A NovaTech

IEC 61850 Client for OrionLX

Software Manual



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DISCLAIMER

This manual contains information that is correct to the best of NovaTech's knowledge. It is intended to be a guide and should be used as such. It should not be considered a sole source of technical instruction, replacing good technical judgment, since all possible situations cannot be anticipated. If there is any question as to the installation, configuration, or use of this product, contact NovaTech, LLC at (913) 451-1880.

To ensure that the equipment described in this User Manual, as well as all equipment connected to and used with it, operates in a satisfactory and safe manner, all applicable local and national codes that apply to installing and operating the equipment must be followed. Since these codes can vary geographically and can change with time, it is the user's responsibility to determine which codes and standards apply, and to comply with them.



Failure to follow the instructions provided in this manual, and/or failure to comply with applicable codes and safety standards can result in damage to this equipment, damage to connected devices, and/or serious injury to personnel.

All links to external websites have been verified as correct and appropriate at the time of the publication of this document. However, these links and websites, being outside of NovaTech LLC's control, are subject to change and may no longer be correct. In this case, please contact:

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The documentation for the OrionLX and OrionLXm is structured as follows.

Manual name (see cover page of each manual)	Purpose
Quick Startup Guide	Describes out-of-the-box setup for quick installation.
Orion LX User Manual or OrionLXm User Manual	 Description of OrionLX/OrionLXm hardware. Setup of configuration using NCD (NovaTech Configuration Director) OrionLX/OrionLXm: Configuration of OrionLX/OrionLXm features Runtime features Functions of Orion MMI console Setup and operation of the video option (-MMB) (OrionLX only)
OrionLX Applications Manual	Specific setup and operation of OrionLX features, such as firewall, SFTP access, installation of SSL certificate, access to OrionLX's SQL database with Microsoft Access® and Excel®, and others.
Software Manuals	Software manuals explain all aspects of setup and operation of protocols such as DNP3 master and software options (Archive, Logic, DA Logic, etc.)
Tech Notes	Tech Notes provide solutions for general integration, such as scaling or setup of RS-485 networks.
Field Instructions	Field Instructions provide step-by-step instructions for installation of new hardware or software in the field.

See also <u>Appendix B – Additional References</u> for a list and locations of the recommended reference manuals.



Styles and Symbols

In this document, fonts, text styles and symbols are used to distinguish standard text from keyboard input, program text, GUI messages, and hyperlinks as follows. Warnings and safety notices are indicated with ANSI symbols.

Displayed text or symbol	Description
This is normal text.	Standard text.
See OrionLX Setup	Hyperlink to text in same document.
www.novatechweb.com	Hyperlink to website.
orion.support@novatechweb.com	Clicking on this link starts email client on PC.
See OrionLX User Manual	Document name.
Minimum value	Menu item or text displayed by software.
Name of the data point	Text to be entered in input field or window.
Save	GUI button to be clicked.
if frequency < 60.0 then	Program code.
<enter>, <ctrl>+<g>, <g></g></g></ctrl></enter>	Key to be pressed.
	This yellow triangle indicates a warning that must observed by the users in order to avoid possible equipment damage or personal injury.
	This yellow triangle indicates an electrical hazard.
	Electrostatic sensitive device requires proper handling and grounding procedures to avoid equipment damage.
	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

Note that depending on the Windows® display settings on the computer running NCD, some of the screen shot details may appear differently than those shown in this manual. The screen shots in this manual have been taken using the setting "Windows Classic" which is available on Windows XP®, Windows Vista® and Windows 7®.



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I. Introduction

The IEC 61850 Client Module enables the Orion to operate as a client or master to IEC 61850 servers such as IEDs, meters, and relays. The IEC 61850 Client can be set up to poll one or more slave devices in the field.

Within the Orion, the data polled by the IEC 61850 Client from the field device(s) is made available to any Orion slave port (through which master stations communicate with the Orion), as well as to an Orion logic module if present. Likewise, commands can be sent to the field device(s). The output commands are either received on one of the Orion's slave ports, or generated by an Orion logic module. In both cases, the output point must be mapped to the correct field device and point address for the IEC 61850 Client.

The IEC 61850 Client Module is available on both the OrionLXm and the OrionLX-CPX. When the term "OrionLX" is used in this manual, it refers to these two products, not the standard OrionLX.

For general information regarding IEC 61850 which is beyond the scope of this manual, refer to the International Electromechanical Commission (IEC) website: <u>www.iec.ch</u>.



II. NCD Port Configuration

Setup of IEC 61850 Port

The IEC 61850 Client is set up on an Ethernet port of the OrionLX as follows. Note that only one IEC 61850 Client port can be set up on the Orion. Multiple IEC 61850 server devices can be handled by this IEC 61850 Client port.

NovaTech Configuration Director				
File Edit Configure Communications	Windo	w Help		
🗋 🚰 🗿 🚺 OrionLX_Demo.ncd* 🔸		General		
		Hardware Model		
	_	Serial Ports	•	
		Network	•	Configure New Port
	~	NKI - Time Interface Add Ons Hardware I/O Logic	* * *	Port 23 - HTTP Slave HTTP Slave Port 24 - XML Slave XML Port 27 - DNP3 Master DNP Master Port 28 - DNP3 Master DDIO
				Port 29 - DNP3 Slave DNP Slave Port 31 - Dial Interface Dial Interface

Figure 1: Configure New Port for IEC 61850 Client

Protocol	Mode	Version	Port in use	
Dial	Interface	3.02	Port 31	
DNP3	Master	3.15		
DNP3	Slave	3.11		
Email	Slave	3.05		
HTTP	Master	3.01		
EC60870-5-101/104	Slave	1.05		
EC61850	Master	1.05.0001		
Modbus	Master	3.11		_
Modbus	Slave	3.07		
SEL	Master	3.14		
SPassthru	Interface	3.01		
WEB	Slave	3.00		
XML	Slave	3.07	Port 24	_
XMLRPC	Slave	3.01		
VMI DDC	Montor	2.00		

Figure 2: Select IEC 61850 as Protocol



Port Menu

After the IEC61850 protocol is selected, the Port menu is displayed for configuring the general port options of the IEC 61850 Client.

ELC61850 Master Port 33 - IEC61850 Master (OrionLX_Demo.ncd)*									
Port Options: Delete Port Close Port									
Port ⊡ Client ¥ Add New Device	Accept Cancel	_							
	Port - General Options								
	Port Name IEC61850 Master								
	Port Module 🔽 Use Automatic Settings								
	Module Name m850_								
	GOOSE Options								
	Adapter ID eth0								

Figure 3: Port Menu

At the top of the above menu, as well as the other IEC 61850 menus, the Port Options menu is displayed (Figure 4).

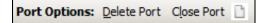


Figure 4: Port Options

Command	Description
Delete Port	Removes the IEC 61850 Client and all points on the port from the configuration.
Close Port	Closes the IEC 61850 Client menu.

Table 1: Port Options Commands



First, configure the port parameters as explained in the table below. Once all parameters have been set up, click Accept . Then click Add New Device in the upper left portion of the above menu (Figure 3), and proceed to the Device Menu.

Parameter	Description
Port Name	Defines the port name used in the NCD configuration program and the name displayed in the Orion menus. The default name is IEC61850 Master. However, entering a port name that describes its purpose will provide self-explanatory diagnostic menus when the Orion is operating. The name can be up to 30 characters long and contain all printable characters except @, &, [,], ', ", =, or commas.
Port Module Module Name	The default settings must not be changed. Only the latest version of the driver is stored on the Orion's flash memory because package installation requires removal of previous packages. If a previous version of a driver must be executed, the driver must be transferred to the Orion from a previous Orion package. Note that this overwrites the current version of the driver. Contact NovaTech technical support if this step is required.
Adapter ID	The IEC 61850 Client operates on only one of the Ethernet ports of the OrionLX. This Ethernet port must be specified in this field. If using an OrionLXm, the available Ethernet ports are eth0 and eth1. If using an OrionLX-CPX, the available Ethernet ports are enp3s0, enp3s1, and enp4s0 which are labeled eth0, eth1, and eth2 on the OrionLX-CPX enclosure.

Table 2: General Port Options



Device Menu

To add a device, click Add New Device (Figure 5) at the top of the left pane (see Figure 3). A new device labeled Device 1 is displayed with subheadings of Inputs and Outputs. Additional devices can be added by clicking Add New Device again. The next available device number in NCD will be assigned to the next additional device. Each device represents an IEC 61850 server device that the Orion will communicate with.

Also, a menu item labeled All Devices with Inputs and Outputs subheadings is displayed. The input and output points of all devices are displayed when this menu item is selected.

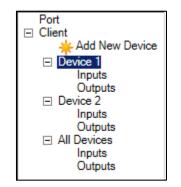


Figure 5: IEC61850 Device Menu

Each device's parameters are configured in the Device menu (Figure 6).

After configuring the device parameters as described in this section, click on Inputs and Outputs below each device to configure that device's input and output points. For detailed descriptions, see the chapters Inputs Menu and Outputs Menu.



EC61850 Master Port	24 - IEC61850 Master ((OrionLX_De	emo_6185	0.ncd)*								
Port Options: Delete Port	Close Port 🗋											
Port ⊡ Client — Add New Device	Device Options:	Accept	Cancel	Delete Device	Copy Device							
Device 1 Inputs	Device 1											
Outputs Device 2	Available SCL Files					Refresh	Fix	Import				
Inputs		Company	Device	IED Name (editable)	Description	Version	SCL File					
Outputs All Devices		ALSTOM	P242	TEMPLATE	P242 Motor Protection	P242v60K						
Inputs		ALSTOM	P142	TEMPLATE	P142 Feeder protection relay with auto-reclose	P142v46A						
Outputs		ALSTOM	P242	TEMPLATE	P242 Motor Protection	P242v60K		KUKAu.scl				
		ALSTOM Bitronics	P142 M871	TEMPLATE NT M871	P142 Feeder protection relay with auto-reclose Measurement & Recording IED with (1xP30) modu	P142v46A		u.ICD				
		Bitronics	M871	NT M871	Measurement & Recording IED with (1xP30) module			M871 CID				
		Distornoo	11071	111213071	Hose and a Hose and the office	10(0) [1007 01 1101						
	Device Parameters	;										
	Description	Device 1										
	Server ID	,		_								
	Polling Rate (msec)	2000										
	IP Options											
	Port	102										
	Host/Slave IP Address	127.0.0.1										
	Report Control Block (RCB) Options											
			<u> </u>	Quality Change 🔲 Di	ata Update 🔽 Integrity 🔽 General Interrogation							
	Maximum URCBs											
					Carfanad							
	Report Control Blocks				Configured							
		NT_M871 NT_M871 NT_M871 NT_M871 NT_M871 NT_M871	System/LL System/LL System/LL System/LL System/LL	.N0/brcb01[BR] .N0/brcb02[BR] .N0/brcb03[BR] .N0/brcb04[BR] .N0/urcb01[RP] .N0/urcb02[RP] .N0/urcb03[RP]		R] R] R] P] P]						
	GOOSE Control Blo											
	GOOSE Control Blocks											
		Name D	ataset M	IAC Address AppID	(Hex) VLanID (Hex) VLanPriority Description	n						
								-				

Figure 6: IEC61850 Device Parameters

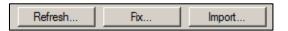


Figure 7: Refresh, Fix, Import Buttons

The IEC 61850 Client must import the .scl, .icd, or .cid file of the IEC 61850 server device from which the client will obtain data. These files contain the IEC 61850 server configuration and are generated with the software provided by the manufacturer of the IEC 61850 server device (IED, meter, relay). Clicking the **Import...** button opens the following window (Figure 8) for selection of the appropriate .scl, .icd, or .cid file.



Choose files to import			×
Computer - System (C:)	•	👻 🚱 Search System	(C:)
Organize 🔻 New folder			::: - 🗔 🔞
🛨 📑 Videos	Name ^	Date modified	Туре 🔺
🖂 🖳 Computer	\$Recycle.Bin	7/10/2013 20:23	File folder
🗖 📥 System (C:)	🎍 Autodesk	6/3/2014 12:42	File folder
🕀 🌗 \$Recycle.Bin	Boot	7/11/2013 06:16	File folder
🕀 퉲 Autodesk	퉬 Brother	7/24/2014 16:22	File folder
🕀 🌗 Boot	🔲 퉬 dell	8/9/2013 15:30	File folder
🗄 🏬 Brother	Documents and Settings	7/14/2009 07:08	File folder
🕀 🕌 dell	Drivers	7/11/2013 06:16	File folder
Documents and Settings Drivers	Carmin	8/21/2013 21:33	File folder
🕀 📔 Garmin		7/11/2013 06:16	File folder
🗉 🌗 Hotfix	🐌 HP Universal Print Driver	10/28/2013 20:49	File folder
🕀 🌗 HP Universal Print Driver	lintel	7/10/2013 20:36	File folder
🕀 🏬 Intel	MSOCache	7/11/2013 13:13	File folder
🕀 퉲 MSOCache	PerfLogs	7/14/2009 05:20	File folder
🕀 🍌 PerfLogs	 ▼ 4 	71 12000 00120	
Drogram Files			
File <u>n</u> ame:		▼ IEC61850 files (*.scl, *.icd, *.cid) 💌
		<u>O</u> pen •	Cancel

Figure 8: File Import Window

The Company, Device, IED Name, Description, Version, and SLC File name from the imported file are now added to the following window.

 Choose 	IED/SCL File					
Company	Device	IED Name (editable)	Description	Version	SCL File	
ABB	REF615	TEMPLATE	REF615	E	REF615.cid	
AREVA	P546	TEMPLATE	P544/P546 Current Differential with Distance Protection - 2 sets of CTs	P546v57A	P54657_K_B.icd	
AREVA	P546	TEMPLATE	P544/P546 Current Differential with Distance Protection - 2 sets of CTs	P546v57A	P54657_K_A.icd	
Bitronics	M571	M571_103	Measurement & Recording IED with digital IO	Mx70v1.02	M571_103.CID	
Bitronics	M871	NT_M871	Measurement & Recording IED with (1xP30) module(s)	Mx70v1.02	NT_M871.CID	
Unknown	IEC61850 IED	Client3	Client3		REF615.cid	
Unknown	IEC61850 IED	Client5	Client5		REF615.cid	-
Unknown	IEC61850 IED	Client4	Client4		REF615.cid	
Unknown	IEC61850 IED	Client2	Client2		REF615.cid	•

Figure 9: List with Imported Device Files



SCL Files	Company:	ABB De	vice: REF615 I	ED Name: Dev	7343		Refresh		Fix	Imp	ort
	A Chasses	IED/SCL File									
	Company	Device	IED Name (editable)	Description			Version	SCL File			—
	ABB	REF615	Dev7343	REF615			E	REF615.cid			
	AREVA	P546	TEMPLATE		nt Differential wi	h Distance Protection - 2 sets of CT			57_K_B	licd	
	AREVA	P546	TEMPLATE			h Distance Protection - 2 sets of CT			57 K A		
	Bitronics	M571	M571 103	Measurement & F				M571 103.0			
	Bitronics	M871	NT M871			th (1xP30) module(s)		NT M871.C			
	Unknown	IEC61850 IED	Client3	Client3	_			REF615.cid			
	Unknown	IEC61850 IED	Client5	Client5				REF615.cid			
	Unknown	IEC61850 IED	Client4	Client4				REF615.cid			_
	Unknown	IEC61850 IED	Client2	Client2				REF615.cid			-
Device Parameters											
Description	Device 4		[
Server ID	1		[
Polling Rate (msec)	2000										
IP Options											
Port	102		1								
Host/Slave IP Address		54									
	,										
Report Control Bloc	k (RCB) O	ptions									
TrgOps	🔽 Data Cha	nge 🥅 Qualit	y Change 🦵 Data Up	date 🔽 Integrity	General Int	errogation					
Maximum URCBs	1		[
Report Control Blocks	Available			Configure	ed						
			atNrmIA01[BR]	>>							
			atNrmIA03[BR]								
			atNrmIA04[BR]	<<							
			atNrmIA05[BR] atNrmIB01[BR]								
			atNrmIB02[BR]								
				,							
GOOSE Control Blo	ock Informa	ation									
GOOSE Control Blocks	Auto-Subs	cribed									
	Name Da	taset MAC A	ddress AppID (Hex)	VLanID (Hex)	VLanPriority	Description					

Figure 10: Device Configuration

The following parameters are configured in the above menu.

Tab	Description
IED Name (editable)	Upon import of a file, the IED name is initially set to a placeholder name such as TEMPLATE (Figure 10). Before the file can be used to set up a device, a specific device name must be entered. The device name entered here (example: Dev7343) is prefixed to the names of the device's report control blocks in the Report Control Block (RCB) Options section (example: Dev7343LD0/LLN0/rcbStatNrmIA01[BR]). The maximum device name length is 8 characters. Only letters, digits, and underscore are permitted.



Tab	Description								
Device Parame	ters								
Description	that device. The default names such as CB266/2 provide self-explanatory M	This is the device name that is used throughout the Orion to identify the points from hat device. The default names are Device 1, Device 2, etc. However, entering names such as CB266/21P that describe the device's function in the application provide self-explanatory MMI menus when the Orion is operating. This string can be up to 30 characters long, and can contain all printable characters except @, [,], ', ", =, and commas.							
Server ID		ult, NCD assigns 1 to the first configured IEC 61850 server e server ID for each additional device. Each server device er ID.							
Polling Rate (msec)	RCBs. Polling is only used	The polling rate applies only to points that are not defined in datasets associated with RCBs. Polling is only used as a fallback mechanism for points not associated with an RCB or if the RCB cannot be enabled. The range should be 100ms to 10,000ms. Default value: 2,000ms.							
IP Options									
Port		rver device defaults to the value imported with the .scl, .icd, nged as needed depending on the port number used by the device.							
Host/Slave IP Address		ver device defaults to the value imported with the .scl, .icd, ged as needed depending on the IP address of the specific							
Report Control	Block (RCB) Options								
TrgOps	server device which are ch	sent by the server device based on the event types in the necked below:							
	Trigger	Description							
	Data Change	When deadbanded value changes, a report is triggered with one data item.							
	Quality Change	When quality of data changes (for example, goes from OK to Invalid or questionable), a report is triggered with one data item.							
	Data Update When counter data is frozen, a report is triggered work one data item. This setting is typically not used.								
	Integrity Periodically, all data items are triggered in the repu User selects the "integrity period", for example, every seconds for simple SCADA.								
	General Interrogation	All data items are triggered upon command from the client (like "Integrity" except "Integrity" is self-triggered by server and GI is triggered by client).							



Tab	Description				
Maximum URCBs	Set the maximum number of unbuffered RCB blocks. Check the server device manual for specific details. Default value: 1				
Report Control Blocks	The RCBs in the Available pane are imported from the .scl, .icd, or .cid file. They can be moved to the Configured pane by highlighting the desired RCBs and clicking on the >> . Likewise, they can be removed from the Configured pane by clicking the << button. The data in the RCBs in the Configured pane are retrieved and stored in the Orion realtime database (see example in Figure 11).				
GOOSE Contro	I Block Information				
GOOSE Control Blocks	Any GOOSE control blocks which are set up in the server device are auto-subscribed and listed as shown in the example in Figure 12.				

Table 3: Device Configuration Parameters

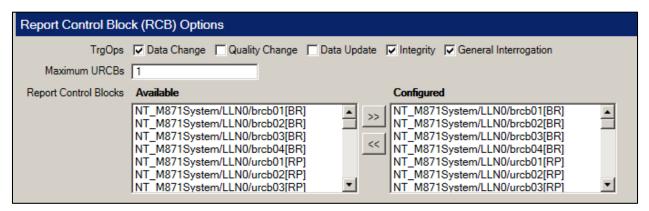


Figure 11: Configured RCBs

GOOSE Control Block Information								
GOOSE Control Blocks	Auto-Subscribed	to-Subscribed						
	Name	Dataset	MAC Address	AppID (Hex)	VLanID (Hex)	VLanPriority	Description	
	NT_M871System/LLN0/gcb01[GO]	Dataset1	01-0C-CD-01-00-01	0001	1F1	4	System GOOSE Control Block 1	

Figure 12: GOOSE Control Blocks Set Up in Server Device

Then the data points in the GOOSE control block can be selected for transfer to the Orion realtime database as shown in the following figure (Figure 13, see also chapter Inputs Menu). Simply set the checkbox(es) for the desired point(s) and click >> to add them to the Orion Point Name window.



EC61850 Master Port 2	IEC61850 Master Port 24 - IEC61850 Master (OrionLX_Demo_61850.ncd)*							
Port Options: Delete Port	Close Port 🗋							
Port < ⊡ Client	Inputs		Device 1 (24 Item(s) - Filter By: All	Points)	Fo	nt -)-		-
Add New Dev	Count Items Selected: 2		🔎 Search 🔀 📔	Configured Inputs				
Inputs	MMS Variables		Orion Point Name	IEC61850 Name 💌	GOOSE?	Min	Max	
Outputs Device 2		>>	GGIO1/SPCSO1/stVal	NT_M871System/GGI01/SPCS01/stVal[ST]	Yes	0	1	<u>-</u>
Inputs	Image: NT_M871System	1	GGIO1/Ind1/stVal	NT_M871System/GGIO1/Ind1/stVal[ST]	Yes	0	1	
Outputs All Devices	GOOSE Variables		DmdMMXU2/PPV.phsCA/t	NT_M871Measurements/DmdMMXU2/PPV.phsCA/t[MX]	No	0	4294967	
Inputs	IV NT_M871System GGI01		DmdMMXU2/PPV.phsCA/q	NT_M871Measurements/DmdMMXU2/PPV.phsCA/q[MX]	No	0	4294967	
Outputs			DmdMMXU2/PPV.phsCA/instCVal.mag.f	NT_M871Measurements/DmdMMXU2/PPV.phsCA/instCVal.mag.f[MX]	No	0	2147483	
	+ 🗹 SPCSOT + 🔽 Ind1	E SPCSO1	DmdMMXU2/PPV.phsCA/cVal.mag.f	NT_M871Measurements/DmdMMXU2/PPV.phsCA/cVal.mag.f[MX]	No	0	2147483	
			DmdMMXU2/PPV.phsAB/t	NT_M871Measurements/DmdMMXU2/PPV.phsAB/t[MX]	No	0	4294967	
			DeedMMXU2/DDV/abaAD/a	NT_M071M	NI-	0	420406	

Figure 13: Selection of GOOSE Variables

After the desired parameters have been configured, click **Accept**. Once the updates have been accepted, the Inputs and Outputs menu setting options in the left pane are activated.



Inputs Menu

The Inputs menu displays the available IEC61850 input points for selection for the Orion realtime database. The variables are presented in a familiar "tree" format, allowing specific selection of desired elements. The tree structure represents the logical structure of a device and its nodes, objects, and attributes. The + and – selectors expand or contract the options list. Clicking the checkbox selects or deselects the listed variable. Clicking the "parent" checkbox automatically selects all related "child" variables. However, if the "parent" checkbox is selected, the "child" checkboxes remain customizable. Selecting or deselecting a child element allows configuration for each variable listed.

For a complete description of all available tools and buttons in this menu, see <u>Appendix A – Tools and</u> <u>Buttons on the Input and Output Menus</u>.

Inputs		Device 5 (9 Item(s) - Filter By: Al	l Points)		Font "	<u> </u>
Count Items Selected: 8		Search 🔀	○]			
MMS Variables		Orion Point Name	IEC61850 Name	GOOSE?	Min	Max
□	>>	MMXU1/TotW/instMag.f	M571_103Measurements/MMXU1/TotW/instMag.f[N	Yes	-2147483648	2147483647
🕀 🗖 Beh	<<	DmdMHAI1/TddA.phsA/cVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsA/c\	No	-2147483648	2147483647
Health Mod	~	DmdMHAI1/TddA.phsA/instCVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsA/in	No	-2147483648	2147483647
TddA.phsA		DmdMHAI1/TddA.phsA/q	M571_103Measurements/DmdMHAI1/TddA.phsA/q[No	0	4294967295
CVal.mag.f[MX] (FLOAT instCVal.mag.f[MX] (FL(DmdMHAI1/TddA.phsA/t	M571_103Measurements/DmdMHAI1/TddA.phsA/t[N	No	0	4294967295
Inst⊂val.mag.f[WiX] (FLC		DmdMHAI1/TddA.phsB/cVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsB/c\	No	-2147483648	2147483647
✓ t[MX] (Timestamp)		DmdMHAI1/TddA.phsB/instCVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsB/in	No	-2147483648	2147483647
□		DmdMHAI1/TddA.phsB/q	M571_103Measurements/DmdMHAI1/TddA.phsB/q	No	0	4294967295
instCVal.mag.f[MX] (FLC		DmdMHAI1/TddA.phsB/t	M571_103Measurements/DmdMHAI1/TddA.phsB/t[I	No	0	4294967295
✓ q[MX] (Quality) ✓ t[MX] (Timestamp) ④ TddA.phsC ④ TddA.res ④ TddPV.phsAB ④ ThdPPV.phsCA ④ ThdPPV.phsA ④ ThdPPV.phsA ● ThdPPV.phsA		All Points ST MX)

Figure 14: IEC61850 Input Points

Add the selected input points to the Orion Point Name pane by clicking >> .

To rename input points in the Orion Point Name field or enter a new minimum or maximum for scaling¹ in the Min/Max fields, highlight the desired items and enter the new name or value. Then press <Enter> to make the change.

¹ For details see Analog/Accumulator Scaling Technical Note.



Tabs for All Points, ST (Status Information), and MX (Measurands) at the bottom of the right pane allow sorting of the input points mapped to the Orion realtime database.

<	All Points	ST	MX

Figure 15: Inputs Point Tabs

Tab	Description
All Points	Display all configured input points in the Orion Point Name pane.
ST	Display only status information points whose value may be read, substituted, reported, and logged.
МХ	Display only measurand information points whose value may be read, substituted, reported, and logged.

Table 4: Inputs Point Tabs



Outputs Menu

The Inputs menu displays the available IEC61850 output points for selection for the Orion realtime database. The variables are presented in a familiar "tree" format, allowing specific selection of desired elements. The tree structure represents the logical structure of a device and its nodes, objects, and attributes. The + and – selectors expand or contract the options list. Clicking the checkbox selects or deselects the listed variable. Clicking the "parent" checkbox automatically selects all related "child" variables. However, if the "parent" checkbox is selected, the "child" checkboxes remain customizable. Selecting or deselecting a child element allows configuration for each variable listed.

For a complete description of all available tools and buttons in this menu, see <u>Appendix A – Tools and</u> <u>Buttons on the Input and Output Menus</u>.

Outputs		Device 5 (5 Item(s) - Fil	ter By: All Points)	Font	<u> </u>	
Count Items Selected: 0		Search	🗡 🔟 🗎 🗹	Configured Outputs		
MMS Variables M571_103Measurements		Orion Point Name	IEC61850 Name		Min	Max
DmdMHAI1	>>	DmdMMXU1/Mod/ctlModel	M571_103Measurement	ts/DmdMMXU1/Mod/ctlModel[CF]	-128	127
	~	DmdMMXU2/Mod/ctlModel	M571_103Measurement	ts/DmdMMXU2/Mod/ctlModel[CF]	-128	127
□ ctlModel[CF] (Enum) □ DmdMHAl2		DmnMHAI1/Mod/ctlModel	M571_103Measurement	ts/DmnMHAI1/Mod/ctIModel[CF]	-128	127
🗆 🗖 Mod		DmdMHAI1/Mod/ctlModel	M571_103Measurement	ts/DmdMHAI1/Mod/ctIModel[CF]	-128	127
□ ctlModel[CF] (Enum) □ □ □ DmdMMXU1		DmdMHAI2/Mod/ctlModel	M571_103Measurement	ts/DmdMHAI2/Mod/ctIModel[CF]	-128	127
		< All Points CO S	P CF			>

Figure 16: IEC61850 Output Points

Add the selected output points to the Orion Point Name pane by clicking >> .

To rename output points in the Orion Point Name field or enter a new minimum or maximum for scaling² in the Min/Max fields, highlight the desired items and enter the new name or value. Then press <Enter> to make the change.

² For details see Analog/Accumulator Scaling Technical Note.



Tabs for All Points, CO (Control), SP (Setpoint), and CF (Configuration) at the bottom of the right pane allow sorting of the output points which are mapped to the Orion realtime database.



Figure 17: Outputs Point Filter

Tab	Description
All Points	Display all configured output points in the Orion Point Name pane.
СО	Display control points whose value may be operated (control model).
SP	Display setpoint points whose value may be controlled (control model).
CF	Display configuration points whose value may be written.

 Table 5: Outputs Point Filter Tabs



Appendix A – Tools and Buttons on the Input and Output Menus

For easy configuration, numerous tools and buttons are available as shown in <u>Figure 18</u> and described in the sections below. The tools and buttons described in this appendix are available for both the <u>Inputs</u> <u>Menu</u> and the <u>Outputs Menu</u>. The Inputs menu and the Outputs menu are very similar, so the screenshots of either menu are nearly identical.

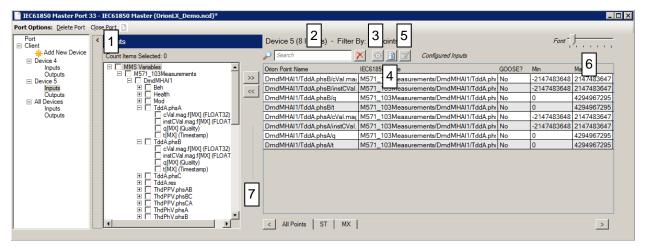


Figure 18: Tools on Input Menu and Output Menu

1. Display/Hide Point Name List

Clicking the < button to the left of the Inputs or Outputs heading hides the Tag Name list, thus providing more usable screen space. Clicking the > button displays the Tag Name list again.

2. Text Filter

The names of the points configured for DNP3 slave device can be filtered by entering a text string. Then only those points will be displayed whose name contains the text string. In the example below, the filter string is "Demand", and all points matching that filter are displayed.

Device 5 (2 Item(s) - Filter By: A	Il Points) Font	
🔎 İnstCVal 🛛 🗙	O 📄 🧭 Configured Inputs	
Orion Point Name	IEC61850 Name	
DmdMHAI1/TddA.phsA/instCVal.mag.f M571_103Measurements/DmdMHAI1/TddA.phsA/instCVal.mag		
DmdMHAI1/TddA.phsB/instCVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsB/instCVal.mag	

Figure 19: Text Filter

The filter can be cleared again by clicking on ¹ to the right of the filter field. Then all points will be displayed again.



3. Display/Hide Alias Name

If the Alias Module has been set up, the Toggle Alias Column Visibility button is displayed above both point list panes. Clicking this button displays a column with each point's alias name. Clicking the button again hides the column.

4. View Report

The View Report button generates a printable report for the points which are currently displayed in the Orion Point Name list. This report can be printed, previewed, or saved as a file on the PC.

Orion Point Name	IEC61850 Name	GOOSE?	Min	Max
DmdMHAI1/TddA.phsA/cVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsA/cVal.mag.f[MX]	No	-2147483648	2147483647
DmdMHAI1/TddA.phsA/instCVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsA/instCVal.mag.f[MX]	No	-2147483648	2147483647
DmdMHAI1/TddA.phsA/q	M571_103Measurements/DmdMHAI1/TddA.phsA/q[MX]	No	0	4294967295
DmdMHAI1/TddA.phsA/t	M571_103Measurements/DmdMHAI1/TddA.phsA/t[MX]	No	0	4294967295
DmdMHAI1/TddA.phsB/cVal.mag.f	M571_103Measurements/DmdMHAI1/TddA.phsB/cVal.mag.f[MX]	No	-2147483648	2147483647
DmdMHAI1/TddA.phsB/instCVal.mag.f	M571_103Measurements/DmdMHAl1/TddA.phsB/instCVal.mag.f[MX]	No	-2147483648	2147483647
DmdMHAI1/TddA.phsB/q	M571_103Measurements/DmdMHAI1/TddA.phsB/q[MX]	No	0	4294967295
DmdMHAI1/TddA.phsB/t	M571_103Measurements/DmdMHAI1/TddA.phsB/t[MX]	No	0	4294967295
MMXU1/TotW/instMag.f	M571_103Measurements/MMXU1/TotW/instMag.f[MX]	Yes	-2147483648	2147483647
	5	Print Pri	nt Preview	Save As

Figure 20: View Report

5. Edit Common Attributes

Attributes which should be identical for multiple points configured for DNP3 Master can be edited in a single window. First, highlight all points for which the attributes shall be set up identically. Then click on

the Edit Common Attributes button 💻

At this point, the following window is displayed (Figure 21). Only attributes which are common to all selected points are displayed, and any settings made in this window are applied to all selected points.

Note that all settings made in the Edit Common Attributes window can also be set directly with each data point.



IEC61850 Master Port 33 - IEC61850 Master (OrionLX_Demo.ncd)*			
Port Options: Del	ete Port Close Port 🗋		
Port ⊡ Client	Edit Common Attributes	() - Filter By: All Points) Font	
Add Ne	Edit Common Attributes from the All Points tab displays a subset of attributes. Individual	Configured Inputs	
Output Device 5	point type tabs provide attributes for that type.	sA/cVal.mag.f M571_103Measurements/DmdMHAI1/TddA.phsA/cVal.mag.f[M	
Inputs Output	Min: 0	sA/instCVal.mag.f M571_103Measurements/DmdMHAI1/TddA.phsA/instCVal.mag	
 All Devices Inputs 	Max: 4294967295	sA/q M571_103Measurements/DmdMHAI1/TddA.phsA/q[MX] sA/t M571_103Measurements/DmdMHAI1/TddA.phsA/t[MX]	
Output		sB/cVal.mag.f M571_103Measurements/DmdMHAI1/TddA.phsB/cVal.mag.f[M	
		sB/instCVal.mag.f M571_103Measurements/DmdMHAI1/TddA.phsB/instCVal.mag sB/q M571_103Measurements/DmdMHAI1/TddA.phsB/q[MX]	
		sB/t M571_103Measurements/DmdMHAI1/TddA.phsB/t[MX]	
		ag.f M571_103Measurements/MMXU1/TotW/instMag.f[MX]	
L	Apply Cancel	т MX _>	

Figure 21: Edit Common Attributes

Clicking on Details in the Edit Common Attributes window lists the points for which any settings made in that window will be applied to.

TEC61850 Master Port 33 - IEC61850 Master (OrionLX_Demo.ncd)*						
Port Options: De	lete Port 🛛 Close Port 🗋					
Port	Edit Common Attrib	utes	× 5) -	Filter By: All Points)		Font -
⊟ Client			nt Details s a subset of attributes, Individual	X a	onfigured Inpu	ts
Inputs Output Device 5	point type tabs provide a		Points to be changed:		×	dMHAI1/TddA.phsA/cVal.mag.f[M.
Inputs	Min: 0		Orion Point Name	Alias		dMHAI1/TddA.phsA/instCVal.mag
Output All Devices	Max: 4294967295		DmdMHAI1/TddA.phsA/t	Device 5_DmdMHAI1/TddA.phsA/t		dMHAI1/TddA.phsA/q[MX]
Inputs			DmdMHAI1/TddA.phsB/cVal.mag.f	Device 5_DmdMHAI1/TddA.phsB/cV		dMHAI1/TddA.phsA/t[MX]
Output			DmdMHAI1/TddA.phsB/instCVal.mag.f	Device 5_DmdMHAI1/TddA.phsB/ins	tCVal.mag.f	dMHAI1/TddA.phsB/cVal.mag.f[M
			DmdMHAI1/TddA.phsB/q	Device 5_DmdMHAI1/TddA.phsB/q		dMHAI1/TddA.phsB/instCVal.mag
			DmdMHAI1/TddA.phsB/t MMXU1/TotW/instMag.f	Device 5_DmdMHAI1/TddA.phsB/t Device 5_MMXU1/TotW/instMag.f		dMHAI1/TddA.phsB/q[MX]
			MMX01/10tW/InstMag.1	Device 5_MMX01/10tw/instMag.1		dMHAI1/TddA.phsB/t[MX]
			ag.f	M571_103Measu	urements/MN	IXU1/TotW/instMag.f[MX]
			Apply Cancel T	MX		>

Figure 22: Edit Common Attributes - Details



6. Font Size

The font size of the Orion Point Name list can be adjusted by moving the slider.



Figure 23: Font Size Slider

7. Slider Bar

To enlarge either the left or the right points list, move the mouse pointer over the vertical Slider Bar (Figure 24), click and hold the left mouse button, and drag the slider left or right.

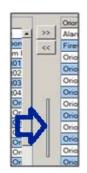


Figure 24: Slider Bar



Appendix B – Additional References

The following additional documentation may be required for setting up and operating the OrionLX. In addition, for each specified NovaTech protocol, the respective manual is included on the installation CD.

The default NCD installation stores the NovaTech documentation files in C:\Program Files (x86)\NovaTech LLC\NCD3\Docs. Third-Party documentation is not included on the NovaTech installation CD and cannot be verified as accurate by NovaTech.

Document Title	File Name
OrionLX User Manual	OrionLX_User_Manual.pdf
OrionLXm User Manual	OrionLXm_User_Manual.pdf
Analog/Accumulator Scaling Technical Note	Technote_Scaling.pdf

Table 6: NovaTech Documentation

For additional information related to the IEC61850 protocol, refer to the International Electromechanical Commission (IEC) website: <u>www.iec.ch</u>.



Revision	Date	Changes
А	11/08/12	Initial Release. MM
В	01/30/14	Updated screenshots, provided tables, improved descriptions. MM, BM
С	01/08/15	Updated screenshots, additional documentation, new features. MM, BM
D	09/29/15	Updated information for Adapter ID setting, clarified supported OrionLX products. NF