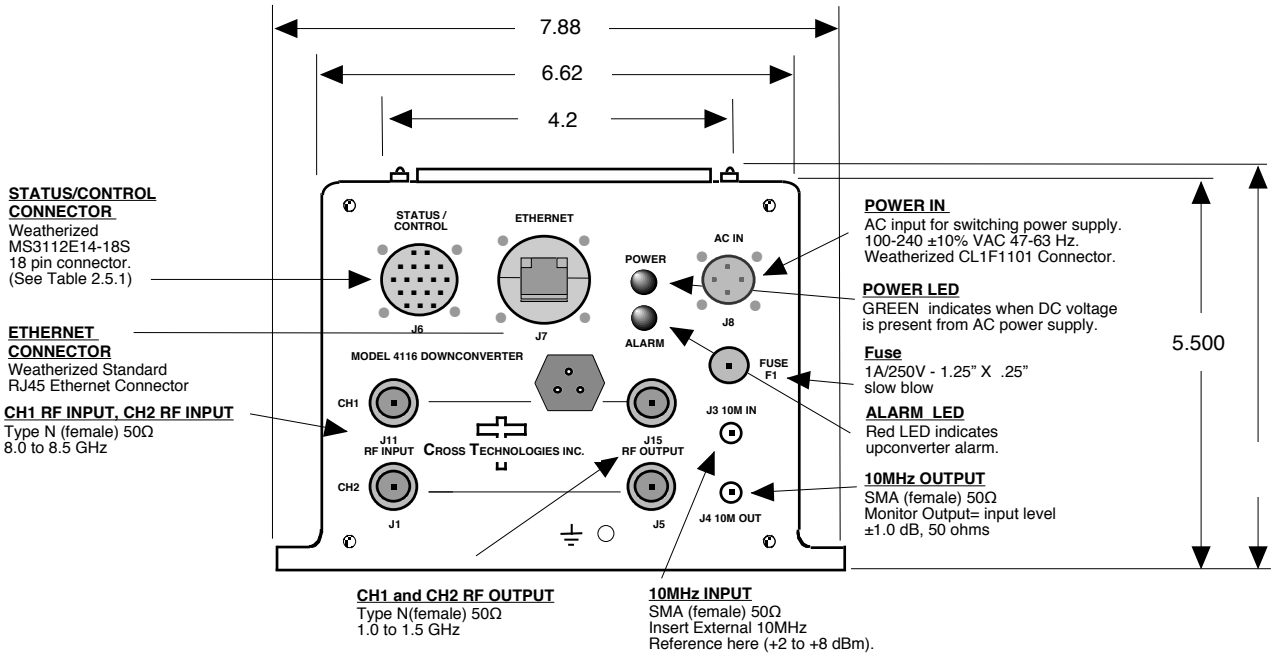
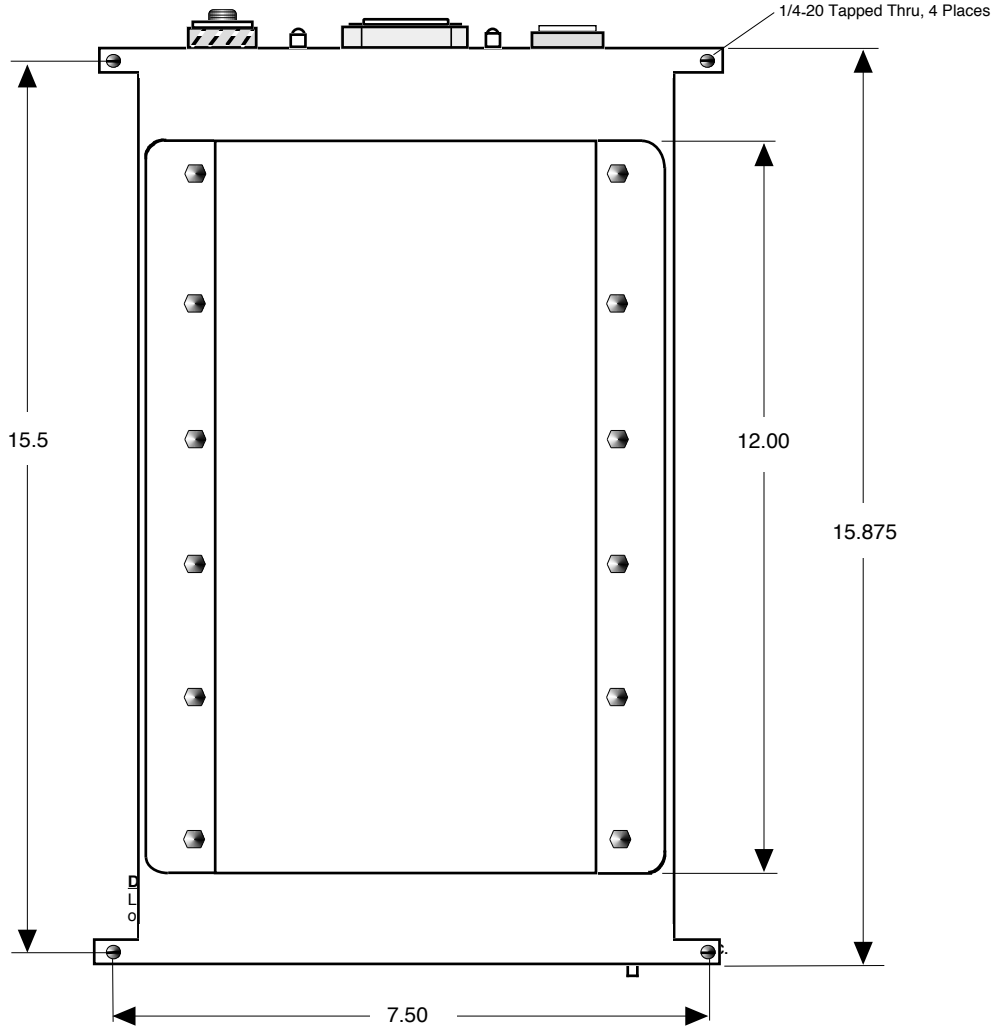


Figure 2.5 Shows the input and output connections on the front panel and the top view of the 4116-22-8085:





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	
Connector part number MS3112E14-18S	
Mating Cable Connector part number MS3116F14-18P	
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
S,G	External 15 VDC Positive (option VO15)
H,J	External 15 VDC Ground (option VO15) **Tied to ground internally

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

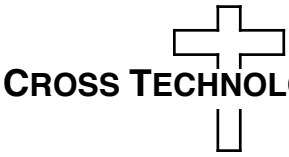
Installing and Operating the 4116-22-8085 Multi-Band, Block Translator

1. Connect -55 dBm to -35 dBm signals to CH1 and CH2 RF INPUTS (Figure 2.5).
2. Connect the RF OUTPUTS to the external equipment.
3. Using the pre-assembled AC power input cable (furnished), connect 100-240 ±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 -20 to 0 dBm (See Table 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, ±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.

4116-22-8085 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 ±10% VAC, 47-63 Hz, 20 watts max.
2	Neutral
3	Ground



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