Using the second data port on Digital Lynx SX

The Digital Lynx SX uses Ethernet to communicate with the PC for data acquisition. There are two types of packets used: TCP command packets and UDP data packets. The Ethernet packets output from the 2nd data port are duplicate UDP data packets of the 1st port. Once acquisition is started, the UDP packet data will begin sending out both ports. Keep in mind that TCP command packets are only processed by the 1st data port. If you want your application to control the Digital Lynx SX (start acquisition, change references, etc.), you can connect to Cheetah using Netcom and issue those commands (rather than directly to the Digital Lynx SX).

The following table describes a UDP data packet format:

Neuralynx Record Sections	**Value Descriptions (32-bit)**	**More Information**				
Header (68 bytes)	start of frame value (stx)	Each of the 17 values in the Neuralynx record header are 32-bit values.				
	packet id					
	record size					
	timestamp high order bytes					
	timestamp low order bytes					
	system status					
	ttl io					
	reserved 0					

	reserved 1					
	reserved 2					
	reserved 3					
	reserved 4					
	reserved 5					
	reserved 6					
	reserved 7					
	reserved 8					
	reserved 9					
Data (128 bytes * number of boards)	Analog to Digital data	Each board in a system generates 32x32-bit values.				
Footer (4 bytes)	checksum	A record is terminated with a 32-bit checksum that is a bitwise XOR of all the 32-bit values in the record.				
		NOTE				
		Byte order within the 32-bit values of a record may appear different as read out by the OS network read function versus byte order seen in the record when viewed using a packet				

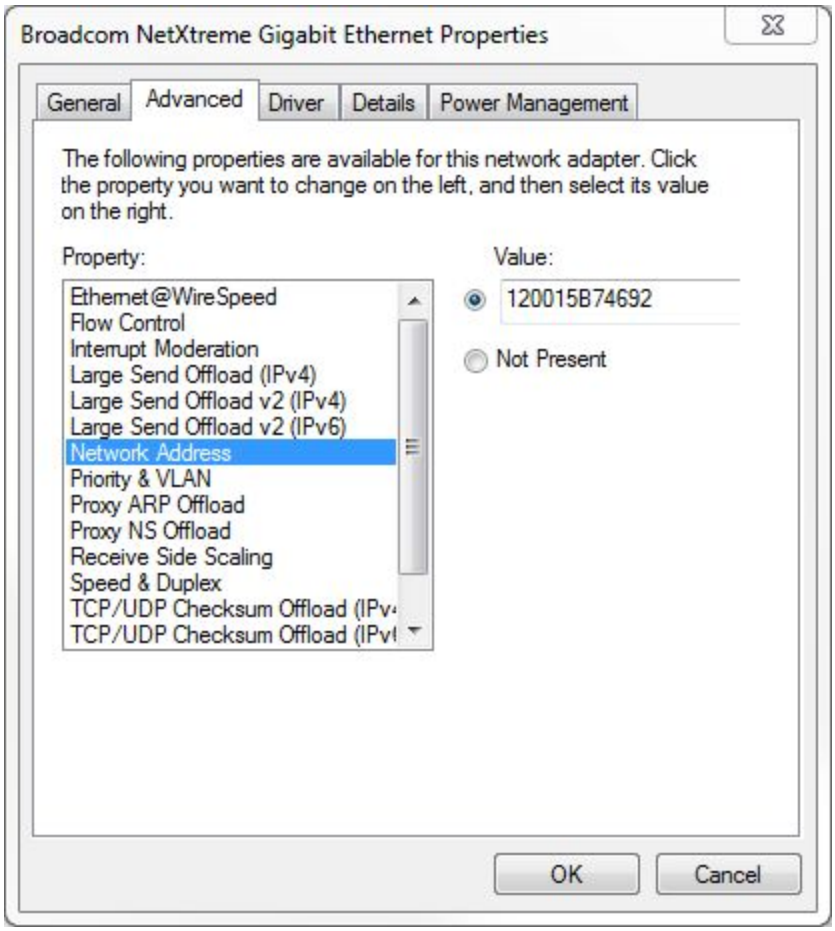
		analyzer.				
		Byte 3 is the most significant and Byte 0 is the least significant.				
		Byte order before loading into record	Byte 3	Byte 2	Byte 1	Byte 0
		Current byte order in record as of 12/1/2011	Byte 1	Byte 0	Byte 3	Byte 2
		New byte order in next Cheetah release	Byte 0	Byte 1	Byte 2	Byte 3

There are three sections to the data format: header, data, and footer. The header and footer sections are fixed in length and the data section is variable depending on how many Input Boards are loaded in the Digital Lynx SX system. The expected record size and packet sizes depending on the Input Board count is reflected in the following table:

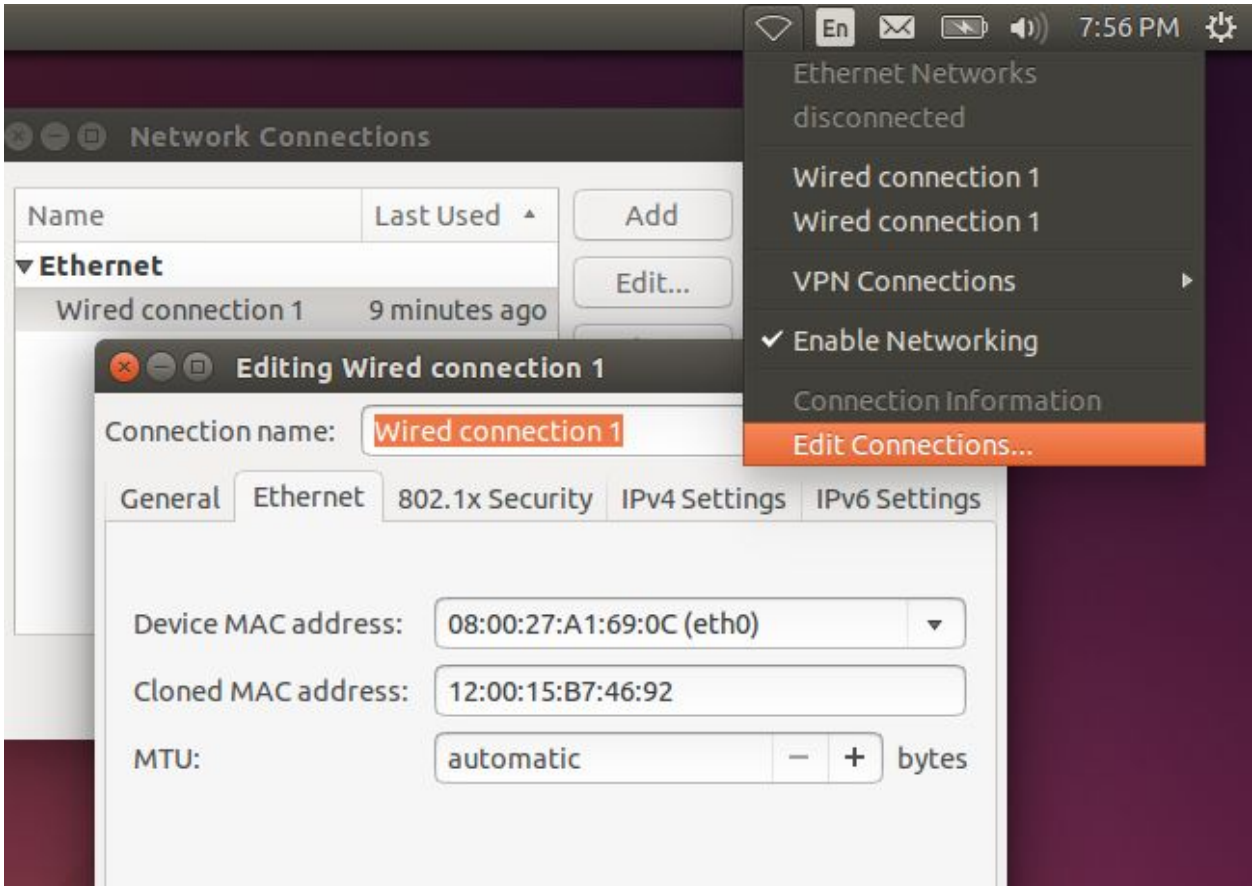
Number of Boards	Neuralynx Record Size (bytes)	Packet Size (bytes)
1	200	242
2	328	370
3	456	498
4	584	626
5	712	754
6	840	882
7	968	1010
8	1096	1138
9	1224	1266
10	1352	1394
11	1480	1522
12	1608	1650
13	1736	1778
14	1864	1906
15	1992	2034
16	2120	2162

Since the packet you'll be receiving from the Digital Lynx SX is a duplicate of the 1st port, the Ethernet packet will contain an identical destination MAC address. You'll need to use a PC other than the Cheetah PC to receive the 2nd port data and you'll need to force its MAC address to be a clone of your Cheetah PC fiber Ethernet card MAC address.

If you are using Windows, under the "Advanced" tab in your network interface configuration, find the network address and copy the value from the network interface Cheetah is using to communicate with Digital Lynx SX.



If you are using Linux (e.g., Ubuntu) you can use edit connections and under Ethernet tab, add the Cloned MAC address.



The default IP address and port used for the data connection are: IP 192.168.3.100 and Port 26090. These are the defaults which you are probably using. The values can be verified by looking them up in the Neuralynx Configuration folder in a file called "***DigitalLynxSX.cfg***".

You can use a free application called Wireshark to verify the packet activity and format of the incoming data on your PC. https://www.wireshark.org/

Note: not all Digital Lynx SX firmware versions support the 2nd port data output, please check back with us to make sure you have the correct firmware version.