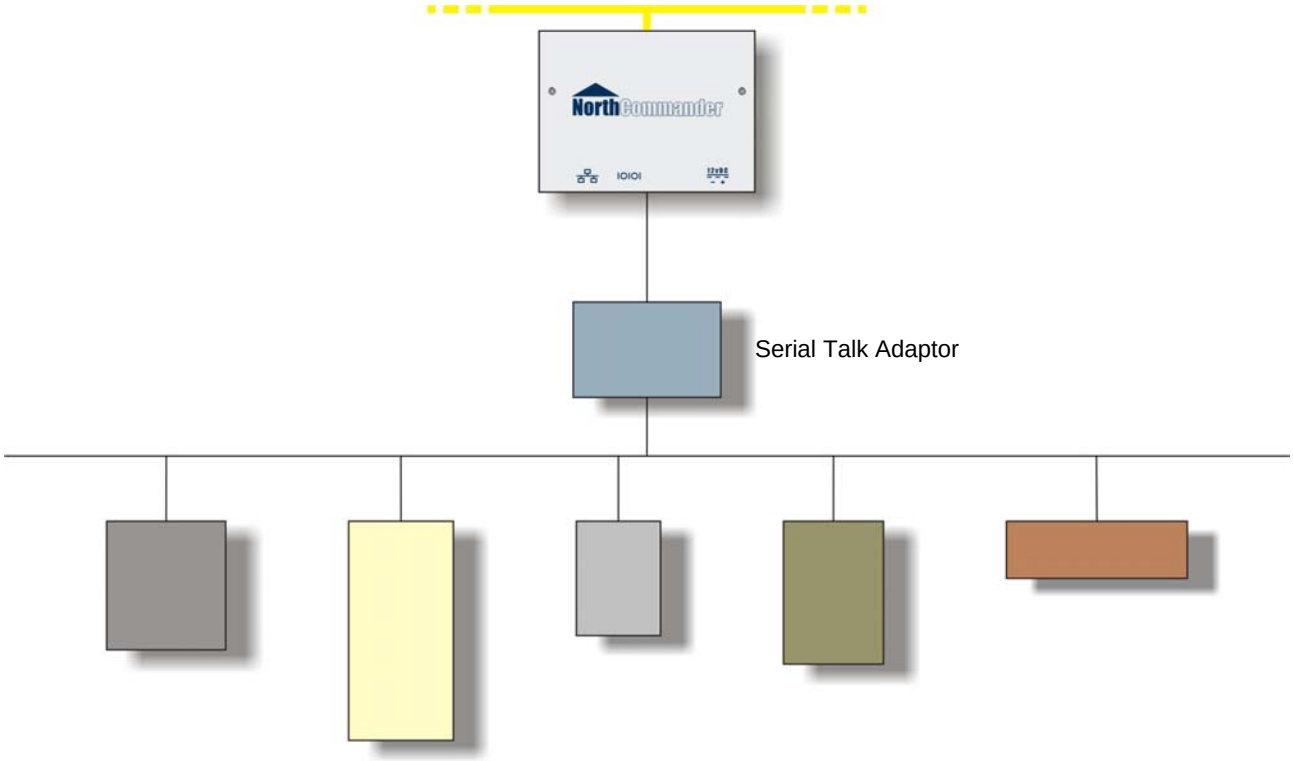
Product Engineering Guide

Commander v10 LonSLTA v12

Introduction

The LonSLTA Commander, called Commander within this document, is a powerful IP based controller and provides a configurable link between an Ethernet network and the Lon network.

Commander has an Ethernet port supporting a range of IP based protocols and a 9-way RS232 port supporting the Lon protocol. This allows Commander to access values on the Lon network and Ethernet networks, and allows other devices on the Ethernet networks to access values within Commander using a wide range of communication protocols. Commander can also act as a bridge providing communication between these networks.



LON Addressing

Each device on the Lon network, including the SLTA, must be assigned a domain number. Only devices residing on the same domain may communicate with each other. One aspect of engineering is to determine which domain the SLTA will reside.

Within a domain, each device has a unique subnet/node number. Subnet numbers are in the range 1…255, and node numbers are in the range 1…127. Before requesting values from a device, the subnet and node number must be determined. The SLTA, being a device on the Lon network, must also have a subnet/node number assigned.

There are two ways of assigning a domain, subnet and node number to the SLTA. The first is to use Lon engineering software and assign the numbers from the Lon network. The second is to have the driver assign them from the RS232 link.

Neuron ID Addressing

It is possible to access a Lon device using its Neuron ID rather that the domain, subnet, and node. Although this is not recommended for normal operation, it is useful when engineering. See the *Using Default ID Mode* section below.

Lon External Interface File

A Lon external interface file (xif) is available for each Lon device. This file describes the network variables available and can be used to generate a North ObSys contents file. We have already generated contents files for many LonMark-Certified products, however if you have a new device then e-mail the xif file to support and we will return the contents file.

Features

Commander contains a range of software modules that provide Alarm handling, Networking services, and Data Acquisition & Control.

LonSLTA Interface

Each LonSLTA Commander has a LonSLTA module that handles communications to and from the Lon network. Commander uses the LonSLTA module to request values from the LON network.

Networking

Commander contains several modules that provide network-based services:

- IPBus Interface – allows Commander to access objects within other IPBus (XOM/IP) compatible devices on the IP network, such as North ObSys and other Commanders. It also allows other IPBus compatible devices to access objects within Commander
- User Database – collects values from the attached systems. It acts as a database of summary information that is aimed at users. Users can view and set the information in the database in several ways: from the Web Server; from the BACnet controller; and from attached compatible devices
- Web Server – automatically generates HTML pages using information collected by the user database and alarm event history. Access to specific pages or values can be controlled using the authentication server
- BACnet Application Specific Controller – supports the ASHRAE BACnet (Building Automation and Control Networks) standard. Information from the user database is automatically presented as BACnet objects
- Authentication Server – identifies tokens and access levels for 250 users. Provides authentication for the Web Server, attached devices, and other devices on the IP network

Once connected to the Ethernet network, Commander can be configured via IPBus using object engineering software such as North ObSys.

Alarm Handling

Commander contains several intelligent alarm handling modules, including:

- Alarm event distribution and routing – routes alarm events to destinations within Commander, the attached system, and Ethernet network depending on configurable criteria
- Alarm event history – stores the last 100 alarm events received
- SNMP Trap notification – reports alarm conditions to a management station trap handler
- E-mail notification of alarm events – sends alarm events as e-mail messages
- Monitoring of values and alarm event generation – the user database monitors the values collected and generates alarm events if required

Modules within Commander, the LonSLTA System, and devices on the Ethernet network can send alarms events to the Alarm Router for distribution. The Alarm Route module sends alarms to other alarm objects within Commander, on the LonSLTA System, and on the IP network.

Control

- Programmable Control – OBVEngine allows the engineer to develop processes to control objects within Commander, the attached system, and on the Ethernet network
- Time Control – uses Commander's date and time to provide on-off time control to other devices. The Calendar is used to specify day-types for the following year, and each of the timers then has a set of usable profiles for each day-type.
- Data Logging – allows Commander to log up to 32 different points and stores the data for use by other object-based software such as the ObSys Data Manager or LogView

Engineering

Step 1 – Install the Commander

Refer to the *Commander Installation Guide* for details on how to mount the Commander securely to a wall or within a cabinet.

Step 2 – Connect Commander to the LonSLTA

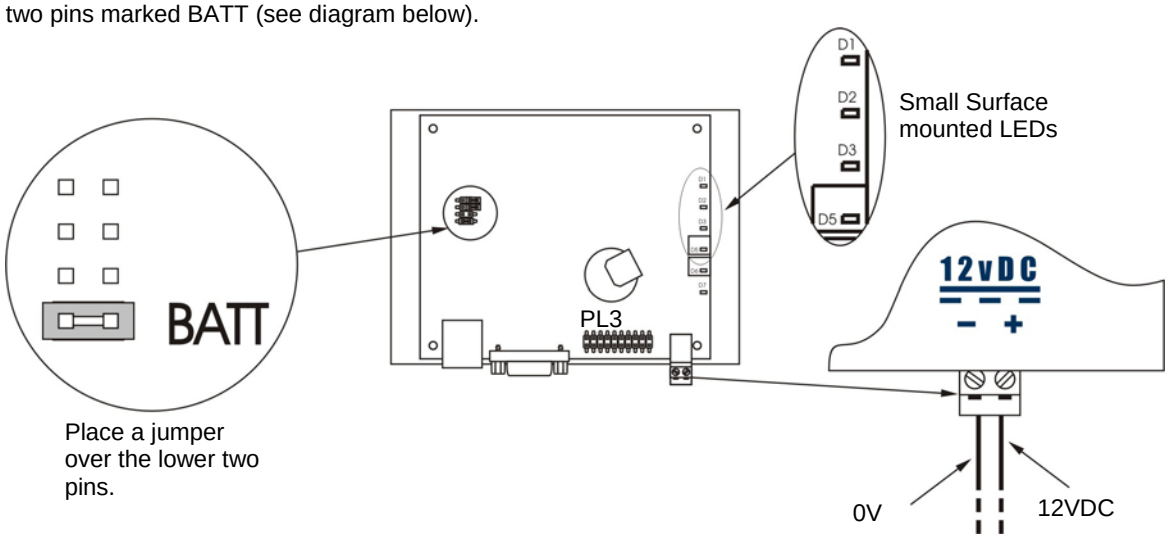
CAUTION! The 9-way RS232 connector on the Commander should be supported when plugging the cable in. Connect the Commander 9-way RS232 port to the 9-way RS232 port on the Echelon SLTA-10. Refer to the *Cable* section below for more details.

Once powered in Step 3, the orange LED marked D3 pulses when a valid message is transmitted or received by the RS232 port.

Step 3 – Apply Power and Enable the Battery Back-up

Commander requires a regulated 12VDC (±10%) power supply and draws up to 500mA maximum. Connect power as shown in the diagram below.

Commander contains a Lithium-ion rechargeable battery. Do not short-circuit the battery, or place on a metal surface where the battery terminals could be shorted. The top surface of the battery is live. During shipment the battery is disconnected and should be connected before engineering Commander. To connect the battery place a jumper over the lower two pins marked BATT (see diagram below).



If the battery jumper is fitted and the board is left without power, then the battery will typically support the Setup module storage and real time clock for 10 months.

Step 4 – Configure the Commander Network Settings

Commander is supplied configured with the default IP address 192.168.2.200 and a network mask of 255.255.255.0.

Configure Commander's network settings to avoid a duplicate address and to match the local network class. Refer to the *Configuring Network Settings* section below for more details.

Step 5 – Connect Commander to the Ethernet Network

Attach the Commander to a 10Base-T compatible Ethernet network switch or hub using CAT-5 cable with RJ45 connectors.

The red LED marked D5 should light to indicate the presence of a physical Ethernet connection.

Step 6 – Configure Engineering Software

Configure the IPBus module within your object engineering software, such as ObView. The IP address of Commander should be added to the alias table. Refer to the *OSM v20 IPBus v20 Engineering Guide* for more details.

Step 7 – Set the Date and Time

Set the current date and time in the Commander General Setup module. The daylight-saving start and end periods may also be configured. Reset the Commander to enter the correct time and date in the last restart field.

Step 8 – Configure the Driver Module

Configure the LonSLTA driver module with a baud rate, device label and SLTA configuration values.

The orange LED marked D3 pulses when a valid message is transmitted or received by the RS232 port.

Step 9 – Configure the Commander Control Modules

ObVerse processes can be configured and downloaded to the OBVEngine module. Use the OBVEditor to author, download and monitor these processes.

If required, Commander's calendar and clock can be used to provide on-off time control to devices attached via the Ethernet or LonSLTA networks. The Calendar is used to specify day-types for the following year, and each of the timers then has a set of profiles to be used.

If data logging is required, configure the number of logging channels required from the LogMax module and then configure each logging channel.

For more information, refer to the *Introduction to Commander Control*.

Step 10 – Configure the Commander Alarm Modules

Alarms generated by the various modules within Commander, or sent to Commander from another device, may be routed using the Alarm Route module. If required, configure the Alarm Route destinations.

If the Alarm History module is required, route alarms to this using the Route Object 'HD.ALARM'

If an e-mail server is available on the Ethernet network, configure the Alarm Email module with the IP address of the destination server, and destination e-mail accounts. Alarms should then be routed to the Alarm Email device.

If a network management SNMP trap handler is available on the Ethernet network, configure the SNMP Trap module with details of a destination IP address and MIB name.

For more information, refer to the *Introduction to Commander Alarms*.

Step 11 – Configure the Commander Networking Modules

If required, configure the pages and objects within the User Data module. The Web Server and BACnet modules can then present this data. The User Data module can also monitor the objects configured and generate alarm events.

If a Web Server is required, enable this from the Web Server module. Web pages are automatically generated from data within the User Data and Alarm History modules. User authentication may also be provided from the User Token module.

If the BACnet protocol is used on the IP network, enable the Commander's BACnet device by configuring the BACnet Device Instance. This number allows the User Database to appear as BACnet objects on the IP network.

The User Token module can provide authentication for the Web Server and compatible devices attached to the Ethernet or LonSLTA networks. If required, logon and configure users within the User Token Setup module.

For more information, refer to the *Introduction to Commander Networking*.

Configuring Network Settings

Commander is supplied pre-configured with the IP address 192.168.2.200. This section describes how the IP settings may be configured manually or assigned from a DHCP server, using either the Terminal Port or Telnet module.

The Terminal Port or Telnet module can also provide useful fault finding information.

Connecting to the Telnet Module

Connect directly to Commander from your PC using a CAT5 cross-over cable. The red LED D5 will light to indicate the cable is connected correctly.

Configure your PC's network connection with an IP address of 192.168.2.2 and a subnet mask of 255.255.255.0.

Launch your telnet client software with the Commander address, for example at the Windows command prompt type:

TELNET 192.168.2.200↵

The server uses the default Telnet port of 23 and all commands should be followed by a carriage-return and line-feed.

Once connected, Commander will then prompt for the user logon. Enter the default user logon of (blank):

User: ↵

Once logged-on to the Telnet session, Commander will request which service is required. For object based communications with Commander enter 'qr':

Service:qr↵

Commander is now ready to have values read from and written to it. Enter commands at the Q prompt:

Q:

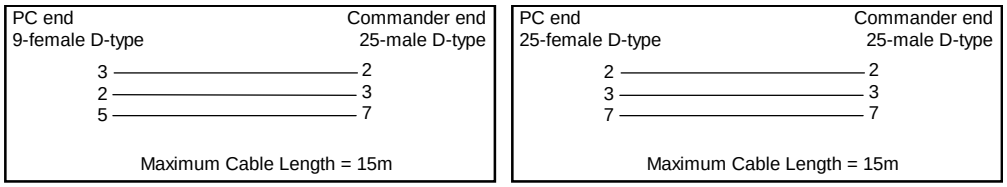
Telnet can be used to read from any object within Commander, from other IPBus devices, and from the connected system. It can also be used to write a value to these objects.

For more information, refer to the *Introduction to Commander Networking*.

Connecting to the Terminal Port

If the IP address is unknown, Telnet cannot be used. Commander has a port that can be used for local configuration and test purposes. A special converter, order code MISC/CMDRCONV, is needed to connect terminal software to this port.

Connect the converter to Commander port PL3 with 'edge side' label towards the bottom edge of the board. Connect your PC using a standard serial modem cable.



Once connected, use terminal software (such as HyperTerminal) to check the operation and read and write objects within Commander. The terminal software should be set to **19200 baud, 8 bits, no parity,** and **no flow control**.

The green LED D2 will light when receiving data, and D1 will light when Commander is transmitting data on port PL3.

The Terminal Port can be used to read from any object within Commander, from other IPBus devices, and from the connected system. It can also be used to write a value to these objects.

Accessing Objects

Once connected using either Telnet or the Terminal Port, objects may be read or written as follows:

Reading Objects

Type the object reference and press carriage-return (↵) to read the object's value (object references are case sensitive). For example, to read the date and time from Commander, type:

C.DT↵

Commander responds with the date and time:

13/09/05|12:30:08

Writing Objects

Type the object reference, the equal sign, the value, and then carriage-return, to write the object's value
For example, to write the date and time to Commander, type:

C.DT=13/09/05|12:22:00↵

Commander responds with 'Ok' when the value has been written.

Configuring the IP Address

Each IP device on the Ethernet network has a unique address that may be configured in one of the following ways:

- Fixed address. If a static IP address is required, the IP address and related network settings may be configured manually
- Automatically assigned using a DHCP server. When powered up, Commander asks the DHCP server for an IP address. The server supplies a unique IP address, as well as the other settings related to the network configuration.

Fixed IP Address

Commander is supplied pre-configured with a fixed IP address. This address should be unique on the Ethernet network and may require changing. Contact you network administrator for an available IP address, network mask and gateway address.

Connected to the Telnet or Terminal Port, use the following commands to configure the IP network settings:

C.IA=<Commander IP address>	… to set the Commander's IP Address (default: 192.168.2.200)
C.IM=<IP Network Mask>	… to set the IP network mask (default: 255.255.255.0)
C.IG=<Gateway IP address>	… to set the Gateway's IP Address (default: 0.0.0.0)
C.!rst=1	… to reset the Commander

For example, if your IP network has addresses 192.168.2.x, and the Commander's address is to be 192.168.2.10, and the gateway's address is 192.168.2.254, then type the commands:

C.IA=192.168.2.10↵
C.IM=255.255.255.0↵
C.IG=192.168.2.254↵
C.!rst=1↵

DHCP Assigned IP Address

Commander can be configured to obtain its IP address from a DHCP server. When powered on, Commander will request IP address information from the DHCP server.

It is recommended that Commander should keep the same IP address. Contact your network administrator to configure a DHCP reservation.

If you want to use a DHCP assigned address, set the IP address to 0.0.0.0 and reset Commander.

Type:

C.IA=0.0.0.0↵
C.!rst=1↵

To check the current IP address, type:

C.CIA↵

Ethernet Engineering Reference

Objects

Once the IP settings are configured, the Commander's main object (which contains other objects) is created on the IPBus network. Use object software, such as ObView, to access these objects.

Object	Label	R/W	Type
o [1]	Commander Main Object	-	*[Commander v10\LonSLTA v12]*

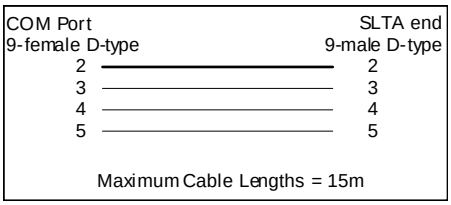
Notes

[1] The object, *o*, is the alias configured within the IPBus module accessing the IP network.

Device Engineering Reference

Cable Specification

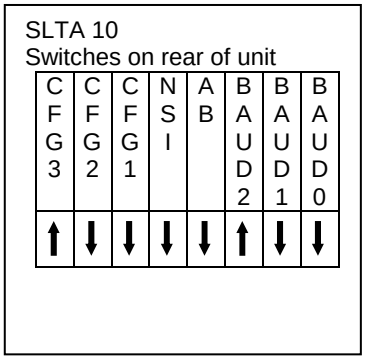
The cable between COM port and the Echelon SLTA is as follows:



CAUTION! The 9-way RS232 connector on the Commander should be supported when connecting the cable.

SLTA-10 Switches

The SLTA has switches that select how the SLTA communicates on its RS232 port.



NOTE: The diagram shows the setting for 19200 baud. We do not recommend 38400 baud on the Commander platform.

Using Default ID Mode

Each device on the Lon network, including the SLTA, must be assigned a domain number. Generally, only devices residing on the same domain can communicate with each other.

If you do not know the domain ID of a group of Lon devices, then the Default ID mode may be used to find this information.

Step 1 – Connect system

Follow the *Engineering* section above to connect the SLTA and configure Commander.

Step 2 – Configure SLTA Address

Using ObView, set the SLTA to a unique address by configuring the following objects within the LonSLTA driver setup: Domain ID (S.I), Subnet (S.S), Node (S.N) and Authentication Key (S.A).

Try using the following values, for example:

SLTA's Domain ID:	00
SLTA's Subnet:	127
SLTA's Node:	127
SLTA's Authentication key:	FFFFFFFFFFFF

Step 3 – Configure SLTA Mode

Next set the following objects within the LonSLTA driver setup:

Initialise SLTA (I):	Yes
Default ID Mode (DM):	Yes

When the SLTA has been configured, the SLTA Successfully Configured object (DS) value should change to yes.

Step 4 – Find Device

We can now start to find the domain ID of a LonMark device. If you have a network of devices, then chose one at a time.

Whilst the ObView page for the LonSLTA driver setup is shown, **press the service pin** on the Lon device. A value should now appear in the Default ID object (DID). If the ID does not appear press the service pin again. If this does still not work, then enter the 12-digit Neuron ID of the device.

Step 5 – View Device

From ObView, navigate to the Lon Network object. Next, click the scan button and once scanning has completed click refresh. You should now see one object for the Neuron device (D). Navigate to this object.

A Lon device can reside in two domains, indicated by objects Domain 0 (D0) and Domain 1 (D1). Navigate to object Domain 0. The ObView page shows the Lon device's address settings.

If the Subnet and Node objects both have the value 0, then this is a sign that the Lon device has not yet been configured. Ask the installer of the Lon devices to address them using LonMaker, and make a note of their address parameters.

Note the address parameters of the device and continue to the next stage.

Step 6 – Reconfigure SLTA

Now the address fields are known, the SLTA can be reconfigured with the correct domain ID. Navigate to LonSLTA driver setup object, enter the Domain ID and Authentication Key that you noted previously.

Next, set the object Default ID Mode to no, and object Initialise SLTA to yes again.

Step 7 – Scan Lon Network

Navigate to the Lon Network object. Click the scan button again, and once scanning has finished click refresh. All the LonMark devices within the domain should now appear.

Finally, open the Lon device you wish to view. If a blank page is displayed then you require a new contents file for the device; e-mail the XIF file for this device to *support@northbt.com*.

Notes

Revision History

Version	Build Date	Details
1.1	04/09/2004	Network variable numbers greater than 255 now supported.
1.1	03/03/2005	Documentation change to correct subnet and node number range
1.1	06/04/2006	Fixed problem when writing to object Vx.ly
1.2	21/10/2009	Added new offset object Px (this replaces Ox offset object). Added new decode types (objects L, D, Z, H, TT, etc). New XIF Converter.

Order Codes

CMDR/LONSLTA	Commander with LonSLTA interface.
CMDR/CABLE/LONSLTA	Cable to connect Commander with Echelon SLTA.
MISC/DINKIT	DIN-rail mounting kit for Commander.
MISC/CMDRCONV	Commander terminal port converter.