

USER GUIDE MAN0133 rev 29



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1 ABB CYLON® BUILDING MANAGEMENT SYSTEM

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1 ABB Cylon[®] Building Management System

The **ABB Cylon® BACnet** Building Management System is made up of several components, which fall into two main categories:

- Hardware the products that monitor and control a building's environment.
- Software the interface which allows users to configure and monitor ABB Cylon® Hardware.

HARDWARE COMPONENTS

ABB Cylon® BACnet uses the following main hardware components:

- Routers.
- I/O Field Controllers.
- Keypad
- PC

There may also be other supplementary hardware components such as printers, modems, pagers, etc., but these are not essential to the basic system.

ROUTERS

CBR devices route communications between BACnet IP and BACnet MS/TP networks.

Aspect® MATRIX Series and NEXUS Series devices are programmable communications controllers, which provide supervision of **ABB Cylon**® BACnet networks and route communications between BACnet IP and BACnet MS/TP networks.

3rd-party BACnet Routers can also be used with the ABB Cylon® BACnet system.

I/O FIELD CONTROLLERS

CBM and CBT Field Controllers take inputs from sensors and Building Control plant and send output to Building Control plant in response. They are available as programmable or unitary controllers, with various input/output configurations.

These I/O controllers can be programmed with strategies, which configure them to send specific outputs to connected devices in response to events occurring on their inputs. For example, you can create a Strategy in **CXpro^{HD}** and download it to a Field Controller specifying that a valve is opened if the temperature being input to the controller rises above a predetermined level.

ABB Cylon® Field controllers are networked together using RS485 by BACnet Routers, which in turn are networked by Ethernet. A Field Controller can also be linked directly to a PC, as well as to a modem or a printer.

PC

The PC is connected to an **ABB Cylon®** network by Ethernet, RS232, or modem connection. The PC can also be connected directly to a Field Controller for small installations with stand-alone controllers.

CXpro^{HD} software - which is used to configure the controllers, schedule events, and extract reports - is run on the PC., which must have Windows 10 Professional 64-bit and Windows 7 Professional / Enterprise / Ultimate 64-bit installed and running.

The minimum configuration to run this application is: Core 2 Duo E6300, 1Gb RAM, 80Gb hard drive.

The <u>recommended</u> configuration is: Core 2 Duo E6600, 2Gb RAM, 160Gb hard drive.

CONNECTIONS BETWEEN HARDWARE COMPONENTS

The following types of connections exist between the hardware components:

- Fast Ethernet bus connecting CBR routers and Aspect® devices with the CXpro^{HD} PC.
- An RS485 fieldbus, using shielded twisted pair cables, connecting the BACnet Router to the I/O controllers.

SOFTWARE COMPONENTS

The CXpro^{HD} suite of software applications is used to set up, maintain, and control the **ABB Cylon®** system in operation.

CXPRO^{HD} MODULES

The following applications are available from CXpro^{HD} group in the Windows Start menu:

- Database Interface
- The **Database Interface** program allows you access to the database that contains details of all the point values on each Field Controller in the network. You can set point values graphically in **CXpro^{HD}**, or you can enter or delete them in the **Database Interface** program.
- Datalog Manager
- A datalog in **CXpro^{HD}** logs the value of a specified point in a Field Controller at a specified interval so that it contains a record of the changes in that point value over a period of time. The **Datalog Manager** program allows you to display the contents of a datalog in either graphic or tabular form. (see also *MAN0136 Datalog Manager User's Guide*)
- Engineering Tool
- CXpro^{HD} is a graphical interface created for programming the ABB Cylon® product range. In CXpro^{HD}, strategies (which tell a controller how its outputs should respond to conditions on its inputs) can be designed, edited and downloaded to, or uploaded from, Field Controllers. CXpro^{HD} could be described as the most important of all the ABB Cylon® applications, as it is the application that programs the ABB Cylon® controllers. This manual describes how to carry out a variety of tasks in CXpro^{HD}.
- Manage Software Licence
- Site Organiser
- The **Site Organiser** is an easy way to configure and examine a complete site or part of a site. Instead of downloading strategies individually to all the controllers on a site, this can be done in one simple task. Any combination of strategies can be downloaded to any combination of controllers or to one type of controller in a *.ins* batch file. (See also *MAN0135 Site Organiser manual*)
- Start CXpro^{HD}

CXPRO^{HD} – OVERVIEW

CXpro^{HD} provides all of the tools required to design, configure, test, commission, and maintain **ABB Cylon®** BACnet systems automatically.

You can use CXpro^{HD} to:

- Graphically create strategies that implement solutions to conditions on site.
- Save those strategies for future editing, testing, or reference.
- Test the operation of strategies.
- Debug and edit strategies.
- Download strategies to the appropriate controllers.
- Define and assign 3rd party blocks to carry data across a Fieldbus.
- Define and assign wide 3rd party blocks to carry data between Fieldbusses and across the network of a site.
- Upload existing strategies from controllers.
- Upload analog and digital point values from controllers.
- Upload statistical and reference information from controllers.
- Record changes that occur on a site as they happen and save the record to a file.

2 Basic tasks

STARTING CXPROHD

Open the CXpro^{HD} section on the Windows Start menu or start screen, or search for "CXpro^{HD}" in the Application search box.

Click on the Start CXpro^{HD} icon. The CXpro^{HD} interface will open:



Note: If other ABB Cylon[®] Engineering Software, e.g. CEC7 is installed on the same PC, then instead of the CXpro^{HD} interface opening directly, a "Chooser" dialog opens first allowing the user to select the software to be opened.

THE CXPRO^{HD} INTERFACE

The CXpro^{HD} User Interface consists of the following sections:

THE SITE LIST

This gives an overview of the BMS Sites that are accessible from this PC



THE STRATEGY DRAWING AREA

This part of the UI shows the modules and points in the current strategy, and the connections between them,



On the right-hand side of the UI there is an area that displays the Modules library, a Module Property editor, a BACnet properties inspector and Page navigation panels.

By default, these panels are displayed one-by-one in a tabbed interface,

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but the layout can be configured by dragging the tabs so that the panels can be displayed all together as shown here:

Page Names	ф 🔀	Pro	operties		부 🔀	Mod	lules	д
+ 🗙 🔽 She	ow Page Numbers On	<	> ?	Tuneable	Forward PID 🔹			
Page Number	Page Name	-	General	Informatio	n	Favo	orites	
1	Inputs		Туре		Tuneable Forward PID	Con	stants	
			Service (Order	1	С		
			Synchro	nised Stat	Disconnected	гц	Digital Constant	
		-	Inputs			Int	Integer Constant	
			🗉 Setp		Analog 1 Room Setpo		integer constant	
			Proc	ess Variable	Analog (1) Room Te	R	Real Constant	
			🗄 Gain		Analog	Cont	trols	
			🗉 Enab	le	Digital			_
			🗉 Integ	ration time	Analog	Fund	ctions	
			🕀 Deriv	ative time	Analog	Mati	n	
		-	Constan	ts		Sche	edules, Timers, and L	_
			Integrati		900	Setr	oints, Inputs, and O	_
			Derivativ	e time	0			
			Service t	ime	1	Stat	istics	
		-	Outputs			VAV		
			🗉 Outp	ut	Analog (9) Heating V	Virtu	ials	_
		Pe Se		tegration of	difference between the s Variable. Set to zero to			

THE RIBBON

At the top of the **CXpro^{HD}** User Interface, there is a palette similar to many Windows applications called the Ribbon. The Ribbon allows access to the majority of **CXpro^{HD}** features.

File - Home	Controller Stra	ategy				í
💉 Connect		📩 Download 🛛 🖓 Compare	123 🔍			
💉 Disconnect	😼 Controller	Wipe Controller 🚉 Show Compare	89		Ø 🗘	
	BACnet	🛃 Auto Online		Scan Override LiveLog	Interface Configure Builder	
Site	Configuration	Operations		Testing	Keypad	

The feature options are grouped into tabs each of which contains a different set of options.

THE QUICK ACCESS TOOLBAR

If there are specific Ribbon feature options that you use often, you can add them to the Quick Access Toolbar where they will be accessible at all times:



To do this, right-click on the feature in the Ribbon and select Add to Quick Access Toobar:

Add to Quick Access Toolbar	
Customize Quick Access Toolbar Show Quick Access Toolbar Below the Ribbon	
Minimize the Ribbon	4
	Add to Quick Access Toolbar Customize Quick Access Toolbar Show Quick Access Toolbar Below the Ribbon

CONNECTING TO A FIELD CONTROLLER

Work in **CXpro^{HD}** can be done on-line or off-line. When on-line, the PC can communicate directly to the controller. When off-line, there is no direct link between the PC and the controller. For tasks that involve direct communication between the PC and the controller, e.g. uploading or downloading information, it is necessary to work on-line.

• To work online, you must connect to the controller by clicking on the **Connect** button in the **Home** tab of the **Ribbon**:

File - Home	Controller	Strategy	
Disconnect	Copy	Site List Page Names Q Search	Strate Reop
Site	Clipboard	View	
Site List		🕂 🔟 🖉 Strategy1	

• To work off-line, click the Disconnect button.

OPENING STRATEGY FILES

To open a strategy file in CXpro^{HD}, you can

• Create a new strategy

or

• Open an existing strategy file.

It is possible to open multiple files: multiple new strategies in different controllers, multiple existing files, or a mixture of both (see page 16)

To create a new strategy, either double-click on a Field Controller in the Site List that does not already have a strategy associated with it or select New from the File menu



You will be asked if you want to create a new strategy - click Yes.

To open an existing strategy file, double-click on a Field Controller that has an associated strategy, or select Open from the File menu:

File - Home	Controller Strategy	
<u>N</u> ew	Recent Documents	BACnet Po
🗁 Open	1 001_01.s32	BACnet Ur
Save <u>S</u> ave	1001_01.552	ules 🔓 Strategy D
Save <u>A</u> s		ategy
Save All		
Footers		

NAVIGATING A MULTI-PAGE STRATEGY

For clarity, many strategies are drawn over several print-pages. To facilitate navigation through these pages, CXpro^{HD} provides a Page Navigation panel.



File • Home	Controller	Strat	egy														
💋 Connect 🔊 Disconnect Site	Copy Paste Select All Clipboard	Site List	Pro	rigati	on	ا 🖸 🖸	lacr	os	2	Stra Reo			ies	Co	nfiguration	Database Interface	
Site List		Д. 🗙	4	001	_01.s	32							Þ	×	Properties		
BACn ⊡BACn	01 - Network 001 - 001 - UC 001 - 002 - CB					· · · · · · · · · · · · · · · · · · ·		•	· · · · · · · · · · · · · · · · · · ·			· · · · · ·	• • • • • • • • • •	^			

The button turns green to indicate the panel is currently displayed:

File	•	Ho	me	Con	troller	Stra	tegy									
	€ Dis	nnect conne	đ	Cor Pas Sele Clipb	te ect All	Site List	Na		Module Macros Search View		Strategy Help Reopen Strategie	25	Co	nfiguration	Database Interface	Di
Site	List					Д 🗙	Navig	gation				џ	×	Properties		
			00)1 - Netv	001 - U	CU3213V BM24			=	-						
		<u>_</u> C	00	et Serial)1 - Netv le Apps I		t										

The **Navigation** panel appears by default as a docked panel within the **CXpro^{HD}** window, but by dragging its title bar it can be repositioned within the window or even 'popped out' as an independent window that you can position anywhere on your monitor:



The Navigation panel shows black rectangles to indicate strategy blocks and a red rectangle to indicate the current Strategy Drawing Pane. Dragging the red rectangle moves the display within the Strategy Drawing Pane:



LABELING THE PAGES WITHIN A STRATEGY DRAWING

An alternative method for navigating a large strategy is to use page names. A pane is available for this, to open it click on the Page Names button in the Home ribbon:



CXpro^{HD} | Basic tasks



The Page Names panel appears by default as a docked panel within the CXpro^{HD} window, but by dragging its title bar it can be repositioned within the window or even 'popped out' as an independent window that you can position anywhere on your monitor.



The Page Names pane allows you to hide the page number on the strategy drawing:

And allows you to add names for pages instead numbers:

Þ	×	Page Names	Page Names 🛛 📮 🕱					
	^	🕇 🗙 🗆 Sho	w Page Numbers On Drawing	ſ				
		Page Number	Page Name					
		1	New Page Name					
• •				ľ				

□ =		
File - Home Controller Strat	49/	
Ste Clipboard	199 Terret Bandari () Sarange Marine Segundari () Norme } Bangar Bandari Segundari () Norme } Bangar Bandari Segundari () Norme } Bangar Bandari Segundari () Norme } Segundari () Seg	
Site Link 🔅 🖬		Page Names - 🖬
0 2 tota 0 2 tota	New Page Name	Y ⊂ Deen Page Mantan (to Daving Page Nordes Page 1 Norde) Norde Page Norde (Norde Page 1 Norde) Norde Page Norde)

Double-click on the name in the Page Names pane to edit it:

Page Names 4							
+	×	Show Page Numbers On Drawing					
Page	Nu	mber	Page Name				
1			Inputs				
-							

and the new name is displayed on the strategy drawing:



Click on a name in the Page Names pane to align the top left corner of that page in the top left corner of the Strategy Drawing Pane:

File - Home	Controller	Strategy								
Ø Connect Ø Disconnect Site	Copy	Site List Properties Page Nawigation	Macros	Strategy Help Reopen Strategies	Configuration E	Database Datalog nterface Manage Utilitie	r Organiser	Backup NB-Pro		
Site List		무 🛛 👌 🛛 001_0					- > ×	Page Names	д 🗴	N
□	01 - Network 및 001 - 001 - UCU 회 001 - 002 - CBN net Serial 01 - Network	J3213V	cess					+ X Sho Page Number 1 2	ow Page Numbers On Dra Page Name Inputs Proces	
⊕- <u>To</u> samt	ole Apps BACnet	· · · · · · · · · · · · · · · · · · ·	Tuneable	Hysteresis 2						P
		· · · · · · · · · · · · · · · · · · ·	Input O Input O On Level O Off Level On level: 2.00; Off	Active High						

FINDING AN ELEMENT IN A STRATEGY

CXpro^{HD}'s Find pane is a facility for locating specific objects in a strategy,

It is opened by either pressing [Ctrl]+[F], or by selecting the search window from the Home tab of the Ribbon.

Search Results			
🗙 Delete 🗌 Select All Modu	le T ype Boolean	▼ Name	Vumber Q Find Q Q
⊡ ⊡ Search results for "subtype: Be	oolean,type: Module" in strategy BACnet IP: 0	01 - Network: 001 - 002 - CBM24 (2	2 matches)
Boolean Boolean			

This pane contains a number of lists in which you can specify a number of filters to reduce the kinds of items that will be located – for example in the screenshot above, only Boolean modules are shown.

You can then step through all of the matching items in the strategy drawing using the mouse or arrow keys and selecting the module discovered in the search results. The current match will be highlighted in the drawing:

	Boolean 1 Input A Output I Input B Complement I Input C Input D	Boolean 2 T Input A Output D I nput B Complement D I Input D
<		
Search Results		
X Delete Select All Module	▼ Type Boolean ▼ Name	Vumber Q Find Q Q
□- ☐ Search results for "subtype: Boolean,type: Mod Boolean Boolean	ule" in strategy BACnet IP: 001 - Network: 001 - 002 - CBM24 (2 i	matches)

ZOOMING AND NAVIGATING THE DRAWING AREA

The drawing area can be displayed in an enlarged or reduced view. The default view is 100 %, i.e. full size.

With a mouse, zoom in and out by rotating your mouse wheel with the control button pressed on your keyboard.

If you do not have a mouse with a mouse wheel or are using a trackpad, you may use the zoom slider at the bottom of the drawing area to zoom in and out.

Enable	
Integration time: 900; Derivative	×
	>
· · · · · · · · ·	100%

For navigating around the drawing area, you can use the scrolls located on the right and bottom of the drawing area.

The mouse wheel may also be used to move around the drawing. Scrolling up and down with the mousewheel will move the drawing up and down. Scrolling up and down with the Shift button pressed on your keyboard, you may move right and left.

You may also use the right mouse button to drag the strategy around in the drawing area.

If you are using a trackpad, the Navigation Pane makes it easy to get around your strategy.

CHANGING THE DISPLAY

The following features of CXpro^{HD} can be customized:

- Drawing Area (Grid Settings). To simplify positioning modules on the drawing area, you can choose a grid of either lines or dots. You can also customize the size of the grid from 8-pixel to 56-pixel squares (see page 22).
- **Colours.** The colour of either the background or the grid can be customized using the **Colour** menu option from the **Display** menu. In addition to the standard colours available, custom colours can also be defined *(see page 22).*
- Macros. If the work you do in CXpro^{HD} involves repetitive strategies or parts of the strategies, you can create macros *(see page 133)* to automate much of that work. You can arrange those macros in groups and, using an art tool, such as Microsoft Paint, you can draw icons to represent the macro groups and individual macros you have created.

Cancel

MODIFYING THE DRAWING AREA (GRID SETTINGS)

From the Strategy tab on the Ribbon, choose Grid.

This opens the Grid dialog box, where you can

specify whether or not to show the grid, and if

it is shown, whether you prefer lines or dots. You can also set the spacing of the grid.

	🛱 Grid 🗊 Grid Colour 🔽 Background C	New Connections
		Display
Grid		×
Sho Style	w Grid on Strategy ○ Lines ⓒ Dots	Spacing

<u>0</u>K

MODIFYING DISPLAY COLOUR SETTINGS

From the Strategy tab on the Ribbon, choose Grid Colour or Background Colour.



In both cases, the Colour dialog box is called. This allows you to select from a range of colours. You can also make custom colours, by clicking on the Define Custom Colours button. When you have selected the colour you require, click **OK**. The colour is applied immediately.



SAVING FILES

CXpro^{HD} allows you store files on disc by:

- Saving a new file
- Saving changes to an existing file
- Saving multiple files at once

Files will be saved in the "strat5" folder of the relevant site directory, under a numbered directory. The number of the directory matches the number of the BACnet Router to which the targeted controller is attached - for example:

```
C:\CXproHD\Lan\strat5\001\001_01FanCoil.stg
```

would be a strategy in a controller on the first BACnet Router of the site called "LAN".

SAVING A NEW FILE

If a file is being saved for the first time, press **[Ctrl]+[s]** on your keyboard or choose **Save** from the **File** dropdown.

<u> </u>	Ŧ			
File	-	Home	Controller	Strategy
	<u>N</u> ew		Recent Docum	ents
	Ope		<u>1</u> 001_01.s32	
	Save Save		2 001 02.s32	
	Sav [Save (C		
	Foot		e strategy.	
	Page			
		er Scaling		
_	Print Print	Set <u>u</u> p		
_	Clos			
	_			() <u>H</u> elp (i) About 🗙 E <u>x</u> if
⊕… <u>₽</u> Sample / ⊕… <u>₽</u> Sample /				

This produces the Save As dialog box allowing you to specify how the file is to be saved:

9 S	ave As	×
(<i>(<i>) → ↑) → ≪ strat5 → 001</i></i>	✓ C Search 001	Q,
Organise 🔻 New folder		0
CAMPBLOR ARCHIVE DRAWINGS KEYPAD MACROS strat5 001	Name ↓ Upload ↓ 001_01.s32	
Upload	~ <	>
File name: 001_01.s32 Save as type: V6 Strategy (*.s32)		*
Hide Folders	Save	el .:

SAVING CHANGES TO AN EXISTING FILE

If you have made changes to an existing file and wish to save those changes, but do not wish to rename the file, nor save it to a different location on the PC, you can save the file in two ways:

- Press [Ctrl]+[s] from the keyboard or
- choose Save from the File drop-down. -

	- •			
	File 🔹 🛛 Home	Controller	Strategy	
	<u> N</u> ew	Recent Docume	ents	
	🗁 Open	1 001_01.s32		
	Save			
	Save As	<u>2</u> 001_02.s32		
	Save As			
		strategy with a i	new name.	
	Page Size			
	I Printer Scaling			
	Print Setup			
	Print P			
	X <u>C</u> lose			
			(?) <u>H</u> e	lp (j)
•		Apps BACnet		

SAVING MORE THAN ONE FILE

If you have a number of files open and wish to save them all, choose Save All from the File drop-down. This saves each of the files.

File - Home	Controller	Strategy		
<u>N</u> ew	Recent Docu	ments		
<u>○</u> pen <u>S</u> ave	<u>1</u> 001_01.s32			in du
Save <u>A</u> s				at
Save All	<u>3</u> C:\CXproHD)\\001_03VAV.s32		
Foo <u>t</u> ers ⁵⁷				
I Printer Scaling				
Print Setup				
Print P				
① L <u>i</u> cence Details				
X Close				
		(?) <u>H</u> elp	(i) About	X E <u>x</u> it
⊡				

If one of the open files is being saved for the first time, CXpro^{HD} will prompt you to specify a drive, directory, name, and file extension for that file by calling the Save As dialog box.

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PRINTING

CXpro^{HD} can generate a hard-copy printout of the current strategy.

INCLUDING A FOOTER IN A PRINTED STRATEGY

When you print files created in **CXpro^{HD}**, they include additional information at the end of the printed page in the form of a footer. The footer includes the name of the site, as well as the BACnet Router and Field Controller for which the strategy is designed. You can edit the footer to include your name, your company's name, the name of the project to which the file belongs, the number of the drawing if any, and the date and details of any revisions made to the drawing.

How to edit the footer that will appear with the strategy when it is printed:

Choose Footers from the File tab of the Ribbon.

Footer Details X			
Company Nam Company <u>A</u> ddres		s Ltd. Susiness and Technology Park.	
Project Project <u>T</u> itle Open <u>F</u> ile 001_0	-Plan Office 1.s32	User E. Peel Project No. 14 Drawing No. 5	lo
Rev Date A 23/ B C D	e Drawing 07/15 3	Checked Remarks EP Ok Image: Second secon	
		<u>S</u> ave	<u>C</u> ancel

This opens the Footers Details dialog box:

Enter the required details and click Save.

ALTERING THE PRINT SET-UP

To define how the strategy is to be printed, choose **Print Setup** from the **File Tab of the Ribbon** to open the standard **MSWindows Print Setup** dialog box, where you can specify the required printer, paper, etc.

Print Setup		×
Printer		
<u>N</u> ame:	Brother HL-2170W series Printer	▼ <u>P</u> roperties
Status:	Ready	
Type:	Brother HL-2170W	
Where:	WSD-63b62ecc-9045-4af1-b52e-8efa8	3b006811.006f
Comment	:	
Paper		Orientation
Size:	Letter	C Portrait
<u>S</u> ource:	Automatically Select	A C Landscape
Net <u>w</u> ork		OK Cancel

PRINTING A FILE

To print a file, choose the **Print** option from the **File** tab of the **Ribbon**. This opens the standard **MSWindows Print** dialog box to specify the required printer, pages to be printed, and the number of copies.

		Print
File 👻 Home	Controller Strategy	PINL
<u>N</u> ew	Recent Documents	Printer Name: Brother HL-2170W series Printer
Den <u>S</u> ave	<u>1</u> 001_01.s32	Status: Ready
Save As	2 001_02.s32	Type: Brother HL-2170W
Save All		Where: WSD-63b62ecc-9045-4af1-b52e-8efa8b006811.006f
Footers		Comment:
∐I Page Si <u>z</u> e		Print range Copies
I Printer Scaling		
Print Setup		C Pages from: 1 to: 12
Print Print		
🗙 Close 📻 Print	(Ctrl+P)	
Print the strategy.		OK Cancel
E	Apps BACnet	

CHANGING THE SIZE OF A PRINTOUT

If a strategy is large, it may not be possible to view enough modules on each page with a standard printout. **CXpro^{HD}** has a Printer Scaling option, which allows you to decrease the printed size of the strategy so that more of it is visible per page.

Also, if you have set a strategy up for printing on a particular printer, you may find that if you try printing on a different printer it may not fit properly on the page. The Printer Scaling option allows you to adjust the printout size to compensate for this.

To resize a printout, select Printer Scaling... from the File menu

This opens the Printer Scale dialog box:

Printer Scale	\times
Printer Scale 100 🔶 %	
Apply to all open documents	
<u>OK</u> Cancel	

Enter a scaling factor between 20% and 300%.

- Factors from 20% to 99% will decrease the size of the modules in the printout.
- Factors from 101% to 300% will increase the size of the modules in the printout.

Ticking the Apply to all open documents box will set all currently-open strategies to print with the same scale.

FITTING A STRATEGY TO A PAGE SIZE WHEN PRINTING.

The strategy drawing indicates where Modules will appear on the printed page, by drawing gray borders on the strategy drawing. In this example, the printer scaling is 100%



The **Printer scale** setting will change the size of the pages relative to the modules. Below shows an example of the printer scale of 200%



The physical page size represented by the gray borders is set by selecting Page Size from the File tab of the Ribbon. This opens the Page Size dialog:

Page Size ×			
Use Standard Page Size			
A4 💌			
C Use Custom Page Size			
1130 <u>-</u> x 799 <u>-</u>			
<u>QK</u> Cancel			

CLOSING FILES

You can close an open strategy file in two ways:

Click the Close button at the top right-hand corner of the file window,



or

Select Close from the File tab of the Ribbon.



If changes have been made to the file since the last save, CXpro^{HD} will prompt you to save it before closing. If more than one file is open, selecting Close from the FileTab of the Ribbon closes the active window.

3 System Configuration

SYSTEM CONFIGURATION DEFINITIONS

In order to properly communicate with and engineer **ABB Cylon®** BACnet Sites, the **CXpro^{HD}** software installed on a PC must be given specific configuration information describing the sites to which the Software will connect, and the methods of connection to each of those sites.

What is meant by "System" during configuration?

The "System" is the current installation of CXpro^{HD} software.

What is a "Site"?

A physical BMS Site in the **ABB Cylon®** system is either a single Field Controller acting on its own, or a collection of Field Controllers grouped into fieldbusses, co-ordinated by one or more Networks.

In CXpro^{HD}, a "Site" is the virtual representation of such a physical BMS installation.

What is meant by "Network"?

There are 2 distinct types of channels through which CXpro^{HD} can connect to a physical BMS installation:

- Serial Connection (RS232)
- BACnet IP

Each of these channels can be enabled or disabled, whether or not Sites have been configured to use them. Disabling channels can prevent delays when connecting to or disconnecting sites, by avoiding 'auto detection' being carried out through unused channels.

CONFIGURING SITES

When you set up a Site, you need to provide the following information:

- The method that the supervisor PC will use to communicate with the Site
- The name of the Site
- The directory on the PC where the site information is stored
- The number and type of controllers on the site
- The controller names

DEFINING THE CONTENTS OF A SITE

The **CXpro^{HD}** system must be able to communicate directly with individual controllers within a Site. In order to do this, the software system must know how many controllers a Site contains and must be able to identify individual controllers.

The following information must be specified for each Site:

- The number of Networks on the Site
- The number of Field Controllers that are attached to each Network
- The names of the Field Controllers on the Site

This information is specified when adding a Site to the system by right-click on the root node of the Site Tree (i.e. the Sites node) and selecting Add Site



to open the Add Site dialog:

Add Site	×
Name: Directory:	
Type of Connection	
	C Serial Connection
	BACnet IP BACnet IP Second S
Enable BBMD - S	ite Level
IP Address	0 . 0 . 0 . 0 47808
Time to Live	60 seconds
	Enable BACnet NAT
	OK. Cancel

or when editing an existing Site by right-clicking on its node in the Site Tree and selecting Properties



to open the Site Properties dialog:

Site Properties		\times	
Name: Directory:	Campus block R CAMPBLOR	_	
Type of Connection	Type of Connection for this Site: C Serial Connection G BACnet IP		
Enable BBMD - S	te Level		
IP Address	0 . 0 . 0 . 0 47808		
Time to Live	60 seconds		
	OK Cancel		

CXproHD | System Configuration

Site Properties / Add Site Dialogs : Site Information section

Each site on the system is given a unique name to identify it to the user and CXpro^{HD} programs.

***	Name			
		The Site Name is used to identify the site	Site Information	
		at all places throughout the CXpro ^{HD}	Name	PL Office
		system. The Site name is entered in the Name field of the Add Site dialog box and can be edited in the Site Properties dialog when editing an existing Site.	Diractory	
***	Directory			
		You use the Directory field to specify the	Name	PL Office
		directory that will contain the site information.	Directory	PLOFFICE

When adding a new Site, enter the name of the directory to contain the files for this Site. The name that you input here will be assigned to a subfolder of the $CXpro^{HD}$ directory that will be created to contain the site information.

- The software will suggest a directory name as you type the Site name in the Add Site dialog.
- The Directory name is limited to eighty characters.
- Giving two sites the same Directory name will cause the system to malfunction.
- The Directory cannot be edited in the Site Properties dialog when editing an existing Site.

Site Properties / Add Site Dialogs: Selecting the Network for connection to a site (Type of Connection)

Type of Connection for this Site O Serial Connection O BACnet IP

* Serial Connection (RS232)

If the Supervisor PC will connect to the Site by Serial communication (RS232), select Serial Connection

BACnet IP

Editing the number and names of controllers on a site

There are several reasons why you may wish to edit the information about the controllers on a particular site. For example:

- A new CXpro^{HD} site has been set up
- A CXpro^{HD} site connected to the PC has changed, (so the system information has to be changed to match)
- You want to change the description of a controller

CXpro^{HD} programs must contain accurate information about the number and types of controllers that each site contains. This allows the supervisor PC to communicate accurately with the system sites.

You must specify the number and names of Networks on a site, and the number and names of Field Controllers attached to each Network.

To edit the controllers on a Site, right-click on the Site in the Site Tree and select Edit Controllers:



Which opens the Edit Controllers dialog, showing all of the Networks on the site.

Edit Controllers								×
⊟ 문 Campus block R 由 모 001 - Network	Sites	There are 1 ro	uters for Camp	us block R				
	Address	Name	Туре	Network	Device In	Duplicate	No. Ports	
	1	001 - Network	CBR	1			1	
	Add	Edit	Delete					Add Multiple
							OK	Cancel

When a Network is selected in the Tree in the left-hand pane, the dialog displays the Controllers connected to the selected Network.

001 - Network		There are 2 contro	ollers for 001 - Net	work of type CBR		
	Address	Name	Туре	Device In	MS/TP Network	
	1	001 - 001 - CBM08	CBM08	41	1	
	2	001 - 002 - CBV-2U	CBV-2U4-3T-N	65644	1	
	Add	Edit	Delete			Add Multiple

Site List 🛛 🗸 💌	Edit Controllers		×	
Stes Deg 10020801 BACnet IP BACnet Serial Ba & BACnet Serial Deg 201 - Wet Systems Deg 202 - AHU Deg 202 - AHU Deg 202 - AHU Deg 202 - Commission BACnet Devices Deg 203		There are Lowbulkes for \$003-FGU of type CBR. me Trpe Device Inc. NS/17 Network 000100 Medulat CBr-4HB 2720302 3		
	Add	Edit Delete	Add Multiple	

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MAN0133 rev 29

The Edit Controllers dialog box is used to specify the Network and Field Controller numbers and names.

By default, Networks are assigned sequentially numbered names in the format 001-Network, and Field Controllers are assigned names in the format 001 - 001 - CBM24, with the Network or Field Controller number increasing in line with the number of controllers on the site.

The Field Controller name must be unique in the Site, so the Router address is included - e.g. on Router address 1, and Field Controller address 2 it can be either 001 - 002 - CBM24, or CBM24 - 002 - 001.

The default names are automatically assigned but can be edited as necessary.

The dialog box allows you to specify the types of Networks and Field Controllers contained in the site, and the number of Field Controllers that are attached to each Network.

The left-hand pane of the dialog lists the Networks on the site. At the top of this pane, the Site Name and total number of Networks are displayed:

¥	orks Network(s) for Site: PL Office						
		Name		Туре		Device In	Duplicate
		001 - Network		CBR			

The right-hand pane of the dialog lists the Field Controllers connected to the Network that is currently selected in the left-hand pane. At the top of this pane the name of the selected controller and the total number of Field Controllers attached to the selected Network are displayed:

Control	lers			
0 0	ontr	oller(s) for Network:	001 - Network	
Ad		Name	Туре	Device In

* Adding Networks to a Site

Before adding Field Controllers, one or more Networks (fieldbusses or Subnets) must be defined. The fieldbusses can be MS/TP or Modbus.

To add a new Network to the site, click the Add button underneath the Network list.

The New Router dialog will appear:

	×
002 - Network	
twork' or 'Network - 001')	
CBR	
(0 to 4194302)	
· · · ·	
uter Level	
· · · ·	
seconds	
Enable BACnet NAT	
	(002 - Network twork' or 'Network - 001') (CBR (0 to 4194302)

The next available Network Number is automatically assigned, but you can manually enter a different value in the Network Number field.

- Enter a name for the Network in the Name field.
- Select the Router type from the Controller Type drop down list.
- Enter a BACnet Device Instance Number.
- Optionally enter an IP address and Port Number for the Router.

Note: If the BACnet Device Instance Number is valid, then CXpro^{HD} will read the IP address and automatically populate the Router IP address and HTTPS Port fields.

• If the Router is to be used as a BBMD, to transfer communications to a different BACnet network, check the Use as BBMD checkbox.

Click the **OK** button to confirm your choice.

Note:	Additional tabs are displayed if a Modbus-ena be set for each fieldbus.	bled router is selected, to allow different Address and Name to
	Edit Comms Controller Details	Edit Comms Controller Details
	Address: 1 Name: 001 - Network Name format: '001 - UCxxxx' or 'UCxxxx - 001' Default Type: CBR	MSTP1 Modbus Address: 1 Name: 001 · Network Name format: '001 · UCxxxx' or 'UCxxxx · 001' Default Type: CBR/MOD
	Device Instance Number: (0 to 4194302) 5321 OK Cancel	Device Instance Number: (0 to 4194302) 56161

Note: If the router type is an extendable controller (FBXi, CBXi etc.), then additional fields are displayed in the Edit Router dialog that matches the Field Controller dialog described in *Editing Controller information* on page 36 and *FLX I/O modules* on page 36

dit Router				
		7		
Network	Number 2			
	Name 002 - I	Network		
(r 'Network - 001')		
Contro	ller Type CBXi	~		
Device Instance	Number 55423	1 (0 to 4194302)		
	ess : Port 192	. 168 . 85 . 146 :	67	
Modules				
Addr Type		Dipswitch		Add
1 FLX-8F	8			Delete
		APEMs ONI		
2 FLX-4	K4-H	1 2 3 4 5		
2 FLX-4F	(4-H	1 2 3 4 5 APEMs ONI	_	
2 FLX-4F	(4-H	1 2 3 4 5 APEMs ON1		
2 FLX-4	44-H	1 2 3 4 5 APEMs ONI		

Note: If the router is set to a type that does not support routing BACnet traffic to MS/TP networks, the right-hand section of the Edit Controllers dialog will be disabled.

* Adding Field Controllers to a Site

To add a new Field Controller to the currently selected Network, click the Add button underneath the Field Controller list. The New Controller dialog will appear.

New Controller ×
Address 1
Name 001 - 001 - CBM24
Name format: '001 - 001 - CBxxx' or 'CBxxx - 001 - 001'
Controller Type CBM24 View All Controllers
Device Instance Number 5539 (0 to 4194302)
OK Cancel

The next available controller address is automatically assigned, but you can manually enter a different value in the Address field.

Enter a name for the Field Controller in the Name field.

Note: A controller name cannot be more than forty characters long.

Select the Field Controller type from the **Type** drop down list. By default, only controller types from the current product range are listed. However, if the **'View All Controllers** box is ticked, all supported controllers will be listed. Click the **OK** button to confirm the choices that you made in the dialog.

Set the Device Instance Number. This must be an ID for this controller that is unique within the ABB Cylon® BACnet Site.

Note: The number set here in the CXpro^{HD} must match the Device Instance Number set in the Field Controller.

* Editing Controller information

Clicking the relevant Edit button while a Network or Field Controller is selected causes an Edit dialog to open, which has identical parameters to the corresponding 'New' dialogs above. If you change the values of any of the parameters in an Edit dialog and click the OK button then the parameters of the selected Controller will be updated to match the dialog.

FLX I/O modules

If the site includes FBXi-X256, CBXi-8R8, or CBX-8R8 devices, their I/O capabilities can be expanded by adding FLX devices. The expanded I/O must be configured on each FBXi/CBXi/CBX device as follows:

In the New Field Controller Details dialog change the Controller Type to FBXi-X256, CBXi-8R8, or CBX-8R8 :

Edit Controllers					×
E-물_ Campus block R 白-코 001 - Network	Network	There are 2 controllers for 001 -	Network of type CBR		
001 - 001 - CBM08	New Controller			< work	
	Address	2			
		001 - 002 - CBM08 - 001 - CBxxx' or 'CBxxx - 001 - 001			
	Controller Type				
	Device Instance	CBM08 CBM12 CBM16 CBM24 CBM24K CBM24K CBM24LC			
	Device Instance	CBT-4T4-2U1R	OK Cancel	1	
	Add	CBT-4T4-4T CBV-2U4-3T CBV-2U4-3T-N			Add Multiple
		CBVT CBX-8R8 UCU32.13VAV		ОК	Cancel
An I/O Modules table will become visible in the New Controller dialog:

	Address	2	
	Name	001 - 002 - CBX-8R8	
Na	ame format: '001	- 001 - CBxxx' or 'CBxxx - 001 - (001
	Controller Type	CBX-8R8	~
		View All Controllers	
Device I	nstance Number	(0 to 4194302)	
Modules Addr	Туре	Dipswitch	Add
	Туре	Dipswitch	Add
Addr		Dipswitch ns to show in this view.	
Addr			

If the FBXi/CBXi/CBX device has one or more FLX modules connected to it, add the same number of entries in the I/O Modules table:



Note: On FBXi devices, the first FLX can be set to address 0. On CBXi and CBX devices, address 0 is reserved for onboard I/O

If you attempt to add more modules than the FBXi/CBXi/CBX can support, an error message will be displayed:

	ccconfig	×
8	The maximum $\ensuremath{I}\xspace{O}$ modules allowed for this controller have already been added.	
	ОК	

When the correct number of FLX modules have been configured, enter a Device Instance number and click OK.

Edit Controllers							×
⊡- 😓 Campus block R ⊡- 💬 001 - Network 	Network	There are 3 contro	ollers for 001 - Networ	k of type CBR			
	Address	Name	Type	Device In	MS/TP Network		
	1	001 - 001 - CBM08	CBM08	41	1		
🕒 001 - 004 - CBV-2U4-3T-N	3	001-003-CBX-8R8	CBX-8R8	55465	1		
U 001-004-03V-244-3T-N	4	001-004-CBV-2U] CBV-2U4-3T-N	65644	1		
	Add	Edit	Delete			ОК	Add Multiple

In the strategy drawing, IO blocks can be added up to the total on the configured FLX modules plus the CBX onboard IO.

Note: If a FLX module is deleted from a FBXi/CBXi/CBX configuration after the strategy drawing has been set up, the blocks associated with that FLX's IO will be 'greyed out' to indicate that they are inactive.

Modbus devices

A CBX controller can communicate with up to 4 Modbus devices connected to its Modbus RTU port.

IP Controllers (CBXi, FBXi, FBVi etc.) can communicate with

- Up to 247 devices per RTU port
- Up to 1280 devices via Modbus Router
- Up to 600 Modbus IP devices

These devices are configured in CXpro^{HD} in a similar way to FLX modules.

To configure Modbus devices,

- 1. open the strategy of the FBXi, CBX or CBXi to which the Modbus devices are connected
- 2. in the Site Tree right-click on the FBXi, CBX or CBXi, and
- 3. select Configure Modbus Devices from the context menu

	2			
Site List		무 🛛 🖉 🖉 001_	01	📩 🔢 🔤 🔤 🔤 🔤 🔤
🖃 🚯 Site			■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	
	10020801		Network 4	
	BACnet IP		Sample Apps BAC	
⊨ ⊡… <u>ī</u> ⊒	BACnet Serial		Sample Apps v1.1	
i in ₽ _	Campus block R		_ Stores	Copy Strategy To
⊨ - -	PL Office		Le stores	Strategy Operations
	💻 001 - Network			stategy operations
				Export ASPECT/INTEGRA Data (router only)
		1		Export ASPECT/INTEGRA Data (entire network)
		s32' Ctrl+O	1	
	🚍 002 - I 👘 Configure Mo	dhus Devices		Update BACnet EDE Data
╞┈╄╴	Sample A	13		Commission MS/TP Network
	Sample Aj Break			Commission way in Network
	Sample Al			Commission this controller
│ ⊡… <u>ĭ</u> ⊒				
				Edit Controllers

Note: The Configure Modbus Devices option will not be available unless the controller has an associated saved strategy that is currently open.

This will open a dialog that allows you to configure the FBXi/CBXi/CBX's Modbus RTU port to match the attached devices and to add an Address and Name for each of those Modbus devices.

Configuring the FBXi, CBX or CBXi's Modbus RTU port

RTU 0	Configuration		
	Baud	9600	•
	Parity	None	•
	Stop bit	1	•
	Inter-packet delay	200	ms (40-10000)
	Communication Timeout	200	ms (200-10000)
RTU Devices used: 0 / 494	Deleting a device will disable a	ny associated	point in the strategy.
Router Devices used: 0 / 1280			
IP Devices used: 0 / 600			
Add Delete		(OK Cance

Note: When configuring Modbus on FBXi two separate RTU networks are available:

When the **RTU** node of the **Device Tree** is selected, you can specify the **Baud**, **Parity**, and **Stop bit** settings that all devices on the RTU network will use to communicate.

Note: With Modbus, all devices on an RTU network must be configured with the same communication parameters for the network to function properly.

Set an Inter-packet delay value that is reasonable for the devices on your network. Modbus devices commonly need time for the RS-485 transceivers to switch from a writing mode to a reading mode. Some Modbus devices will write to their flash or perform similar operation before being ready for the next Modbus command to be sent. Set the Inter-packet delay to a value that allows for the worst-case operation.

The **Communication Timeout** is the time the **CBX** will wait before giving up on one request and moving on to sending the next request.

Note: The status output of a Modbus Analog or Modbus Digital module will display a value that is non-zero for any failing Modbus transmission.

Adding and Removing Modbus Devices

Before an FBXi, CBX or CBXi can access Modbus points, it must be configured with a list of Modbus devices that is available to the Modbus Analog or Modbus Digital modules.

To add a device, click the "Add" button

Configure Modbus Devices		×
RTU [15] Electricity Meter [1] Uphting Offices [1] Liphting Production	Configuration Baud Parity Stop bit Inter-packet delay Communication Timeout Deleting a device will disable a	9600 • None • 1 • 200 ms (40-500) 200 ms (200-10000) my associated point in the strategy.
Devices used: 3 / 4 Add Delete]	OK Cancel

For CBX products, the device is automatically added the single RTU port.

For FBXi and CBXi products, you will be offered the choice of channel to which the Modbus device will be connected: RTU port, Modbus Router or IP port:

Select type		×
RTU port		
C Modbus Router		
C IP port		
	ОК	Cancel

If you choose RTU port on an FBXi, you will be offered a further choice - RTU 0 or RTU 1



When the channel has been selected, a new device will be added to the tree. Select it:

Configure Modbus Devices	×
RTU [15] Electricity Meter [1] Uphing Offices [1] Lighting Production [1] Devert	Configuration Name Device 4 Address 1 Deleting a device will disable any associated point in the strategy.
Devices used: 4 / 4	
Add Delete	OK Cancel

and then edit the Name and Modbus Address of the Modbus device.

The Address must be one of the following:

- Modbus RTU A number between 1 and 255.
- **Modbus TCP** An IP address with optional port, in the format nnn . nnn . nnn . nnn : pppp. The port (pppp) is separated by a semicolon. The port is optional, and if omitted the default Modbus port of 502 will be used.
- Modbus RTU device behind a Modbus Router An IP address with an optional port and RTU address in the format nnn.nnn.nnn.nnn : pppp / zzz The port (pppp) is separated by a semicolon. The RTU address for routing (zzz) is separated by a '/' character. The port is optional and if omitted, the default Modbus port of 502 will be used. For routing, the RTU address is required.

Note: The Modbus Addresses do not need to be sequential.

To delete a Modbus device from the list, choose the device, and click the "Delete" button.

At any time later, the Address of the Modbus device can be updated without any change to the Modbus Analog or Modbus Digital modules in your strategy.

Accessing Modbus points in the Strategy

To access a point within any of the Modbus devices configured for a specific CBX, add a Modbus Analog module or Modbus Digital module (whichever is appropriate for the point) to that CBX's strategy.

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Modbus modules are displayed as follows:

or Modbu ⊾∵	is Analog 1	In ← Mode ↓	ous Digital 2
⊘ Value in	Value out 🛇	Value in	Value out 🗗
Write control	Status 🛇	Write control	Status 🛇
Device: Device 1)	Register: 0	Device: Device 1	; Coil/input: 0

In the module Properties, specify which of the CBX's configured Modbus devices contains the required point:



CXproHD | System Configuration

Module	Action	Modbus Entity
Modbus Analog	Reading	Input Register
Modbus Analog	Reading and Writing	Holding Register
Modbus Digital	Reading	Discrete Input
Modbus Digital	Reading and Writing	Coil

The modules are capable of interacting with the following Modbus entities:

For writing to occur, the "Value in" input of the module must be connected. For reading to occur, the "Value out" output of the module must be connected.

If Write Control is connected, then the input value must be a 1 before COV or other timers are evaluated.

Reading data from a Modbus device is done periodically and controlled by the "Read Frequency" constant.

Writing can be performed either periodically or be triggered by a change of value. For a Change Of Value, if the input value to the module changes (or, in the case of a **Modbus Analog** module, changes by a predetermined amount), then a write is performed.

The Modbus Analog module can handle endian differences, word swapping, and interpretation of the value read from the Modbus device.

* Removing a Controller from a Site

Clicking the relevant **Delete** button while a Network or Field Controller is selected, will remove the selected Controller from the list.

* Adding Multiple Controllers

At certain times you may find it convenient to add several controllers to the site at once.

The Edit Controllers dialog contains an Add Multiple button underneath each of the Network and Field Controller lists.

- If you click the button under the Network list, you can automatically add several Networks to the Site.
- If you click the button under the Field Controller list, you can add several Field Controllers to the currently selected Network.

When you click either of the two Add Multiple buttons, the relevant Generate Default Names dialog will appear.

Add Multiple Controllers ×	Add Multiple Controllers
Number of Controllers	Number of Controllers 1
Controller Type CBR V View All Controllers	Controller Type CBM08 ✓ ✓ View All Controllers
Name Format 002 - CBR (001 - <text>' or '<text> - 001' where 001 will be the incremented.)</text></text>	Name Format 002 - CBM08 ('001 - <text>' or '<text> - 001' where 001 will be the incremented.)</text></text>
Starting Device Instance Number (0 to 4194302)	Starting Device Instance Number (0 to 4194302)
OK Cancel	A valid Device Instance Number is required! OK Cancel

These dialogs are similar to the Add dialogs for single Comms and Field Controllers, with the exception that the Address parameter is replaced with a Number of controllers parameter.

This parameter specifies the maximum address that will be used to generate controller entries. What that means is that controller entries are generated starting at the next available controller address and continuing as far as the address specified in the Number of controllers box.

For example, if controllers exist for the current Network up to address 5, and the Generate Default Names facility is used with 10 in the Number of controllers box, then Controllers will be generated for addresses 6, 7, 8, 9 and 10.

The Number of controllers parameter does not represent the total number of items that will be added Note: automatically. Instead, it represents the maximum address that will be generated.

••• Sorting the Controller List

The Network and Field Controller lists can be sorted based on:

- Address
- Name
- Type

By default, the controllers in the list are sorted by address. To sort by any of these columns, click the column header at the top of the controller list.

Saving the changes made in the Edit Controllers dialog

When you click OK from the Edit Controllers dialog, the changes are immediately validated.

CONFIGURING SERIAL PORT CONNECTION

In order to modify Serial Port settings, or to choose between serial ports if your PC has multiple ports, open the Application Settings dialog by clicking on the Settings icon in the Settings group of the Home ribbon:

ile 🔹 Home	Controller	Strategy			
🚿 Connect 💉 Disconnect	습 Copy 출 Paste	Site List	Page Names Search	Database Datalog Site NB-Pro	Settings BACnet
Site	Clipboard		View	Utilities	Settings

In the Application Settings dialog, select Serial Port Connection:

Application Settings		×
Download Options Scan Options Strategy Settings BACnet Configuration Serial Port Connection Commands Livelog	Enable Serial Connection Detected COM Port COM1 Port Speed 9600	
	OK Cano	el Apply

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CONFIGURING STRATEGY DEFAULTS

By selecting the Strategy Settings option in the Application Settings dialog, you can set several default values for new strategies:

Application Settings	×
Download Options Scan Options Strategy Settings BACnet Configuration Serial Port Connection Commands Livelog	Strategy files Reopen Strategies Autosave every 10 Autosave every 10 Analog inputs default Temperature to: Celcius Note: this value apply only to new analog inputs. Existing inputs will keep their values. Analog value precision Show this number of decimal places 2
	OK Cancel Apply

This can be opened directly by clicking on the Strategies icon in the Settings group of the Home ribbon:

le 🔹 Home	Controller	Strategy		
🖋 Connect 💉 Disconnect	습 Copy ট Paste	Site	Database Datalog Site NB-Pro	Settings
	Select All	List Navigation Macros	Interface Manager Organiser	Reopen Strategies
Site	Clipboard	View	Utilities	Settings

Also in the **Settings** group of the **Home** ribbon, there is a checkbox that defines whether or not strategies that were open when **CXpro^{HD}** was closed will be automatically opened when **CXpro^{HD}** next starts.



CONFIGURING BACNET COMMUNICATIONS

In order to connect **CXpro^{HD}** to a specific BACnet Site, you must set its system-wide BACnet Properties in the **Application Settings** dialog.

These properties are the identity of the Network Adapter that will be used to connect the PC to the BACnet System, and the Device Instance Number of that Network Adapter in the BACnet system.

Open the BACnet Configuration option in the Application Settings dialog by clicking on the BACnet icon in the Settings group of the Home ribbon:

le 🔹 Home	Controller	Strategy
🚿 Connect	Сору	I Properties Page Names Search
🖋 Disconnect	Paste	Achieve Properties in Modules is strategy help the strategy help t
	Select All	Site Database Datalog Site NB-Pro Interface Manager Organiser Reopen Strategies
Site	Clipboard	View Utilities Settings

This opens the Application Settings dialog with BACnet Configuration selected

Application Settings	×
Download Options	Device Instance Number for this Computer
Scan Options	Device Instance Number 214 (0 to 4194302)
Strategy Settings	IP Address
BACnet Configuration	192.168.000.073 : Intel(R) Ethemet Connection (2) I219-LM
Serial Port Connection	Port 47808
Commands	Subnet Mask 255.255.0
Livelog	
	Retry Settings
	Time Out 20 seconds
	✓ Enable BBMD - System Level IP Address 192 . 168 . 6 . 35 47808
	Time to Live 60 seconds
	Enable BACnet NAT
	OK Cancel Apply

The Device Instance Number will be set to "-1". This must be changed to a unique Device Instance Number.

In the IP Address drop-down list, select one of the PC's network adapters to be used as the channel for all BACnet communication. Set the Subnet mask in accordance with the local network policy – if in doubt ask your local Network Administrator. The default is 255.255.255.0.

It is recommended that the Number of Retries is left at 0 unless there is a clear reason for changing it.

Note: In order to avoid conflicts with Command settings for set and get, the BACnet Timeout should be set to Number of retries = 0 and Time out = 20 seconds.

If you wish to connect to a remote BACnet site, enter that site's IP address in the BBMD settings – System Level section.

Click OK to save these settings.

CONFIGURING BBMD

If you wish to connect to a remote BACnet Site, you must set a Network, a Site or the CXpro^{HD} system to act as a BBMD.

What is BBMD?

Some BACnet services (e.g. "Who-Is") use 'broadcasts'. These broadcasts are blocked by standard Ethernet routers so that BACnet broadcasts are limited to the IP subnet of the BACnet device. A BACnet/IP Broadcast Management Device (BBMD) is one way to get around this limitation on a BACnet/IP network of 2 or more IP subnets.

How a BBMD operates

A BBMD located on an IP subnet monitors broadcast messages on that subnet and constructs a "peer to peer" message for each broadcast to pass it through any IP router. This "peer to peer" message is received by other BBMDs on other IP subnets and transmitted as a broadcast on their attached subnets.

Since the BBMD messages are 'directed', individual messages must be sent to each BBMD. Each BBMD device maintains a Broadcast Distribution Table (BDT), the content of which is usually the same for all BBMDs within the network. Each BBMD must know the IP address of every other BBMD in the network.

Setting a BBMD in CXpro^{HD}

BBMD properties can be set at the System Level, on a Site or a Network, and if more than one is set then it 'cascades' upwards. This means that if a controller attempts to communicate with a remote BACnet Site, it will use the Network-level BBMD settings if any have been defined. If the Network to which the Controller is attached does not have BBMD settings configured for it, then the Controller will use Site-level BBMD settings if any have been defined attached does not have BBMD settings configured for it, then the Controller will use Site-level BBMD settings if any have been defined. If the Site containing the Controller also does not have BBMD settings configured for it, then the Controller will use the System-level settings.

BBMD Parameters

In the CXpro^{HD} system, the following BBMD parameters can be set:

- IP Address
- Port Number
- Time to Live (not available in Site-level parameters)
- Enable NAT (Override "I am") (not available in Site-level parameters)



* System-level BBMD parameters

To set the BBMD parameters for the whole CXpro^{HD} system, click on the BACnet icon in the Settings group within the Home ribbon:

le 🔹 Home	Controller	Strategy		
S Connect	다 Copy 라 Paste	Properties Page Names Search		BACnet La Strategies
🖋 Disconnect	C Paste	Site	Database Datalog Site NB-Pro	Settings Reopen Strategies
	·		Interface Manager Organiser	
Site	Clipboard	View	Utilities	Settings

This opens the Application Settings dialog with BACnet Configuration selected. The BBMD - System Lev settings are at the bottom of the dialog:

Time Out J20 seconds
IP Address 192 . 168 . 6 . 35 47808
Time to Live 60 seconds
Enable BACnet NAT
OK Cancel Apply

Site-level BBMD parameters

To set the BBMD parameters for a specific Site, right-click on that Site and select Site Properties

→ ● Sites → ⊕ 10020801 → ⊕ BACnet IP ⊕ ⊕ BACnet Serial ⊕ ⊕ Campus block I ⊕ ⊕ 001 - Neth ↓ ⊕ 001 - Neth ↓ ⊕ 001 - Neth ↓ ⊕ ⊕ ⊕ 001 - Neth ↓ ⊕ ⊕ ⊕ 001 - Neth	Discover Site Backup Site Export ASPECT/INTEGRA Data Create BACnet EDE Data Commission BACnet Devices	to open the Site Properties dialog:	Directory: Type of Connection	C Serial Connection G BACnet IP
니므, 002 - Net\ 由-꿈을 Sample Apps 由-꿈을 Stores	Commission BACnet Devices Edit Controllers Delete Site Site Properties		Time to Live	60 seconds
-				OK Cancel

The Site BBMD settings parameters are at the bottom of the dialog.

* Network-level BBMD parameters

To set the BBMD parameters for a specific Network, right-click on that Network and select Router Properties



The IP settings in this dialog include a checkbox to allow the router to be used as a BBMD.

CONFIGURING SITE COMMUNICATIONS (COMMANDS)

The commands that CXpro^{HD} uses to communicate with ABB Cylon[®] controllers can be adjusted from the Application Settings dialog.

This can be useful in troubleshooting connection failures. It can be useful to tell the system to give the connection more time to become established.

On the other hand, if you have a reliable fast connection it can be of more benefit to reduce the time taken to establish connections, and so increase the speed and responsiveness of the system.

Command Settings

To adjust the Commands settings, open the Application Settings dialog by clicking on the Settings icon in the Settings group of the Home ribbon:

ile 🔹 Home	Controller	Strategy		
💉 Connect	Сору	Properties Page Names Search		BACnet
🖋 Disconnect	[라 Paste	BACHEL Properties I Modules I Strate		Strategies
	Select All	Site	Database Datalog Site NB-Pro Interface Manager Organiser	Settings Reopen Strategies
Site	Clipboard	View	Utilities	Settings

In the Application Settings dialog, select Commands:

ownload Options	Commands	Time out (1-20s)	Retries (0-25)
can Options	Controller Detect	5	0
scan Options	Get Block	20	4
Strategy Settings	Get Point	5	2
	Router Detect	5	0
BACnet Configuration	Set Block	20	2
	Set Point	5	2
Serial Port Connection			
Commands			
Livelog			
-			
	1		Reload
	, Number of Retries for	Command NACKS (Failur	

To edit a value, double-click on it in the Port Handler Command Settings dialog.

Clicking the 'Reload' button will cause all of the values to revert to their previous settings, and any changes made will be lost.

Each command has a Retries setting:

• Number of Retries for Command NACKs (failures)

The retries in the main list apply to Timeouts, where no response is received. This parameter sets the number of retries when a response is received, and the response is NACK, indicating a failure.

When the **OK** button is pressed, each edited value is checked to see if it is valid. If a command **Time Out** is greater than 20 seconds then it will be reduced to 20 seconds, and if a **Time Out** value is less than zero seconds, then zero seconds will be used.

If a command **Retries** value is greater than 25 then it will be set to 25, and if a **Retries** value is less than zero then it will be set to zero.

Profiles:

The following profiles provide advisory settings that may be helpful when requests from a site and its controllers, or manipulation of data, results in failures.

***** TCP/IP Profile:

Command	Time Out	Retry
Get Point	2000	1
Set Point	2000	1
Get Block	2000	1
Set Block	5000	1
Router Detect	2000	0
Controller detect	2000	0

* Default Profile:

Command	Time Out	Retry
Get Point	2000	0
Set Point	2000	0
Get Block	2000	0
Set Block	5000	0
Router Detect	10000	0
Controller detect	10000	0

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4 Using Modules

MODULES - OVERVIEW

Modules are the building blocks from which strategies are constructed. They are the basic units of operation in CXpro^{HD}.

Modules perform tasks within a strategy such as

- bringing controller inputs into the strategy
- changing the values of points in the strategy according to mathematical rules
- comparing the values of points in the strategy
- recording the values of points in the strategy
- sending point values to the controller's outputs.

Modules can be grouped and saved as in order to avoid repetitive tasks, i.e. if you use a particular strategy or part of a strategy frequently, you can save it as a macro and reuse it without having to repeatedly re-create it.

ACCESSING MODULES

By default, Modules are available from the right-hand pane, by clicking the Modules tab at the bottom of the Pane:



The Modules Pane groups the available modules into Constants, Controls, Functions, Math, Schedules/Timers, Setpoints/I/O, Statistics, VAV, and Virtuals. To access individual modules, click on one of the groups:

	igu		ion					느산 느ऊ 느중 느물 Datalog Site Backup NB-Pri lanager Organiser Utilities
						Þ	×	Modules
							^	
								Favorites
								Constants
								Constants
								Digital Constant
	·							Int .
								Integer Constant
								R
								🔨 Real Constant
								Controls
								Functions
								Math
	,							Schedules, Timers, and
								Setpoints, Inputs, and
								Statistics
								Statistics
								VAV
								Virtuals
								Virtualis
							~	
						>		Page Nam Properties Mod
ted	l to	: Sa	amp	ole	Ap	ps	вас	net (3),

There is also a "Favourites" group, where you can set up a custom list of modules that you use frequently or want to be able to access quickly.

To add a module to the Favourites group, right-click on the module in the Modules Pane and select Pin to favorites:

Setp	oints, Inp	outs, an 👻											
AI	Analog Input												
AO	Analog	Analog Output											
?	Analaa	Add to Strategy											
⊘ 41 ▶ ●	BA	Pin to Favorites											
BACr	Cnet A Help												
⊡ বা ⊾⊕	BACnet Binary												

To remove a module from the Favourites Group, right-click on it and select Unpin from Favourites:

Modu	les			† 🗙	
				×	
Favo	rites			-	
	Anal	na S	etnoint	P	
A>B	_		Add to St	rategy	
A>B	Com	~	Unpin fro	m Favorites	
Int	Inte		Remove	rom list	
AI	Anal	_	Help		
Cons	tants			•	
Contr	ols			•	
Funct	tions			•	

PLACING A MODULE ON THE DRAWING AREA

In order to use a module in a strategy, you must place it in the strategy's 'drawing area'.

To do this, click on the module name in the Modules pane:

∮ Connect ∛ Disconnect Site	Copy Paste Select All Clipboard	Strate Site List	F	Prope Navig Page	jatio	n	् व ऽ	lacro	_	Strat Reop		egie	;	Con	L ; figu	¢ iratio			Datalog Manager Utilitie	r Organise	Backup er	NB-Pro	
Site List		Д	4		Stra	tegy	1										I	×	Mod	ules		д	μ
⊒… 📢 Sites		^																. ^					
																			Favo	orites		•	
	01 - Network																		Con	stants			
	🖻 001 - 001 - UCU		· ·																Cont				
	001 - 002 - CBM	124	1																			•	
																			Fund	tions		+	
	ple Apps BACnet)01 - Wet Systems																		Math	ı		+	
	🗐 - Wet Systems	D																	Sche	edules, Tir	mers a		٦
1 1	1112 - CT Single																						4
1 1	1112 - CT Single		1																Setp	oints, Inp	outs, an	-	
	1114 - CT Dual I																		AI	Analog	Input .		
	1115 - CT Dual I																						
	🗐 1116 - CT Dual I																		AO	Analog	Output		
1 1	, 1121 - VT Single																						
	🔍 1122 - VT Single	Pi	1																0 100	Analog	Setpoint		
	🗐 1123 - VT Single	Pi	1 1																01	BACnet	Analog		
	🗐 1124 - VT Dual F	Pur	1																	DAGREE	Analog		
	🗐 1125 - VT Dual F	Pur																	BAC	net Analo	g Priority.		
	🗐 1126 - VT Dual F	Pur																	04				
	🗐 1131 - Four Boil	ers																	40	BACnet	Binary		
	💐 1132 - Four Boil		1																PAC	not Pinan	Driority		
	🚽 1133 - Two Boil	ers 🗸	1															÷.,	<	200.00) >	Þ
		>	<															>	Page	e Nam P	roperties	Modul	le

Then click on the strategy drawing area at the position where the module is to be placed (note the cursor changes to the "Module Cursor" i during this process):

File - Home Controller Strat	gy	í
	Properties Modules Strategy Help Navigation Page Names Search View View	Datalog Site Backup NB-Pro Ananger Organiser Utilities
Site List 4 X	₫ Strategy1 ▷ ×	Modules 4 X
⊡S Sites		×
BACnet IP		Favorites
🗐 🖳 🖳 001 - Network		Constructor
💌 001 - 001 - UCU32	🛄	Constants
📼 001 - 002 - CBM24		Controls •
BACnet Serial		Functions
Sample Apps BACnet		Math
DOI - Wet Systems		
		Setpoints, Inputs, an 👻
		Al Analog Input
		i i i i i i i i i i i i i i i i i i i
		AO Analog Output
		Analog Setpoint
		BACnet Analog
		. Drience rulaiog
		BACnet Analog Priority
🔍 1126 - VT Dual Pur		
		BACnet Binary
1132 - Four Boilers		PACnot Pinany Briarity A
1133 - Two Boilers	· _ · · · · · · · · · · · · · · · · · ·	< >
< >	< >	Page Nam Properties Modules
	Connected to: Sample Apps BAC	inet (3),

Some modules (e.g. Analog Input) prompt for basic configuration information when they are first placed. When this happens, fill in the dialog and click **OK**

File - Home Controller Stra	egy	i
	Properties Im Modules Image: Strategy Help Navigation Image: Macros Reopen Strategies Page Names Search View	Datalog Site Backup NB-Pro Manager Organiser Utilities
Site List 📮 🗵	✓ Strategy1 ▷ ×	Modules 🛛 📮 🔀
□-€ Sites ∧ □-₽ BACnet IP □ 001 - Network □=001 - 001 - UCU32 □ 001 - 001 - UCU32 □=001 - 002 - CBM24 □ -₽ □=₽ BACnet Serial □ □=₽ Sample Apps BACnet □ □=₽ 001 - Wet Systems □	Point Name Point Name Room Temperature	Favorites Constants Controls Functions Math
— , 1111 - CT Single P — , 1112 - CT Single P — , 1112 - CT Single P — , 1113 - CT Single P — , 1114 - CT Dual Pur — , 1115 - CT Dual Pur	<u>OK</u> <u>Cancel</u>	Schedules, Timers, a Setpoints, Inputs, an Al Analog Input AO Analog Output
— — — 1116 - CT Dual Pui — — — 1121 - VT Single Pi — — — 1122 - VT Single Pi — — — 1123 - VT Single Pi — — — 1124 - VT Dual Pui		Analog Setpoint
		BACnet Analog Priority
Setup block updated.	Connected to: Sample Apps BA	Page Nam Properties Modules

The module is displayed on the strategy drawing, and as it has just been placed it is automatically selected. This is indicated by a green outline:

File V Home Controller Strat Connect Disconnect Site Clipboard	egy Properties Modules ? Strategy Help S Navigation Macros Reopen Strategies Page Names Search View	Configuration Database Datalog Site Backup NB-Pro Interface Manager Organiser Utilities
Site List 📮 🗵		Modules 4 2
□-● Sites ^ □-□ BACnet IP _ □-□ 001 - Network _ □-□ 001 - 001 - UCU32 _ □-□ 001 - 002 - CBM24 _	Analog Input ¹ Analog Input ¹ Room Temperature Point Q Quernia [T]	Favorites
BACnet Serial		Functions
날… 🔁 Sample Apps BACnet 날… 😎 001 - Wet Systems		Math
		Schedules, Timers, a
		Cotrointe Innuite an
		Serpoints, Inputs, an 👻
		Al Analog Input
		AO Analog Output
		Analog Setpoint
		BACnet Analog
		BACnet Analog Priority
		BACnet Binary
		BACnet Binary Priority A
	<	> Page Nam Properties Modules
Setup block updated.	Con	nnected to: Sample Apps BACnet (3),

It is possible to examine and edit the properties of the selected module by clicking on the **Properties** tab at the bottom of the Right-Hand pane:

Site			Propei laviga Page N		•	Macı	ch	-	Strat Reop	 		Conf	i gur	ratio				er Organiser	Backup NB-Pr	ro
ite List			5	trateg						 					 Þ	×	-	perties		д
⊒€) Sites				auteg																_
BBACn	et IP																			
	1 - Network		AI		alog 1			1										General Info		
	001 - 001 - UCU32	2	AI	Room	Tem													Type Service Order	Analog Inpu	ut
	001 - 002 - CBM24	4					Point	-												
	et Serial					Ov	erride	Ð										Name	Room Tem.	
	le Apps BACnet																	Synchronis	Disconnect.	i
ė - – 00	1 - Wet Systems																	Constants		
	, 1111 - CT Single F	P i																	Input Anal.	•••
	, 1112 - CT Single F	P																Low thresh		
	, 1113 - CT Single F	P																High thres	0	
	, 1114 - CT Dual Pu	a 👘 .																Lower sens	0	
	, 1115 - CT Dual Pu	a 🖂 🗤																Upper sens	0	
	, 1116 - CT Dual Pu	a 🖂 🛛																Input error	0.0000	
	, 1121 - VT Single P	Pi 🖂																Exponential	60	
	1122 - VT Single P	Pi 📄																Sensor type	PT1000	
	, 1123 - VT Single P	Pi 👘																Unit	°C	
	1124 - VT Dual Pu	и []						÷.				÷			÷			Averaging	0	
	, 1125 - VT Dual Pu	и 📋																Outputs		
	🕽 1126 - VT Dual Pu																			
	1131 - Four Boiler																			
	, 1132 - Four Boiler																			
	1133 - Two Boiler	s 🚬 👘														· 🗸				
	1.4494 E. D. 1	· <													:	>	Pa	ge Nam Pro	perties Mod	du

You can edit the properties of the selected module by clicking in the property's value in the right-hand pane. Help text relevant to the property being edited is displayed in the lower portion of the Right-Hand pane

Fil File Home Controller Strate	Properties Modules ? Strate	en Strategies	guration Database Data Interface Mana Util	
Site List 🛛 📮 🔀	4 Strategy1		⊳ × Pi	roperties 🕂 🗵
D D Sites D	Analog Input 1 Al Room Temperature	· · · · · · · ·		Analog Input [1] General Information Type
B - H = BACnet Serial B - H = Sample Apps BACnet	Point O Override 🗗			Service Order 1 Name Room Tem Synchronis Disconnect
001 - Wet Systems 1111 - CT Single P 1112 - CT Single P	· · · · · · · · · · · · · · · · ·		· · · · · · · · · · · ·	Constants
				High thres 0 Lower sens 0 Upper sens 0
				Input error 0.0000 Exponential 60 Sensor type PT1000
	· · · · · · · · · · · · · · · · · · ·			Unit °C Averaging 0
, 1125 - VT Dual Pur , 1126 - VT Dual Pur , 1131 - Four Boilers	· · · · · · · · · · · · · · · · · · ·			Outputs ower sensor range
				he settings specify the range of he input, after analog-to-digital
< > > Setup block updated.	<	Connected	to: Sample Apps BACnet	Page Nam Properties Modules

Note: If you have multiple strategies open at once, ensure that you select the strategy into which you would like to place the module before you select the module from the modules bar.

The module can now be **selected**, and **edited**, **moved**, **copied**, **cut**, or **joined** to other modules.

SELECTING MODULES ON THE DRAWING AREA

Before you can move, copy, cut, or delete a module, you must first select it. This can be done by:

Clicking on the module symbol,



Or by clicking and dragging from the top left to the bottom right of the module symbol(s) as shown. When you release the mouse button, the module will be selected



To select more than one module on the drawing area:

You can select multiple modules at once by the following methods:

- 4. Press and hold down the [Ctrl] button while clicking the modules required.
- 5. if you want to select every item in the drawing simultaneously, click on Select All in the Strategy tab.



6. Click and drag a box around all the modules you want to select. When you release the mouse button, all the modules within the box will have been selected.



Selected modules (and points, which are represented by lines) are surrounded by coloured borders. Most modules will have a red border, but one will be green. This is the module (or point/line) whose properties are currently displayed in the Properties Pane – i.e. the module that is "in focus".

You can change which of the selected modules is "in focus" by using the navigation controls at the top of the **Properties** pane, with the arrows:

4 Strategy1	Þ	×	Properties	Д 🗙
		^		alog Setpoint [1 💌
Analog Setpoint 1			Constants	
Room Setpoint			Value	0.000000
Point Q	· ·		Outputs	
Tuneable Forward PID	2		Point D	Analog 1 Roo
			Nu	1
Setpoint Output 6	9 <u>n</u>	3	Туре	Analog
Analog Input 1 Room Temperature	Ŀ		Value	0.00
Point Q and Enable	Ŀ		Name	Room Setpoint
Override	Ŀ		Unit	°C
O Derivative	1			
Integration time: 900; Derivative				

Or the drop-down, which lists the currently selected modules and points:



MOVE, DELETE, CUT OR COPY A MODULE OR MODULES ON THE STRATEGY DRAWING AREA

In order to Move, Delete, Cut, or Copy a module or modules, you must first select the module(s) as described above. Then:

Moving modules

To **move** the selected module(s) on the drawing area, drag any one of the selected modules. The modules and their connected points (lines) will move together. Alternatively, you can also use the arrow keys on the PC's keyboard to move all of the selected modules at the same time.

Deleting modules

To **delete** the selected module(s) from the drawing area press the **[Delete]** button on the PC's keyboard.

Copying modules on the drawing area

To **copy** the selected module(s) to the PC's clipboard, so that they can be pasted to another part of the drawing area or to a different **strategy**, either

- Press [Ctrl]+[c] on the PC's keyboard, or
- Click on Copy in the Home tab:



A copy of the module(s) will be saved on the Clipboard until placed (pasted) elsewhere.

Then, **paste** the module(s) to a specific point within the same strategy, or to another strategy, by first either

- pressing [Ctrl]+[v] on the PC's keyboard, or
- clicking on Paste in the Home tab:



then click on the drawing area in the target strategy with the mouse. The top left-hand corner of the module(s) will be positioned on the point where the mouse was clicked.

TOOL TIP DATA ON MODULES

To view details of a specific Module, hover the mouse pointer over the Block in the strategy drawing.



Note: Pasted hardware point modules may adapt some parameters to the destination point but retain others. For example, an analog input configured as PT1000 when pasted to a UniPut will change to a voltage input but retain the max and min limits (in the Advanced button) which for PT1000 could be min 0 and max 0, leading to incorrect operation of the UniPut.

JOINING MODULES IN A STRATEGY

Modules in a strategy must be **joined** together to allow information to flow from input to output. The flow is from left to right, so that controller input **connection points** are on the left of the drawing area, controller outputs are on the right, and the modules are positioned between the inputs and outputs in the center of the drawing area.

Notes on joining modules

- A connection is possible only if both the input and the output are of the same type (analog or digital).
- An output of a module can be linked as often as required with inputs of other modules.
- An input of a module can be linked with only one output of a module.

MODULE CONNECTION POINTS

Connection points are marked on module symbols as blue circles or squares on the left and right edges of the module. When the mouse pointer is placed over a connection point, it changes to a cross-hair.

- Circular connection points are analog.
- Square connection points are digital

If you want to connect two points, make sure they are both either digital **or** analog. You cannot connect analog to digital or vice versa.

HOW TO JOIN MODULES

Place the mouse pointer over the required output of the first module so that it changes to a crosshair.

Click and drag the mouse from the output to the required input of the other module. You will see that the crosshair changes back to a mouse pointer once you have left the blue connection point and return to cross-hair format when you reach the next blue connection point.

Release the mouse when you have reached the required input. The two modules are now joined. The connection between the two modules is marked by a coloured line. The default colour is black, but this can be customized by clicking on the connection line with the right mouse button.



HOW CONNECTIONS ARE REPRESENTED

By default, the connection between 2 modules is represented by a black line with the numbers of the points at each end of the connection also displayed (as in the above example).

You can customize the way in which all connections are represented by right-clicking on the **Drawing Area** to open the **Display Options** menu:



This gives access to the following options:





You can customize the line and label visibility of a single point (line) in the properties panel:

Pro	perties	₽ ×
<	> ?	•
	Point Details	Analog 1 Room S
	Number	1
	Туре	Analog
	Value	0.00
	Name	Room Setpoint
	Unit	°C
-	Display Propert	ies
	Show Line	True
	Labels	Show value only 🗸
		Hide
		Show number Show name Show value only (sin

You can also change the default visibility using the New Connections option on the Strategy tab of the Ribbon:

Strategy				
Сору	BACnet Points	Create	Ö Ö Ö 🗘 Logging	Grid I New Connections
Paste	BACnet Units	Manager	Configuration	🗊 Grid Colour
Select All	View Add I/O Reorder Modules Text Terminals Modules Text Strategy Details Help	View Macros 🖹 Save New	itart/Pause Stop Reset	Dackground Colour
Clipboard	Strategy	Macros	Simulation	Display
₽ X 4	Strateov1			▷ × Modules

This opens the New Connections dialog, where you can set the appearance of new module connections:

	New Connections		×					
☑ Display lines on newly created connections.								
Configure how point information is display on newly created connections.								
	Show value only (simulation 💌							
	Show number Show name Show value only (simulation)	Cancel						

MOVE EXISTING LINES

The lines that connect modules on a strategy drawing can be moved from one module to another without deleting and re-adding them. To do it, right-click on the output or input node on the module to which the line is connected, and select Move Line(s)... from the context menu:



The line(s) can then be moved by clicking the new module node:



CONNECTORS

Lines are a convenient and intuitive way to connect modules that are close together in the strategy drawing. However, clicking and dragging to connect modules that are far apart in the drawing can be impractical. To overcome this, **CXpro^{HD}** provides an alternative way to connect modules using named **Connectors**.



A Connector creates an invisible channel of information between a single Source and multiple Destinations.

Add a Source Connector

To set up a Source Connector, right-click on any output on any module and select Add Source Connector.

/lax	Maximum	4													
) Input A	Maximun	n Q													
) Input B			S	٥ho	w li	nes	;								
Input C			-		~										
Input D				١dd	50	urc	e C	.on	neo	tor	r				
) Input E			(Con	ver	t Li	hot	s to	Со	nn	ect	ors			
) Input F	-														
Input G			5	Simu	ulat	ion	n Pr	ор	erti	es					
) Input H				-	-	-	-	-	-	-	-	-	-	-	-

In the dialog that opens, enter a name for the point that will be exposed by the Source Connector you are creating.

Point Name	
Point Name MaxHWater	
ОК	Cancel

The Source Connector is now created.

lax	Мар	ámum	4		•	•				•			•		
Input A		Maximu	um 🛇	28			•	•	. 2	K	0	Max	dHW	ater	
Input B															
Input C				· ·											

Note: Points exposed by Source Connectors must be named.

Adding a Destination Connector

To connect a module to a point exposed by a Source Connector you must create a Destination Connector as follows: Right-click on any input of any module and select Add Destination Connector.

A>B	Com	parator	1					
🛇 Input A		Outp	ut 🖸 🕇	. .				
O Input B		Compleme	ent 🗖 🕯	1 ·	•	•	•	•
S	how	lines						
A	٨dd D	estinatio	n Conn	ecto	r			
	Conve	rt Lines t	o Conn	ecto	rs			
S	limula	ation Pro	perties					

A list of Source Connectors will be displayed.

	Select	Source	e Co	nnect	or	×
Name						
MaxHW	ater					
	caler Block					
Weathe	rCom Block	(8001 I	npu			
			~		Cance	
			OK	N	Cance	

Choose the appropriate Source Connector and click OK to complete the connection. The new destination connector is added to the input of the module.



Deleting Connectors

The rules for deleting connectors are as follows:

Source: If a Source **Connector** is deleted, <u>all</u> Destination **Connectors** connected to the Source **Connector** will also be deleted.

Destination: If a Destination Connector is deleted, it is the same as disconnecting an input from any output.

If the Destination Connector is the last one connected to the source, a dialog will be displayed asking the user if they want to delete the source. If they decide to do so, then the Source Connector will also be deleted. If the user does not delete the Source Connector, that point will be available for new Destination Connectors.

Quick Searching for Connectors

Jumping from a Destination Connector

Right-click on the Destination Connector and choose either Jump to Source or Jump To Other Destination.



If you choose Jump to Source you will immediately be taken to that Connector.

If you choose Jump To Other Destination and there is only one available, you will immediately be taken to that Connector.

If you choose Jump To Other Destination and there is more than one available Destination, then the Search Results window (below the Strategy Drawing window) will display them as a list so that you can select which one to view.



Jumping from a Source Connector

Right-click on the source connector and choose Jump to Destination.



If there is only one Destination Connector, then that Connector will immediately be displayed. If there is more than one, then the Search Results window (below the Strategy Drawing window) will display them as a list so that you can select which one to view.



Convert Lines to Connectors

It is possible to quickly convert an existing Line to a set of Connectors (one Source and one Destination).

Right-click on a Line and choose Convert Line to Connector.

		Log trigger Datalog number: 1; Update	-
÷		 Convert Line to Connector	ge Jed
•	•	 Simulation properties	F

If the point is not named, you will be given the option to name it.

VIEWING POINT PROPERTIES

The **Properties** panel in the **CXpro^{HD}** Right-hand pane can be used to examine points and routing. To do this, select a line (representing a connection between two modules, usually meaning a point). The properties of the point are displayed in the **Properties** panel:

Pro	perties	д 🗙							
<	> ?	•							
	Point Details	Analog (9) Heati							
	Number	9							
	Туре	Analog							
	Value	0.00							
	Name	Heating Valve							
	Unit	°C							
	Display Properti	ies							
	Show Line	True							
	Labels	Show value only							
N	Number								
Th	The point number that represents a path of data in a strategy. There are a								
Pro	perties Page Na	ames Modules							

Some attributes of a point (such as Name or Unit) are editable and can be changed directly in the Properties panel.

VIEWING BACnet PROPERTIES

If the BACnet Properties option is enabled in the Home tab of the Ribbon,

Home	Controller	Strategy		
nnect	С Сору	Proj	erties 📑 Page Na	ames 🔍 Search
connect	Paste	BAC	net Properties 📗 Module	s Strategy Help
	Select All	Site List Nav	gation 🖪 Macros	Reopen Strat
ite	Clipboard	-	View	

then in the right-hand pane, alongside the Properties panel, there is a BACnet Properties panel:

O Input E		
>	Properties	BACnet Properties

When a BACnet-exposed point (the line representing the point has hexagon indicators near each end) is selected

A	I		Anal Tem				3						Д	-		Hys	tere	sis
				C	P Over	oint ride	~	(3)	-	2	•	(3)	-	put			1	cti Act
•	•	•	•	•	•		•		•		•	Г	On: 2	.00;	Off	4.0	0	-

and the controller is connected in CXpro^{HD}

File 🔹	Home	С
	connect	°C) €31
Si	te	Cli

66

then **CXpro^{HD}** will interrogate the BACnet network in real-time, and live BACnet property values for the selected point will be displayed in the **BACnet Properties** panel.

BAG	Cne	t Properties	д	x
	Dev	rice properties		
	AN	IALOG_INPUT		
	ob	ject-name (77)	Temperature	
	ob	ject-type (79)	0	
	ob	ject-identifier (Analog Input (0),	
	pre	esent-value (85)	1000.000000	
	+	status-flags (1		
	ev	ent-state (36)	normal	
	rel	iability (103)	No Fault Detected	
	ou	t-of-service (81)	False	
	un	its (117)	62	
	mi	n-pres-value (78.000000	
	ma	ax-pres-value (120.000000	
	со	v-increment (22)	0.100000	
	tin	ne-delay (113)	0	
	no	tification-class	0	
	hig	gh-limit (45)	0.000000	
	lo۱	v-limit (59)	0.000000	
	de	adband (25)	0.000000	
	+	limit-enable (
	+	event-enable		
	+	acked-transiti	to-offnormal, to	
	no	tify-type (72)	Alarm	-
		•	•••••	
I	Pro	perties 🔢 BACr	et Properties	

Viewing Module BACnet Properties

The BACnet Properties panel can also be used to view and edit BACnet information related to certain modules as well as points.



The following modules are supported:

- Binary input/output
- Analog input/output
- Setpoints
- BACnet Schedules
- Unitron Schedules
- Broadcast transmit and receive
- Modbus Analog and Digital
- Accumulator
- BACnet Trendlogs

Viewing Device BACnet Properties

67

At the top of the BACnet Properties panel there is a Device Properties checkbox:



Checking this box changes the contents of the panel from the properties of the selected point or module, to the BACnet properties of the device that contains that point or module:

Cnet Properties	д			et Properties	4	
Device properties				evice properties		
ANALOG_INPUT				DEVICE		÷
object-name (77)	Temperature			bject-name (77)	CBx CCBX819002F	
object-type (79)	0			bject-type (79)	8	
object-identifier (Analog Input (0),		C	bject-identifier (Device (8), Instan	
present-value (85)	1000.000000		S	ystem-status (112)	Operational	
			N N	endor-name (121)	Cylon Controls, L	
event-state (36)	normal		N N	endor-identifier	171	
reliability (103)	No Fault Detected		r	nodel-name (70)	CBx	
out-of-service (81)	False		f	irmware-version	CBx 7.9.0f 18-08-2	,
units (117)	62		a	pplication-softw	Plant Controller	
min-pres-value (78.000000		1	ocation (58)	Location not set	
max-pres-value (120.000000		c	lescription (28)	Plant Controller	
ov-increment (22)	0.100000		F	protocol-version	1	
me-delay (113)	0		F	protocol-revision	14	
otification-class	0		G	protocol-servi	acknowledgeAlar	
igh-limit (45)	0.000000		6	protocol-obje	analog-input, an	
ow-limit (59)	0.000000		c	bject-list (76)	DE819002AI2AI3	
deadband (25)	0.000000		r	nax-apdu-length	480	
∎ limit-enable (s	egmentation-su	Segmented Both	
• event-enable			l.	ocal-time (57)	12:29:59	
acked-transiti	to-offnormal, to		1	ocal-date (56)	26/04/2019	
notify-type (72)	Alarm	-	L	tc-offset (119)	0	
•	· · · · · · · · · · · · · · · · · · ·		_		- ·	1

HOW TO ADD TEXT TO A STRATEGY

You can add text comments to a strategy drawing by selecting Add Text from the Strategy tab on the Ribbon:

Strategy			
Copy	View	Adas	I/C
	Modules	Text	Termir

Click the drawing area at the point where you want the text to be displayed.

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	ŀ			•					•								•					
	l.		N											1	0)				tpoi		_
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																					P	oint
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The Add Text dialog box will be displayed:

	Add Text	
		alog Setpoint om Setpoint Point
Font AI Room Tempe	OK Cancel	· · · · · ·

To select the type of font in which the text should be displayed, click Font. The standard Windows Font dialog box will be displayed in which you can choose a font, style, point size, etc. Once you have chosen the required font, click the OK button.

Font: Arial	_	Font style: Regular	Size:	ок
Arial Arial Unicode MS BANKGOTHIC LT B BANKGOTHIC MD Baskerville Old Face	^ ~	Regular Narrow Bold Narrow Bold Itali Bold Bold Italic	8 9 10 11 12 14	Cancel
Effects Strikeout Underline Colour:		- Sample	Zz	
Black 💌		Script: Western		•

Note: It is recommended that you always use "True-type" fonts. When the printing is scaled, non true-type fonts do not scale properly.

Add Text

Add Text

B1 DS floor temp sensors

Font

QK

Cancel

Al

Room Temperature

In the Add Text dialog box, type the text that you would like to include in the strategy

And click OK.

The text will then be displayed on the drawing area on the point at which you clicked the mouse.

×	4	/	5	Stra	ate	gy	1																		
^		n	ľ)	Ü	t	S										•								
			B1	D	S fl	00	r te	mp	se	nso	ors)						Γ			A	nalo	g Se	tpoi	int	
					Ì	Ċ	÷			÷		÷	÷	÷	÷	÷	0	10	0	Ro	om	Se	tpo	int	
																	\vdash							Po	vint
																		•	•	•	•	•	•	·	

HOW TO CHANGE TEXT THAT HAS BEEN ADDED TO THE STRATEGY DRAWING

To change text, select the text, and edit its content or font directly in the Properties pane.



VIRTUAL MODULES

Virtual modules are so-called because they do not result in point values being downloaded to the **ABB Cylon®** controllers, i.e. they do not represent real points. The basic function of a virtual module is to allow for greater flexibility in connecting modules, e.g. backward connection of modules. Virtual modules are also used when creating macros, as they allow one external point of a macro to be connected, via a virtual module, to many internal macro points. There are two virtual modules on a floating toolbar – one analog and one digital.

Analog Virtual Module:

PLACING VIRTUAL MODULES ON THE DRAWING AREA

The procedure for placing virtual modules on the drawing area is similar to that for any other module.

Select the required module from the Virtuals group in the Moules panel:

Modules	џ	x
		×
Favorites		+
Constants		Þ
Controls		۲
Functions		F
Math		۲
Schedules, Timers, and Logic		۶.
Setpoints, Inputs, and Outputs		۶.
Statistics		۶.
VAV		Þ
Virtuals		•
V Analog Virtual		
V Digital Virtual		
• Digital Virtual		
Properties Page Names Module	es	

And click in the drawing area (note the cursor changes to the "Module Cursor" induring this process)

The top left-hand corner of the module's symbol will be placed on the point where the mouse was clicked.



RULES FOR CONNECTING TO VIRTUAL MODULES

- 1. If the point being connected to the virtual module has a point number, then this becomes the number of all the inputs and outputs of the virtual module. Any modules that are then connected will have the same point number.
- 2. If the point being connected to the virtual module does not have a point number, **CXpro^{HD}** chooses a new number and this becomes the number of all the inputs and outputs of the virtual module.
- Rules 1 and 2 describe how the inputs and outputs of the virtual module are numbered once a connection has been made. This is why **CXpro^{HD}** will not allow you, once the first connection has been made, to connect another module that has a number. You can, however, connect a module if its point number box is blank.

NUMBERING VIRTUAL MODULES

Since virtual modules are not downloaded, they do not use any memory in the controller and do not need to be numbered in the Block Manager like other modules.

Virtual modules have their own numbering system. The first virtual module used in a strategy is numbered V1, the second V2, etc.

VIRTUAL MODULES IN MACROS

Virtual modules are useful when creating macros as they allow one input to be used several times.

For example, to create a macro from the strategy shown, it would be necessary to include two inputs in the macro.



Creating the same macro with a virtual module requires just one macro input.


5 Points and Point Values

WHAT ARE POINTS?

A Point is an area in a Controller where data is collected and stored. The data stored by the point is referred to as the Point's "value". Controllers in the **ABB Cylon**[®] system include input, output, set, and virtual Points.

Note: Cylon's Controllers are sometimes referred to as "universal controllers", where "universal" means that they can contain both analog and digital Points.

WHAT ARE BLOCKS?

An important aspect of CXpro^{HD} is the concept of blocks.

Blocks can be seen as units of measurement for the number of modules and points used in a strategy – one block corresponds to one module, one hardware input Point, one hardware output Point, or one virtual point.

The Managers dialog, accessible from the View menu, allows you to see at a glance which of the blocks in the controller are occupied and which are not.

When Points or strategies are downloaded to a Controller, the Controller must also be informed of how many blocks are needed to store the required information.

- If you are using Automatic Download (*see page 77*), CXpro^{HD} automatically recognizes how many blocks are required and it sends this information to the Controller.
- If you are not using Automatic Download you must, when downloading Points and strategies, send specific "Setup" information to the Controller, instructing it as to how many blocks it must serve in the strategy. This procedure is called Sending Setup (*see page 155*).

BLOCK NUMBERS

An important aspect of CXpro^{HD} is the concept of blocks.

Blocks can be seen as units of measurement for the number of both modules and points used in a strategy.

 In the CBM, CBV, and CBT controllers, the Hardware Point numbers are from 1 to 1024, and strategy blocks go from 1 to 1024. Note however that only Hardware Points 1-24 are used on the CBM24, only Hardware points 1-16 are used on the CBM16, etc.



POINT NUMBERS

In CXpro^{HD}, the connections between modules are referred to as 'Points'. These strategy Points can represent physical inputs and outputs on a Controller, or Analog/Binary values (referred to in CXpro^{HD} as 'Virtual Points').

Each Analog Input, Analog Output, Binary Input, Binary Output, Analog Value, and Binary Value is assigned a number, and how these points are numbered depends on the controller type.

In CBM, CBV, and CBT controllers, controller terminals (i.e. inputs and outputs) - "hardware points" in CXpro^{HD} - are assigned numbers between 1 and 24. Each terminal can be either an input or an output so that there cannot be two hardware points with the same number. For example, if there is an Analog Input 3 there cannot be an Analog Output 3 or Binary Input 3 at the same time.

Note: In theory, hardware Point numbers could be up to 1024, but is limited by the Controller hardware so that the current maximum is 24.

Analog Values ("Analog virtual points") can be numbered 1-1024, and Binary Values ("Digital virtual points") can be numbered 1 - 1024, so that there could be for example both Analog Value 3 and Binary Value 3.

Note: The combined number of Analog Values and Binary Values that can be exposed on a BACnet network by a single CBM or CBT is 225. As a result, it is recommended to keep the total number of defined setpoints in a strategy below this value.

However, it is possible to have up to 100 additional setpoints **that are not exposed on BACnet**. Such setpoints in effect act as constants, because they cannot be changed by the strategy nor via BACnet, but can be set using **CXpro^{HD}**.

In strategy drawings generated by CXpro^{HD} for CBM, CBV, and CBT controllers, it is possible to identify a strategy Point's nature as follows:

- If the number has brackets around it is a "hardware point" Analog Input, Analog Output, Binary Input, or Binary Output.
- If the number is not bracketed but is connected to a circular connection point, it is an Analog Value ("analog virtual point").
- If the number is not bracketed but is connected to a square connection point, it is a Binary Value ("digital virtual point").
- If the line representing the point has a hexagon near each end, then that point is exposed on the BACnet network.



Point exposed over BACnet:



DEFINING HARDWARE POINTS

Hardware points are the inputs and outputs of Field Controllers.

To define a hardware point it is necessary to define the following features:

- Point number
- Point name
- Point type (input, output, digital, analog)
- Unit of measurement
- Damping (for analog inputs only)

Once the required hardware points have been defined in CXpro^{HD}, they are then downloaded to the Field Controller for which they are intended.

HOW TO DEFINE HARDWARE POINTS

The procedure for defining hardware points is as follows:

- Specify (Target) the controller for which the hardware point is being defined
- Choose the module from the modules bar
- Place the module on the drawing area
- Complete the module dialog box
- Save the hardware point definition
- Log in to the Field Controller
- Download the hardware point definition to the Field Controller

Defining Hardware points - Target the controller

in the Site List select the BACnet Router and Field Controller that you want to target. This specifies the Field Controller on which the hardware point is being defined and the location in the database on the PC's hard disk in which the point definition will be stored.

Defining Hardware points - Place the module on the drawing area

Once you have selected a module from the **modules bar**, place it on the drawing area by simply clicking the drawing area. A dialog box will appear prompting you to enter a name for the hardware point.

Enter a name and click **OK** to close the dialog box.

The top left-hand corner of the module's symbol, i.e. the graphical symbol for the analog input point, will be placed on the point on the drawing area where the mouse was clicked.

Expandable I/O - Hardware Points on CBX + FLX devices

In the strategy drawing, IO blocks can be added up to the total on the configured FLX modules plus the CBX onboard IO.



Note: Unlike CBM UniPuts, if UniPuts on CBX/CBXi devices are configured as Analog Inputs, they have all of the parameters that are available in Universal inputs. Also, the "Operation Mode" parameters, which a apply only to certain CBM UniPuts, are not used by CBX/CBXi.

Defining Hardware points - Save the hardware point definition

Save the edited strategy by choosing Save or Save As... from the File menu. The Save As dialog box appears:

	Save As				×
(e) → ↑) ≪ BACNETIP → strat5 →	001	v ¢	Search 001		P
Organise 👻 New folder				8⊞ ▼	0
BACNETIP Archive DBASE DRAVINGS Keypad Macros Stat5 001		° Na	ame No items r	natch your search.	
Je Strategy		< <			>
File name 100102:832 Save as type: V6 Strategy (*.532)					>
Hide Folders			Save	Cancel	

Enter a name under which the strategy should be saved. **CXpro^{HD}** enters a default file name that identifies the BACnet Router and Field Controller for which the strategy has been designed, e.g. if Field Controller #3 on BACnet Router #1 was connected to a VAV, its strategy might be named: "001_03VAV.s32".

When the Save As dialog box is complete, click OK. The name of the strategy will appear in the Drawing tab:



Connect to the controller

Connect to the controller by clicking the Connect button on the Strategy tab of the Ribbon

File 🐐 🕴	Home	Controlle	r	Strategy	
S Conne Discor	ct inect	Download	ľ] Copy] Paste Select All	
Site	1	Controller	0	lipboard	

Download the hardware point definition.

You can download a strategy to a controller in just one step, by choosing Download from the Controller tab of the Ribbon.

•	❤ <u>~</u> `		
ne	Controller	Stra	ategy
	🚼 Communica	tions	📥 Download
ct	Gontroller		Download
	BACnet		💾 Auto Online
	Configuratio	on	

CXpro^{HD} will automatically wipe the Field Controller's memory, download the hardware point, and send the set-up to the UC, i.e. the number of blocks it is to serve. While it is doing this, it will display the **Downloading** window. As the point is being downloaded, the **Downloading** window displays the progress and in the **System status** section, it shows which of the 3 stages (wiping memory, downloading strategy, or sending set-up) CXpro^{HD} is currently completing. If only one hardware point is being downloaded, the process will take place so quickly that the downloading window will appear only for a brief moment.

It is more usual to download an entire strategy, with several hardware points and other modules. In that case, the **Downloading** window will remain visible for longer and the progress of the download will be measured in the progress bars.

Downloading		×
Controller		
Hardware Points	48	_
Strategy Blocks	2	_
Analog Setpoint Values		
Digital Setpoint Values		
BACnet Point Config		_
Sending strategy to controller		
	Close	t

SUMMARY OF PROCEDURE FOR DEFINING HARDWARE POINTS

In practice, the procedure for defining hardware points is as follows:

- Define all hardware points whose values are already known, in the module dialog boxes and place the corresponding modules somewhere on the drawing area.
- Save the strategy.
- Click Communications Setup from the Communications menu and enable Automatic Download.
- Log in
- Choose Download from the Communications menu.
- •

POINT NUMBERS FOR INPUTS AND OUTPUTS

When another input module is selected, **CXpro^{HD}** automatically assigns it to it the next unused input, i.e. the unused input with the smallest point number.

Defining digital and analog outputs follows the same principle. As outputs are numbered in the range 9 to 16, **CXpro^{HD}** assigns point number 9 to the first output.

For CBX and CBXi devices, point numbers are defined by the I/O module in which they reside – internal I/O on the CBX/CBXi device are I/O module "0", any attached FLX devices are I/O modules 1,2 or 3

I/O Module	Terminal Number	Туре
CBX-8R8	1 8	Universal Input
_	9 16	UniPut™
FLX-8R8 adress 0 (FBXi only)	18	Universal Input
_	9 6	UniPut™
FLX-8R8 adress 1	101 <mark>108</mark>	Universal Input
	109 <mark>116</mark>	UniPut™
FLX-8R8 adress 2	201208	Universal Input
_	209 216	UniPut™
FLX-8R8 adress 3	301 308	Universal Input
_	309 316	UniPut™

A SHORT CUT TO DEFINING HARDWARE POINTS

To save time when defining the hardware points you can bring the definitions directly to the database by using the **Database Interface**.

The types ("A" for analog, "D" for digital), point names, and point numbers and units can be written as comma-separated or tab-separated lists in a word processing application, copied and pasted via the clipboard to the Database Interface. This avoids unnecessary writing work and typing errors. Using external applications for text handling also saves time because of their Copy, Search, Replace, and Pasting features.

The point list shown below was created in **Microsoft Windows Notepad**. Other software applications, such as **Excel** and **Word** may also be used.

A	Room Temperature 1	°C	1	
A	Room Temperature 2	°C	2	
A	Outair Temperature South-East	°C	3	
A	Outair Temperature North-West	°C	4	
A	Supply Water Temperature 1	°C	5	
A	Supply Water Temperature 2	°C	6	
A	Valve 1	010	9	
A	Valve 2		010	10
D	Pump 1 ON/ OF	FF 11		
D	Pump 2 ON/ OE	FF 12		

When preparing a hardware point definition list you must separate the values (type, point name, unit, point number, etc.) by using tabs or commas, not spaces.

Note: This shortcut for defining hardware point values should only be used for UCs that do not already have hardware point definitions in the database on the PC's hard disk, since existing database entries are not deleted. The Database Interface does not check for uniqueness. This means that there is a danger of defining more than one entry per point, which will cause a lot of confusion in the later use of the point in other programs.

WHAT ARE UNIPUTS™?

A UniPut[™] can act as an input or an output so that you can now have a controller that fits your BMS design exactly - no need to use an extra controller to gain an extra output while leaving an input on the original controller unused. BMS sites can make more efficient use of a smaller number of controllers, saving on cost and complexity.

A UniPut[™] can be configured as any one of the following:

- an Active Input, reading between $0 \dots 10$ V at 40 K Ω , with 9-bit resolution.
- an Active Output, outputting 0 ... 10 V at a maximum load of 20 mA
- a Digital Volt-Free contact.
- a digital input detecting the presence or absence of 24Vac

or

• a relay switched output.

The **ABB Cylon®** range of controllers has several different combinations of UniPuts[™] and standard Universal Inputs.

UniPuts[™] are used in controller strategies through standard Analog and Digital Input and Output modules. However, before it is possible to add a module for a UniPut[™] to the strategy, the UniPut[™] must be configured using CXpro^{HD}'s I/O Terminals dialog box.

CONFIGURING THE FIELD CONTROLLER'S INPUTS AND OUTPUTS

Cylon® controllers can have a mixture of Universal Inputs and UniPuts™. The Universal Inputs are fixed as inputs, but UniPuts™ may be configured as analog or digital inputs or outputs. Universal Inputs and UniPuts™ are configured using the I/O Terminals dialog.

HOW TO OPEN THE "I/O TERMINALS" DIALOG.

The I/O Terminals dialog can be opened by clicking the I/O Terminals button in the Strategy tab of the Ribbon:

roller	Strategy					
	Copy Paste Select All Clipboard	View Modules	Add Text	I/O Terminess	Reorder Modules	BACnet F BACnet L Call Strategy

Analog Input	Address	Туре	Name		Sensor	Dither	Input	Temp	Powe	10V	Temp	Low Val	High Va	Low Thr.
		Universal Input	Heating Water Ter	np	PT1000	14 Bits	0-10		Normal	Normal	Pulsed	0	0	0
Digital Input	3	Universal Input	Temperature		PT1000	14 Bits	0-10	Centi	Normal	Normal	Pulsed	78	120	-50
nalog Output														
igital Output														
II Assigned														
li Assigned														
	<													
	Unassigned	ł:												
	Address	Туре		Can mov	ve to									
	1	Universal Input		Analog I	nput,Digital Input									
		Universal Input			nput,Digital Input									
		Uniput with Relay			nput,Digital Input,									
	19 20	Uniput with Relay Uniput with Relay		Analog	nput,Digital Input, nput,Digital Input,	Analog Output	Digital Out	put						
	20	Oniput with heidy		Allalog	npur, olgital inpur,	A laiog Output	,Digital Out	put						

80

The I/O terminals that have already been configured are listed in the top panel. The configuration of these I/O terminals can be adjusted directly in the top panel.

I/O terminals that have not yet been configured are listed in the bottom **Unassigned** panel. For each of these, the types of I/O as which it can act are listed in the **Can move to** column.

In the left-hand panel there is a list of the I/O natures to which terminals can be assigned – Analog Input, Digital Input, Analog Output, and Digital Output.

To assign an Unassigned terminal, first select an appropriate "nature" in the left-hand panel,



Input Add	ress Type	Name	Outpu.	Low Val.	. High Va.	Sequen	. Low Unit	High Unit	Existi	
nnut										
al Input										
log Output	Ę	ta								
ital Output										
Assigned										
				There are	no items to sl	how in this vi	ew.			
Unass	signed:									
	ress Type		nove to							
1	Universal Input		g Input,Digit							
4	Universal Input Uniput with Relay	v Anal	g Input, Digit	tal Input tal Input Anal	og Output,Di	ioital Output				
19	Uniput with Relay	y Anal	g Input,Digit	al Input,Ana	og Output,Di	igital Output				
20	Uniput with Relay	v Analı	va Input Diait							
	onpor marriedy	, , , , , , , , , , , , , , , , , , , ,	yg in por, orgi	ai input,Ana	og Output, Di	igital Output				
		, , , , , , , , , , , , , , , , , , , ,	ng in par, bigi	a nput, Ana	og Output, Di	igital Output				
rminals							1	1		
Addre	ess Type	Name	Outpu	. Low Val	High Va	. Sequen	Low Unit			
				. Low Val			Low Unit Off	High Unit	Existi	
og input Addre al input	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input og Output	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input og Output	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og Input Addre al Input 18 og Output al Output 18	ess Type		Outpu	. Low Val	High Va	. Sequen				
og input al input og Output al Output signed	ss Type Uniput with Relay		Outpu	. Low Val	High Va	. Sequen				
og input al input og Output al Output sisigned Unassi	Type Unjout with Relay	Nane	Outpu Normal	. Low Val	High Va	. Sequen				
og input al input og Output al Output ssigned Unassi Addre	Type Uniput with Relay gned: ss Type	Name	Outpu Normal	0	High Va	. Sequen				
ag input al input bg Output al Output sisigned Unassi Addre 1	ned: bit Type Unjout with Relay Unjout With Rela	Name	Outpu Normal	Low Val 0	High Va	. Sequen				
og input al input og Output al Output ssigned Unassi Addre	ss Type Uniput with Relay uniput with Relay gned: ss Type Universal Input Universal Input	Name	Outpu Normal	l Low Val 0	High Va 255	0				
ag input Addre al input 18 ag Output al Output signed Unassi Addre 1 4	ned: bit Type Unjout with Relay Unjout With Rela	Nane	Outpu Normal	l Low Val 0	High Va	Sequen 0				

then select the Terminal and drag it into the top panel.

Note: Terminals marked Universal Input type are not UniPuts[™], so they cannot be selected if Analog Output or Digital Output is selected in the left-hand panel

Enter a Name for the new point:

I/O Terminals									
Analog Input	Address	Туре	Name	Outpu	Low Val	High Va	Sequen	Low Unit	High
	18	Uniput with Relay	Water Pump Enable	Normal	0	255	0	Off	On
Digital Input									
Analog Output									
Digital Output									

Adjust the parameters of the I/O terminal as required:

I/O Terminals									
Analog Input	Address	Туре	Name	Outpu	Low Val	High Va	Sequen	Low Unit	High
	18	Uniput with Relay		Norma 👻	0	255	0	Off	On
Digital Input				Normal	_				
	_			Relay/Tria	ac				
Analog Output									
Digital Output									

Repeat this process until all required UniPuts[™] have been configured.

Note: When the I/O Terminals dialog is closed, point modules will be added to the strategy drawing for any newlyconfigured terminals which were not already in the strategy.

CHANGING THE CONFIGURATION OF A UNIPUT™ OR UNIVERSAL INPUT

Any editable parameter of a configured I/O terminal can be adjusted by selecting it in the I/O Terminals dialog:

Dither	Input	Temp	Powe	10V	Temp	Low Val	High Va	Low Thr
14 Bits	0-10	Centi	Normal	Normal	Pulsed	0	0	0
14 Bits	0-10	Centi	Normal	Normal	Pulsed	78	120	-50

An I/O terminal's behavior can be changed from one nature to another, e.g. from Digital Output to Analog Output, by dragging the point to a different entry in the left-hand Pane:

alog Input	Address	Туре	Name	Outpu	Low Val	High Va	Sequen	Low Unit	High Unit	Existi		
	18	Uniput with Relay	Water Pump Enable	Normal	0	255	0	Off	On	0		
igital Input												
nalog Output												
igital Output												
I Assigned												
Assigned												
O Terminals												
		-			[-			-		
nalog Input	Address	Туре	Name	Outpu	Low Val	High Va	Sequen	Low Unit	High Unit	Existi		
Digital Input												
nalog Outout												
nalog Outout igital Output												
Digital Input Analog Output Digital Output												
nalog Output igital Output II Assigned												
igital Output												
nalog Output igital Output Il Assigned D Terminals nalog Input		Туре	Name	Low Val	. High Va	. Low Str			Sequen	Unit	Existi	
nalog Output	17	Uniput with Relay	Name Chiller	0	10000	0	100	0.000000	0	°C	0	
nalog Output gital Output I Assigned Terminals nalog Input	17											
nalog Output	17	Uniput with Relay		0	10000	0	100	0.000000	0	°C	0	
nalog Output	17	Uniput with Relay		0	10000	0	100	0.000000	0	°C	0	

01_01.s32	I	> ×	Prop	erties	ф
	· · · · · · · · · · · · ·	^	<	> ? Analog Input [1]
				General Information	
		•		Туре	Analog Input
		•		Service Order	1
				Name	Outside Air Temperature
				Synchronised Status	Checking
				Constants	
	Analog Input 1			 Point type 	Input Analog
	Analog Input 1 Outside Air Temperature	•		Low threshold	78
	Point Q (1)	- I		High threshold	120
	Override 🗖	Ľ		Lower sensor range	-50
				Upper sensor range	150
				Input error	0.0000
				Exponential filter	20
				Sensor type	PT1000
	Analog Input 2 Heating Water	· .		Unit	°C
	Al Heating Water Temp			Averaging	0
	Point (2)	-		Outputs	
	Override 🗗			Point	Analog (1): 0.00 Outside Air T.
				Manual override	Digital
		· .			
		•			
		·			
		. 🔪			
		× 1	-	perties Page Names M	lodules

Example: Configuring Analog Input module properties

General Information

Туре

(not editable) shows that this is an Analog input.

Service Order

(not editable) indicates the order in which this block will be processed by the controller.

Name

Shows the text identifier for the point, which must be no more than 24 alphanumeric characters. Spaces, commas, full stops may also be used. Each point in a Field Controller must have a point name that is unique within that controller.

Synchronised Status

Shows whether the strategy drawing matches the strategy in the connected Controller.

Constants

Low Input Threshold / High Input Threshold / Low Strategy Value / Hight Strategy Value

The threshold settings specify the on/off turnover point on a digital input or output.

Input Error

A constant with the same unit as the input value, which is added to the input value to compensate for errors in input arising from factors such as resistance of long cables or positioning of sensors. Temperature values (sensor type PT1000) are corrected in mV. To compensate for 1 °C, the input error is 2.5 mV. For example, a decrease in temperature of 2 °C requires an input error of -5.0 mV to be entered. This feature is only available for analog passive inputs.

Exp. Filter Constant

An individual time constant for the analog input., behaving as a damping filter. The measured input value will be averaged over the time specified in seconds by the Exponential Filter constant, so that short-term variations of the measured value can be filtered out if the Exponential Filter value is longer than the sensor response time.

Sensor Type

Select the required filter from the Sensor Type list. Some of the available options are:

- Pt1000: This configures the analog input for reading temperatures from a standard Pt1000 sensor. The Controller will convert the measured resistance (voltage) to a temperature signal.
- 0-10 V: This converts the hardware voltage signal 0...10 V DC to a software value in the range 0...100 %. For example, the voltage signal 6.7 V DC will be converted to 67.0 %.
- 0-20 mA: This converts the hardware current signal 0...20 mA to a software value in the range 0...100 %. For example, a current of 15.0 mA gives the software a value of 75.0 %.
- Pulse(V/F): This is designed for reading voltage-free contacts, which can be operated at a frequency of up to 12 Hz. The value of the input will be incremented by 1 after each detected pulse. Evaluation and resetting of the counter will be done by using the Meter Module (module 63).

Additional sensor types can be allowed for by defining extra units of measurement - see *Appendix :: Adding units of measurement to the system* on page 207.

Unit

The Unit list box contains a collection of text strings, one of which will be displayed together with the point value. Choose from the list the type of unit that corresponds to the type of input, e.g. if an analog input point represents a temperature reading in degrees Celsius, you may choose DegC from the Units list box. If necessary, additional units may be defined in the C:\CXproHD\(SITENAME)\SYSTEM\site.ini file. Appendix :: Adding units of measurement to the system on page 207 contains details of how this is done.

Outputs

Point

The output of the Analog Point module assumes the type, name, and units of the point module. A point number is automatically assigned (though this can be edited by selecting the connecting line, which represents the point itself)

Note: Point numbers 1...8 represent controller inputs 1...8. Point numbers 9...16 represent controller outputs 1...8.

VIEWING USED BLOCKS

To check which blocks have been used in a strategy, select Strategy Details from the Strategy tab of the Ribbon:

Strategy							
은 Copy - Paste Select All Clipboard	View Modules	Add Text	I/O Terminals	Reorder Modules Strategy	BACne BACne BACne Carates	t Units	Strategy Help
				4 🖉	04 04 -22	7	

This opens the Strategy Details dialog:

	Strategy Details	
rategy Blocks Controller Resources Points Manager		
001 Comparator 002 BACnet Schedule 003 Absolute Value 004 Maximum 005 Analog Gate 006 Linut to 0 or 100 007 Rounding 008 Integer Constant 0109 Real Constant 0101 Not Ubed 0111 Not Ubed 0123 Not Ubed 0134 Not Ubed 015 Not Ubed 016 Not Ubed 017 Not Ubed 018 Not Ubed 019 Not Ubed 020 Not Ubed 021 Not Ubed <td< th=""><th></th><th>~</th></td<>		~
U23 Not Used	0	

Viewing the list of blocks

Click on the **Strategy Blocks** tab to see which of the available blocks have been used in the active strategy and which have not.

Strategy Details	×
trategy Blocks Controller Resources Points Manager	
001 Comparison 002 BADext Schedule 003 Abconstant 004 Maximum 005 Analog Gate 006 Linit to for 100 007 Rounding 008 Integer Constant 009 Real Constant 011 VAV Differential Pressure 011 Not Used 011 Not Used 012 Not Used 013 Not Used 014 Not Used 015 Not Used 016 Not Used 017 Not Used 018 Not Used 019 Not Used 019 Not Used 020 Not Used 021 Not Used 022 Not Used 023 Not Used 023 Not Used	^
]	ОК

In the above example, the **Strategy Blocks** tab indicates that the first block (block no. 001) is being used as a Comparator module.

Block 002 is an BACnet Schedule module, block 003 is an Absolute Value module etc.

Blocks 011 to 023 have not been used in the strategy.

To view the remaining blocks (in the above example, blocks 024 ... 1024), use the horizontal scroll bar to move down the Strategy Blocks tab.

Viewing the blocks associated with each point

The **Points Manager** tab allows you to examine points in a strategy, listing the strategy blocks to which each point is connected.

Strategy Details	×
Strategy Blocks Controller Resources Points Manager	1
□-== Points □-== 1 □-== Strategy Blocks □-== 2 □-== 3 □-== 4 <td></td>	
	ОК

In this example, Analog Point number 2 is connected to strategy blocks numbered 3 and 4.

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KEEPING CXPROHD AND CONTROLLER STRATEGIES IN SYNC

STRATEGY COMPARE

When connected to a site, it is possible to compare the strategy in CXpro^{HD} with that in the Controller.

To compare CXpro^{HD} and Controller strategies,

Connect to the Controller by clicking on the Connect button in the Home tab of the Ribbon:



Right-click on the Field Controller in the Site List and select Strategy operations > Compare Strategy To Controller,

E BL Office E								
□	Open '001_01.s32' Ctrl+O Configure FLX Hardware Modules	ľ	· ·	· ·	 [AI	Ou	alog Inpu itside A nperatu
	Break Copy Strategy To		· ·	 	 			
	Strategy operations	⊑‡	Reord			cks		
	Export Aspect Data Update BACnet EDE Data		Comp			Cont	roller	Temp

Alternatively, you can select Compare from the Controller tab of the Ribbon.

·											
ne	Controller	Stra	itegy								
	😽 Communica	tions	📩 Download	Compare	1.23 Version	Чв					
:t	Controller		Y Wipe Controller	Show Compare	🗟 Time and Date	<u>51</u>					
	BACnet		🛃 Auto Online		Maximums	e Lo					
	Configuratio	on		Operations							

Only strategy modules are compared.

Note: Parts of the strategy that can be modified using tools other than the Engineering Tool (e.g. CCView) are not compared. For example, the sample interval on a Datalog module is excluded from the comparison, but the Type of datalog is included.

Compare Process

When the Compare process is requested, the Select Items to Compare dialog is displayed:

Select Item	ns to Compare ×
Hardware Blocks	001-024
Range Strategy Block:	001-024
Range	001-1024
Analog Setpoint Val	001-1024
Digital Setpoint Val	
🕅 Range	001-1024
BACnet Points	
Range	001-224
Select / deselect all	
	Compare Cancel

This allows specific subsets of the strategy to be compared if required.

Clicking the Compare button starts the process, and shows the Uploading progress dialog:

Uploading			×
Controller			
Hardware Points		16	
Strategy Blocks		1025	
Analog Setpoint Values		3	
Digital Setpoint Values			
BACnet Point Config			
Receiving analog setpoints			
	Close	Abort	

and when the upload is complete, a comparison report dialog is displayed

ype	Service Or	Block Type	Difference	
LX Module	1	Configuration	FLX Module at address <1> is configured on controller but is n	ot configu
trategy Blocks	1	Boolean	The Output "Complement" has address: - < Unconnected> on t	
trategy Blocks	3	Adder/Scaler	The Input "Input B" has address: - < Unconnected> on the Con	
trategy Blocks	6	Modbus analog	The block of type Modbus analog at address 6 on the strategy i	
trategy Blocks	1025	FLX port configurat	The "Module at 1" value is: - <flx-4r4> on the Controller - <no< th=""><th>ne> on t</th></no<></flx-4r4>	ne> on t
с			Controller	
		^ <u>1</u>	imp to	^
		~		~
<		>	<	>

This dialog lists all of the differences between the PC version of the strategy and the Controller version, with a facility to jump to each of the modules that contains a difference, so that the difference can be manually resolved.

When the differences have been resolved, clicking on the Close button terminates the Compare process.

STRATEGY SYNCHRONIZATION

CXpro^{HD} will evaluate whether its copy of the strategy and the Controller's are fully synchronized at the following times:

- When a module is selected in the strategy drawing
- When a strategy is closed following a partial download
- When Scan Mode is enabled

If any potential discrepancy is found, the user will be prompted to run the Strategy Compare feature.

Modules in the drawing that do not match the controller strategy are marked with an icon showing a red circle containing an "x" to indicate that it is no in sync:



The user is not blocked or forced to take any action, and no changes take place in the background.

Note: The checks apply to all strategy modules with the following exceptions:

- Macros
- DI Modules
- Set Point Modules
- IO Modules (On UC16 controllers)
- Comment Modules

When a module properties are edited:

When a module is selected, its Synchronised Status is displayed in the properties inspector:

s32															Þ	×	Pro	pertie	s				ņ	x
																^	<	>		? Analog Inp	ut [3]			-
•																		Туре	2			Analog Input		
•																		Servi	ice	e Order		3		
•																		Nam	ie			Outside Air Temperature		
																		Sync	hr	ronised Status		Checking		
																		Cons						
	I			_	Ana	aloo	ı In	put		_	3	11						± P	oi	int type		Input Analog		
•		A	L		Ana Ou Ten							1						Low	th	nreshold		78		
•	ł				ren	T				oint	0	- 31	-					High	n tl	hreshold		120		
	l							0	ver	ride	Ø			Ľ		-		Low	er	sensor range		-50		
																		Upp	er	sensor range		150		
																		Inpu	t e	error		0.0000		
													1											

When a strategy is closed following a partial download:

A partial download takes place when the Automatic Download feature is <u>disabled</u>. In this case, selecting Compare from the Controller tab of the Ribbon will open a Select items to Download dialog allowing different subsets of the strategy to be downloaded individually.

This dialog is similar to the Select Items to Compare dialog used in the compare process (see *Strategy Compare* on page 88).

CXproHD | Points and Point Values

However, if you carry out a partial download the setup block is not downloaded. The next time you close the strategy, the Synchronisation process will register a discrepancy between PC and Controller strategies. When this happens, a warning will be displayed stating that the "setup block was updated but not downloaded" and suggesting that the setup is downloaded:

2	The setup block was updated but not downloaded to the controller. This may cause synchronization issues between the controller strategy and PC strategy. It is strongly recommended that you download the setup to the controller before continuing. Do you want to continue anyway?
	Yes No

Clicking on the **No** button will allow you to save the setup block. If you do not wish to do so, click the **Yes** button and the strategy will be closed without updating the setup block on the Controller.

When Scan Mode is enabled

When Scan Mode is activated (see *Activate scan mode* on page 125) the PC version of the strategy is compared to the Controller version and if any discrepancies are found, the mismatched modules will be identified by a flashing 'highlight box' and a message in the status bar will inform the user

READING LIVE POINT VALUES (LIVELOG)

The LiveLog feature in CXpro^{HD} allows you to read the values of points in the controllers on your site (i.e. it reports "live" or in real-time from the site).

As well as reading point values, the LiveLog also scans time schedules, the BMS network, and its Fieldbusses, and, if configured to do so, it will log those values to a text file. It can also show HOA values.

CONFIGURING LIVE LOG

Livelog can scan just one strategy, can either append to the log or wipe the log each time it starts and can write the log to a file for later analysis.

To set up these options, select LiveLog Setup from the Controller tab of the Ribbon

	Controller St	trategy						
	tommunications	s 📩 Download 🛛 🖓 Compare	123 Version	Reard Diagnostics			Live og Setup	
	G Controller	Wipe Controller 🔄 Show Com	pare 🛛 🗟 Time and Date	Statistics	Q	Ō	LiveLog Report	/ 5
	BACnet	💾 Auto Online	Maximums	Lock and Unlock	Scan	Point	LiveLog C Upload BACnet Points	Interface Config Builder
	Configuration		Operations				Testing	Keypad
1		부 🖬 🛛	001 01.s32		Þ	× Prop	erties 🖳 LiveLog Setup	

This opens the Livelog Setup dialog.

Livelog Se	tup
Scan C All Opened Strategies C Active Strategy Scan Interval (<60s) 5	Update C Append Overwrite
Cog To File	
	OK Cancel

In the Update section, select Append to cause the LiveLog to add new scan data to the end of the existing list, or Overwrite to cause the LiveLog list to be replaced each time a scan is completed.



If you chose to scan the Active Strategy only, enter a number between 1 and 60 in the Scan Interval edit box. This represents the number of seconds CXpro^{HD} will remain idle after scanning the strategy before it will scan the strategy again. (The LiveLog continuously scans the strategy until you press the Stop Scan button on the Livelog dialog)

If you would like the results of the LiveLog to be written to a text file and saved, click the Log to File checkbox. By default, logs are saved to \system\iowin.log

To view the contents of the LiveLog text file, click LiveLog Report in the Controller tab of the Ribbon:

Controller Stra	ategy						
tommunications	📥 Download 🛛 📳 Compare	123 Version	Q Board Diagnostics			📃 🗟 LiveLog Setup	
G Controller	Wipe Controller 🔄 Show Compare	🗟 Time and Date	Statistics	Q	0	LiveLog Report	0
BACnet	🛃 Auto Online	Maximums	Lock and Unlock	Scan	Poin	de LiveLog Upload BACnet Points	Interface Cor Builder
Configuration	Oper	rations				Testing	Keypac
	д 🔀 🗸	001_01.s32		Þ	× P	roperties	

This will open the log file in your default text editor:

	iowi	n.log - Notepad		-	- 0		×
File Edit Form	at View Help						
Currently Sc	anning Scanning	Real Points (1-16))				^
001_01.s32	PL Office	001 - Network	001	- 001	- 0	BM24	
001_01.s32	PL Office	001 - Network	001	- 001	- 0	BM24	
							\sim
<						>	

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MAN0133 rev 29

RUNNING LIVELOG

Select from the Site List the site the BACnet Router and Field Controller containing the point that is to be read.

Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

😐 ÷		
File * Home	Controller	Strategy
💉 Connect	Copy [라 Paste	Properties Modules ? Strategy
Disconnect	Paste	Navigation 🖪 Macros 🗌 Reopen
	Select All	Site List Page Names Q Search
Site	Clipboard	View

Activate LiveLog by clicking the LiveLog option in the Controller tab of the Ribbon

File - Home	Controller Str	ategy							
🚿 Connect 💉 Disconnect	Communications	▲ Download 집 Com 게 Wipe Controller 값 Show 삼 Auto Online		│ 🛃 Version │ 😼 Time and Date │ 🖫 Maximums	Board Diagnostics	₽ Scan	Overrid Point	te LiveLog Setup	Inter Built
Site	Configuration		Ope	rations				Testing	
Site List		ά	4 /	001_01.s32		Þ	× Pr		
⊡-• Sites							^	View Livelog output.	

This opens the Livelog dialog:

LiveLog						
Hardware Points	Strategy Target	Cylon BACne	t Router 49 one		CBx CCBX8307	792F
Hardware Analog Points	Filters	jojian brian				
Hardware Digital Points	Point Name	Range		FD	X Modules Al	I/Os 💌
Analog Setpoint			kample: "3,7,9-16"		-	
Digital Setpoint						
Analog Points	Point Number Point Name	Point Type	Value	Override	Time	
Digital Points						
		There are no item.	s to show in this view			
		There are no items	to show in this view			
	,					
	Setup View Report	<u>D</u> \	verride		Stop Sc	an C <u>l</u> ear
						Close

LIVELOG - SCANNING DEFINITION

In the LiveLog dialog, you can view the following parameters for the LiveLog, and change them where it is appropriate to do so:

- The type of points to be scanned
- Whether or not points will be overwritten

Strategy Target

Strategy Target	PL Office	001 - Network	001 - 001 - CBM24

This window shows the target of the currently selected strategy. The values cannot be changed in the LiveLog dialog.

Scanning definition

Scanning	
IO Points	
C Analogs	
C Digitals	

The Scanning section of the LiveLog window allows you to decide which values to scan.

To scan the values of the controller's hardware points, click Hardware Points.

To scan analog points only, click Analogs in the scanning section. To scan a specific number of analog points, enter a range of point numbers in the edit box under Digitals.

To scan digital points only, click **Digitals** in the scanning section. To scan a specific number of digital points, enter a range of point numbers in the edit box under **Digitals**.

Override Status

When a scan has been stopped, you can change the override status of any point listed in the LiveLog window by selecting the point from the list and clicking on the **Override** button at the bottom left of the window.

	,	,			
Point No	Point Name	Point Type	Value	Override	Time
002	Heating Water Temp	Analog	0.01		15:44:08
003	Outside Air Temperature	Analog	0.01		15:44:09
1					
Overside	1	Stop	Scan	Clear	
	_				

This opens the **Override Hardware Point** dialog, where the current override status of the point is displayed and can be changed if necessary.

MANUALLY OVERRIDING POINT VALUES - THE OVERRIDE POINT DIALOG

OVERRIDING POINTS

Point values can be overridden using the **Override Hardware Point** dialog, which allows you to set a point in a strategy to a particular value, regardless of conditions at a controller's inputs or outputs, or conditions within the strategy itself.

- When a hardware **output** is manually overridden (disabled), the modules in the **strategy** do not affect the point value.
- When a hardware **input** is manually overridden (disabled), the hardware signal which is connected to the input (PT1000, transmitter, dry contact, etc.) is ignored by the input.

In both cases, the overridden hardware point keeps the value that is assigned to it in the Override Point dialog.

The only way to change the value of a hardware point which has been manually overridden to another specified value is to use the **Override** option again, assigning a new value in place of the first.

Note: Some specific controllers, such as CBX-8R8-H and FLX-4R4-H, have "HOA" controls built-in to them. When these HOA controls are active, CXpro^{HD} cannot affect them but can display the overridden values, but not affect them.

Removing manual override status from a hardware point (enabling) means that the point can now be influenced by the connected hardware or strategy once again. The length of time that a hardware point will remain in the overridden state can be set in CXpro^{HD}.

It is only possible to disable and enable hardware point values from CXpro^{HD} if the PC is connected to a controller (either directly or via a BACnet Router) and CXpro^{HD} Connect button is active.

Whether hardware points are overridden by the CXpro^{HD} Override Point dialog, or by HOA switches on the Controller itself, CXpro^{HD} is aware of the override state and value and displays it in the LiveLog window.

Point No	Point Name	Point Type	Value	Override	Time		Point No	Point Name	Point Type	Value	Override	Time
209	Anl Output 209	Analog	46.00	HOA	11:31:09		209	Anl Output 209	Analog	15.00	One Hour	11:32:5
						_						
Point No	Point Name	Point Type	Value	Override	Time	F	Point No	Point Name	Point Type	Value	Override	Time
209	Anl Output 209	Analog	15.00	Continuous	11:33:18	2	209	Anl Output 209	Analog	0.00		11:31:39

The point's **Strategy module** has a digital output labeled Override, which is set to a value of 1 if an override is in effect (i.e. the hardware point is 'disabled'), or 0 if the point is not overridden (i.e. the point is 'enabled').



USING THE OVERRIDE POINT DIALOG:

To open the Override Point dialog, either:

1. Right-click on a line or module and select Override Hardware Point Value from the context menu:

1					Subtraction 1	
					A - B - C - D	
τQ				-		
• 🖸	(1)-			Sho	ow Point Route	
				Co	nvert Line to Connector	
2				Sin	nulation properties	
•		Ì		Ov	erride Hardware Point Value	
.0	, -		-	 -	-) G mpan	

AI	Analog Input Named point	1	Subtraction A - B - C - D					
	C	Display Options	ب (
		Override Hardware Point Value						

2. or click on the Override button in the Livelog dialog

Strategy Jarget PhilReal		001 - Network	name	001 - 002 -	CBX-SR8		
Mode Points C Time Schedules	Point No 001	Point Name Named point	Point	Type ig Hardware	Value 1000,00	Override	Time 09:51:0
C Hermon							
Scanning (* JO Points							
C Analogs							
1							

The relevant Override Hardware Point dialog (analog or digital) will open:

Override Hardware Point	Override Hardware Point
Point Type Analog	Point Type Digital
Point Number 1	Point Number 2
Override (• Off C 1 Hour Duration C Midnight C Continuous	Override Off C 1 Hour Duration C Midnight C Continuous
Value 1000,000 Change	Value Off Change
Status Received point value from controller	Status Received point value from controller
Close	Close

The Override Duration can be set to one of the following states:

- inactive at all times Off
- active until the controller time passes 00:00 Midnight
- active for one hour from the time at which it becomes active 1 Hour
- active at all times Continuous
- If the override is caused by a Controller's HOA switch, the override state is reported as "HOA"

The 'Midnight' and '1 hour' options are provided to conveniently avoid problems that could arise if the override is not removed when it is no longer required.

Note:	Even if '0ff' is selected in the Override Duration for Hardware Point section, setting a value (analog) or state
	(digital) for the point will still have an effect. When the Override button on the dialog is pressed, the value is
	sent to the point in the controller strategy, which stays at that value until the next time that the controller
	scans its strategy.

CXpro^{HD} | Points and Point Values

Enter a value for the point.

In this instance, a value of 100 is being is being entered for an analog point.

A value of Off or On can be entered for digital points.

Select the length of time that the value of the point will be changed in the Override Duration for Hardware Point section of the dialog.

The point will be set to the entered value when the **Change** button is pressed:

Click the Close button to close the dialog.

Notes about overriding BACnet points

Inputs

When an input is overridden via $\mathsf{CXpro}^{HD},$ both the "out of service" and the "override" flags are automatically set.

When an overridden input comes out of its CXpro^{PD} override both the "out of service" and the "override" flags are reset. It will be put into service regardless of the state it was in prior to going into override.

To override an input via BACnet, the "out of service" flag is manually set by writing to the "out of service" property. Then the desired value is written to the present-value. The OWS can clear any CXpro^{HD} override by putting the point back into service and then back out again. From CXpro^{HD} side, the "override" flag will disappear and be replaced with an "overriden" flag.

Putting an input in service will clear all overrides both CXpro^{HD} and BACnet and will flag the change appropriately on both protocols.

Outputs

When an output is overridden via CXpro^{HD}, both the "out of service" and the "override" flags are set. The information in the present-value property will still be delivered to the hardware layer despite being out of service.

When an overridden output comes out of its **CXpro^{HD}** override, the point is put back in service, and both the "out of service" and the "override" flags are reset.

To override an output via BACnet, it is presumed that the priority array will be used, and clear all overrides and flag the change appropriately on both sides.

All I/O blocks have an output labeled **Override**. This output is true any time the point is "out of service" or "overridden" via **CXpro**^{HD}. This way the point reflects the status of the data regardless of whether it is being overridden via BACnet or **CXpro**^{HD}.

Value	100	Change
Value	Off 💌	Change
Override Duration	⊙ Off C Midnight	C 1 Hour Continuous
Value	100	Chartse

HOW TO ENABLE A HARDWARE POINT VALUE (REMOVE MANUAL OVERRIDE STATUS)

Removing manual override status from a hardware point (enabling) means that the point will once again respond to hardware connections or strategy conditions.

If the override duration on a hardware point has been set to 1 hour or until Midnight the point will be enabled when the specified period has elapsed. However,

- If the override is identified as "HOA" you must use the switch on the Controller to disable it.
- if the override duration has been set to Continuous the following procedure must be carried to enable the point:

Open the Override Point dialog by selecting Change Point from the Controller tab of the Ribbon or by clicking on the Override button in the Livelog dialog, and select the point to be overridden.

Select the **Off** option in the **Override Duration** section of the dialog,

Click the Change button to apply the change.

Click the Close button to close the dialog.



If you opened the **Override** dialog from the **Livelog** dialog, then to see the new value of the point, click the **Restart** button.

The next time the LiveLog scans that point, its new value will be displayed. The LiveLog window displays the symbol ¶ beside the value of points that have been changed.

Note:	Double-clicking a point number in the LiveLog window places an asterisk beside it allowing it to be
	monitored more effectively.

HOW TO CHANGE THE VALUE OF A SETPOINT

The value of a set point can be changed using the Change Set Point Value dialog box, in a similar way to changing the value of a hardware point.

The procedure for changing the value of a setpoint is as follows:

To open the Change Set Point Value dialog either:

1. Right-click on a setpoint module or the line and click Change Setpoint Value option from the context menu:

• •							•				•	•	
0 🚮	Digita	Setpoint		1			•	·					
	Digital	l Setpoint I Setpoint											
	Change Set Point Value						1						



2. or click on the **Override** button in the **Livelog** dialog:

Point No	Point Name	Point Type	Value	Override	Time
002	Heating Water Temp	Analog	0.01		15:44:0
003	Outside Air Temperature	Analog	0.01		15:44:0
		Stop			

The relevant Change Set Point Value dialog (analog or digital) will open:

Change Set Point Value	Change Set Point Value
Point Type Analog	Point Type Digital
Point Number 2	Point Number 1
Value 0.00 Change	Value Off Change
Status Received point value from controller	- Status Received point value from controller
Close	Close

Enter a value for the point.

In this instance, a value of 100 is being is being entered for an analog point.

A value of Off or On can be entered for digital points.

The point will be set to the entered value when the **Change** button is pressed:

Click the Close button to close the dialog.

If you opened the **Override** dialog from the **Livelog** dialog, then to see the new value of the point, click the **Restart** button.

The next time the LiveLog scans that point, its new value will be displayed. The LiveLog displays the symbol ¶ beside the value of points that have been changed.

Note: Double-clicking a point number in the LiveLog window places an asterisk beside it allowing it to be monitored more effectively.

Value	100		Change
Value	Off	•	Change
Value	100		Charte

MANUALLY CHANGING A MULTI-STATE VALUE

As a tool to test a strategy, it is possible to manually set the value of one of the priorities in a Multi-state Value's priority-array when connected to the site.

- This is intended for testing only, and must be manually reversed when no longer required.
- The Multi State Value module must be on the running strategy to change the value this way.

To change a Multi-state Value (MV):

Right-click on a Multi State Value module and select Change Multi State Value from the context menu.



This will open the Change Multi State Value dialog:

Change Multi St	ate Value	
Point Type	Multi State Value	
Point Number	21	
Present Value	3 : Open	Get Present Value
Priority Value	3 : Open 💌	Change
Priority	16 -	Get Value
		Clear Priority
Status Received poin	t value from controller	,
		Close

Select one of the configured State Texts from the Value dropdown menu and specify a Priority to read from / write to the priority-array property of the MV object.

To read the current value at the selected priority from the MV object, click the Get Value button.

To change the value at the selected priority to the specified value, click the Change button

To write NULL to the selected priority (i.e. to clear the current value) click the Clear button.

The Get Present Value button will read the present-value property and the current highest priority of the MV object.

6 Creating Strategies

WHAT IS A STRATEGY?

An **ABB Cylon**[®] Field Controller interacts with HVAC and other equipment by varying its outputs in response to inputs such as temperature, switch settings, air flow speed, etc.

The way that the controller's outputs react in response to the controller's inputs can be defined by the user. The definition is called a 'strategy'.

A strategy is the 'user program', stored in an **ABB Cylon**[®] Field Controller, which configures the controller for a specific role in a BMS site. It can be described as the "implementation of a solution to a requirement on a site".

In **CXpro^{HD}**, a strategy is designed graphically using the algorithmic modules available on the **modules** panel. It is saved as a strategy file on the Engineering PC and then downloaded to the controller for which it was designed, where it tells the controller how to behave within the BMS site.

The simplest of strategies is made up of algorithmic modules, hardware, and virtual points. Strategies are often more complex, however, and can also include time schedules, trendlogs, and alarms.

AN EXAMPLE OF A STRATEGY

The Problem

The heating system of a building is too costly to run constantly.

The Solution

The heating system should be switched off when the outside air temperature rises above a certain point (for example 23° C). It should not be switched on again until the outside air temperature drops below another predefined point (in this case, 18° C).

The Strategy

A strategy to implement this solution to the problem can be designed in **CXpro^{HD}** and downloaded to the controller connected to the heating system, where it will be applied.

The strategy shown below uses the Hysteresis module to compare the outside air temperature to the two set points defined in the module (in this case, these are set at 18 °C and 23 °C). If the outside air temperature is greater than 23 °C, the H output is unset (off). If it is less than 18 °C, the H output is set (on).

The strategy is saved and then downloaded to the Field Controller connected to the heating system.



HOW TO CREATE A STRATEGY

To create a strategy, follow these steps:

• Select Site, BACnet Router, and Field Controller in the Site List and double-click to open its strategy:



• If the selected Feld Controller does not already have a strategy, you will be prompted to create a new one:

✓ Connect ▲ Copy ↓ ✓ Disconnect Download ▷ Pasta ↓	B BACnet Points IO Reorder MBACnet Units Strategy Details Strategy Strategy Strategy Macros	Start/Pause Stop Rest Configuration	Grid Grid Grid Grid Colour Grid Colour Background Colour Display	
Site List □ 区		Propertie	s 🔍 🛛 Modules	0 🗙
BACnet IP			Favorites	+
· 토 001 - Network			Constants	•
001 - 001 - UCU3213V 001 - 002 - CBM24			Controls	•
표- 문_ BACnet Serial			Functions	•
由 聖_ Sample Apps BACnet			Math	•
			Schedules, Timer	s, and L 🕨
			Setpoints, Inputs	, and 0 👻
	Engineering Centre	×	Al Analog Inp	ut
	There is no Associated Strategy with this of	unterline Constant and	AO Analog Out	put
	Strategy?	ontroller. Create a new	Analog Set	point
			Salution Sector	
		Yes, No	🖡 🎳 BACnet Ana	log
			BACnet Analog P	riority Array
			BACnet Bin	ary
			BACnet Binary Pr	ioriby Array
			DI Digital Inpu	ıt
			DO Digital Out	put
			<u>ீட</u> ீ Digital Setp	voint
			Statistics	•
			VAV	•
			Virtuals	•
< >	Connected to: Sample Apps BACnet (3), Remot		100% OVR	

• Click Ok to open a blank strategy



• Select a module from the modules panel

The module is now on the drawing area. It can now be moved, deleted, copied, or linked to other modules.

CXpro^{HD} | Creating Strategies



To operate on a module, it must be selected by left-clicking on it,



or by dragging a selection box around the module symbol (or symbols)



Once a module has been selected, it can then be:

move d	by using the mouse to drag the module to its new location;
delet ed	by pressing the [DELETE] key on the keyboard;
cut	by pressing [Ctrl] + [x] on the keyboard
copie d	by pressing [Ctrl] + [c] on the keyboard
paste d	by pressing [Ctrl] + [v] on the keyboard

Note: Pasted hardware point modules may adapt some parameters to the destination point but retain others. For example, an analog input configured as PT1000 when pasted to a UniPut[™] will change to a voltage input but retain the max and min limits (in the Advanced button) which for PT1000 could be min 0 and max 0, leading to incorrect operation of the UniPut[™].

PLACE ALL THE REQUIRED MODULES ON THE DRAWING AREA AND JOIN THEM

Place other modules required to implement the strategy on the drawing area.

Modules must be positioned from left to right on the drawing area. Hardware inputs must go on the left side of the drawing area, hardware outputs on the right. Between the inputs and the outputs, organize the modules so that a signal flows from left to right across the strategy.

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				AI			Anal 'em					3				Ŋ	-		Hys	tere	sis	15] .			D	0)	igita atin				9		
								_	0		oint ride				6) In	put					h [] // []				£	Po	int		0	verri	ide (3		
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+ -																																			
<	Ĺ		ĺ.																															>	Ť

Join the modules together as required, by placing the mouse pointer over module inputs or outputs

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																																				,	~
				AI			Anal emp				3				D	-		Hys	stere	esis		1					D	0		Digit leati				9	ן ו		
								╞	c	oint ride	10			6) In	put				Activ Activ		gh (w (_				٦	Point	t		1	C	verr	ide 🗗	3		
				-	-	-	-							0	n le	vel:	2.0); O					_														
								÷.				÷									÷.																
																																				1	4
<																																				>	

and dragging to another modules output or input.

 AI Analog Input 3 Temperature	I I I I	Hysteresis 15	 DO Digital Output 9 Heating Enable	
 Point 🛇 Override 🖓	() Inp	ut Active High 🖸 Active Low 🔽	Point Override	
		el: 2.00; Off level: 4.00		

CXpro^{HD} displays lines between linked modules:

Analog Input 3	Hysteresis 15	DO Digital Output 9
 Point Orac	O Input Active High	Heating Enable
 Override 🖸	Active Low	
	On level: 2.00; Off level: 4.00]

If you cannot see a line connecting the two modules, right-click on the drawing area and select Display Options > Display Lines > Show All Lines from the menu that appears

1	· ·				 	
		Display Options	×	Display Lines	Show All Lines	
¢ 🛇 1				Display Labels	Hide Al Lines	

Continue joining modules until all the required connections have been made.

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			[A				alog npe				3] [ſ	Ţ			Hys	tere	esis			15							DC)			ital (ut able	<u> </u>	9		
			h	_	_	_	_	Ť	_	_	Poin	:6				-	0	Inpu	ut	_			Activ	re H	ligh	П	(9)	1	1	1			ЛP	oint		_	T	_	Ove	rride	П		
								F	_	Ove	rride	• [1 (3)			(2)	-	-					Acti	ve L	.ow	ī	(2)				.(2)[_	_	_	-	-	-	_	_	_		
				_	_	_	_		_	_	_						On	leve	al: 2	.00	; Of	f le	vel:	4.0	0																		
																																											~
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Automatic point selection

When two unconnected modules are linked together, **CXpro^{HD}** automatically selects the next available virtual point. This is the lowest numbered unused point. This number is entered in the two modules that are linked, as an input and an output, and it is also displayed at either end of the connecting line. In the example below, the number of the virtual point connecting the two modules is 1 and it is displayed at both ends of the connection:



If you cannot see the point number at either end of a connection line, click Module Setup from the Display menu. right-click on the drawing area and select Display Options > Display Labels > Show Number from the menu that appears

] [•		•	•			•	•	:	:		:	-		•	1	:					•			•					• •
	Di	spla	ay C	Opt	ion	s		•			Di	ispl	lay	Lin	es			•	Ŀ												
	Г							÷			Di	ispl	lay	Lak	oels	;		۲		H	lide										
																		-		5	ho	KN	lum	be	r						
	ŀ																	ł		5	h٥	NY.	lam	e							
٦.	Ŀ																	G		5	ho	٧ v	alu	e O	nly	(sir	mul	latio	on)		
	Ē		-	-		-			-									0	PV		_		-	-	-	-	Л				
] : : : : : : : :] .		□]		Display Options						Disp	Display	Display Lat	Display Labels Hide Show	Display Labels Hide Show N Show N Show V C	Display Labels Hide Show Num Show Valu	Display Labels Hide Show Numbe Show Value O	Display Labels Hide Show Number Show Name Show Value Only	Display Labels Hide Show Number Show Name Show Value Only (sin	Display Labels Hide Show Number Show Name Show Value Only (simu	Display Labels Hide Show Number Show Name Show Value Only (simulati	Display Labels Hide Show Number Show Name Show Value Only (simulation)	Display Labels Hide Show Number Show Name Show Value Only (simulation)						

When the output of a module which is already connected is connected to the input of another module, the point number of this output will be written in the input.

Selecting a connection line

To select a line connecting two modules, click the line with the left mouse button. Selected lines are displayed with a green highlights. Selected lines can then be:

moved	by using the mouse to drag the line to its new location
deleted	by pressing the [Delete] key on the keyboard

When a connection line is deleted, the point number in the input of the target module will be removed.

If this connection was the only one for the output of the source module, the point number will be removed from there too. The point will now be available for other connections.

Naming a point

To give a point a name, select it and then edit the text in the Name property on the Properties pane.



When finished, press enter and the name will be displayed on the module in the Drawing Area.



The name can have no more than 24 alphanumeric characters. Spaces, commas, and full stops may also be used. Each point in a controller must have a point name that is unique in that controller.

Assigning a unit to a point

In the case of Analog points, the **Units** list box (which is displayed in **Properties** pane) contains a collection of text strings, one of which will be displayed together with the point value.

To specify a type of unit for a point, select the line that represents it, and select a value from the Unit list.

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																				^		<	$\langle \rangle$?									-	1
																							Poi	nt De	tails			1	Analog	(3) T	empera	ature (°C	1	
																								Num	nber			3	3					-
	١	_		alogi			_	3	Ľ				Γ	Π		_	Hys	tere	rsis					Туре	2			1	Analog					
Ľ			Ter	nper	atu			_					Ŀ					_						Value	e			(0.00					
				\vdash	_	P Over		0	(3)			.(ŋ¢) In	put				Activ Acti					Nam	ne				Tempe	rature				
		_	_			over	nce	5					6	n le	vel:	2.00); ()	flev						Unit					°C				~	,
													1	1			1							olay I	Prope	rties			Fdays					
																							Sho	w Lir	ne				ears					
																							Lab	els					Nonths					
																													Veeks Jays					
																													lours					
		-		Ana	loa	Inpu		_	2													U	nit					Ň	/lin					
	A			Ana leati	ng Fen		er															Tł	his is t	the u	init of	measi	ire for							
					T	up.	P	oint	0																				n/s					
					H	_	-	- 1	0	(2)										~	Į.							k	m/h					1

If the point is a digital point, select the required unit in the Low Unit and High Unit list boxes. The units of a digital point are text strings, which are displayed instead of the digital values 0 or 1.



If the list does not contain the unit you require, additional application-specific units can be entered manually in the c:\CXproHD\(SITENAME)\SYSTEM \site.ini file. For details on how this is done, see Appendix :: Adding units of measurement to the system on page 207.

Additional units of measurement can also be added if points are defined using the shortcut method (see *A short cut to defining hardware points* on page 79). When the tab (or comma) separated list of point definitions is prepared, units of measurement which are not already defined in

C:\CXproHD\(SITENAME)\SYSTEM \site.ini can be used. When the definitions are pasted to the Database Interface, the new units of measurements will be added automatically to site.ini.
CREATING STRATEGIES - SET THE VALUES OF THE MODULE'S CONSTANTS

Many modules can be configured by setting internal constant values. These are accessible in the Properties pane when the module is selected. For example, the **Timer with Constant Inputs** module has the following properties:

	\triangleright ×	Properties	д 🗙
Timer with Constant 16	· · · ^	< > ? General Information	•
Trigger Output 🖸			Time with Constant law to
Reset Complement		Type Service Order	Timer with Constant Inputs
On delay: 10; Off delay: 10; Mini			16
· · · · · · · · · · · ·		Synchronised Status	Disconnected
		Inputs	
		Trigger	Digital
		Reset	Digital
		Constants	
		On delay	10
		Off delay	10
		Minimum on time	0
		Outputs	
		Output	Digital
		Complement	Digital
			-
	· · ·		
	•		
	>	Properties Page Names M	odules

CREATING STRATEGIES - ADD EXPLANATORY TEXT IF NECESSARY

Text can be added to the drawing area to label parts of the strategy to explain the purpose of certain modules, or groups of modules, within the strategy,

You can add text or edit text that is already in the strategy drawing. You can also delete, cut, or copy the text in a strategy.

For details see How to add text to a strategy on page 69

HOW TO REORDER BLOCKS IN A STRATEGY

It is possible to change the order of blocks within a strategy, which can help to optimize the servicing process.

From the Site List, right-click on the controller and select Strategy Operations > Re-Order Module Blocks

The professo	191														
PL Office															
ė- 🖳 001 - N		CD1 (24)													
□-= Ho Sample Ap		Open '001_01.s32'													
는 <u></u> Sample Ap															
		Break		llt -											
		Copy Strategy To													
		Strategy operations	•	∎ t	Reo	rder l	Mod	lule	Blo	cks					
		Export Aspect Data				oald									
		Update BACnet EDE Data				npare							er		
	22 - V 🖘	ingle Fump mp		11							_	_	_	_	-

This opens the Reorder Modules tab in the Strategy Details dialog:

lew Line	Service Order	Module	^	-
vew Line				
Strategy Blocks	1	1 - Comparator		
	2	2 - BACnet Schedule		
Controller Limits	3	3 - Absolute Value		
Resources	4	4 - Maximum		
(c)ources	5	5 - Analog Gate		
Points Manager	6	6 - Limit to 0 or 100		
Reorder Modules	7	7 - Rounding		
keorder Modules	8	8 - Integer Constant		
BACnet units	9	9 - Real Constant		
	10	10 - VAV Differential Pressure		
/O Terminals	11	11 - BACnet Schedule		
	12	12 - Holiday Schedule		
	13	13 - Time Schedule		
	14	14 - Comparator		
	15	15 - Hysteresis		
	16	16 - Timer with Constant Inputs		
	17	18 - Real Constant	~	
	Find			

The list shows modules in their Service Order.

Note: Some modules serviced based on a time schedule, not necessarily according to their Service Order. Any modules in the list that are in this category will be highlighted.

Select a module in the list and use the buttons on the right-hand side of the dialog to change its position in the list:

	Move the highlighted block to the top of the list (Service number = 1)
	Move the highlighted block up one position in the list
•	Move the highlighted block down one position in the list
T	Move the highlighted block to the bottom of the list
Find	Highlight the selected block in the strategy drawing.

Repeat until the list is in the required order.

HOW TO UPLOAD SETPOINT VALUES

It is possible for all of the controller values for all setpoints in a single strategy to be retrieved in a single operation.

From the Site List, right-click on the controller and select Strategy Operations > Upload Setpoints



This opens the Upload Setpoints dialog:

Point Name	Address	Type 🛆	Local	Controller
✓ a	1	Analog	0.00	0.00
🗸 aA	2	Analog	9.00	9.00
✓ aB	3	Analog	3.00	3.00

Select the points to be uploaded and click the Update Selected button

NAMING STRATEGY FILES

When saving strategy files, it is recommended that you use a name which indicates the site, the BACnet Router number, and the Field Controller number.

For example, the strategy for the Air Handling Unit controller, which is Field Controller number 1 on the Rooftop subnet (which is BACnet Router number 1) on the Office Block site might be named <code>Office_001-01</code> AHU.STG

HOW TO OPEN AN EXISTING STRATEGY:

A strategy file can only be opened if it is Associated with a controller.

You can open a contoller's Associated strategy in one of the following ways:

1. Double-click on the controller in the Site Tree

1	Site List
	⊡• Sites
	BACnet IP
	🖽 – 🛨 🗖 BACnet Serial
	🖃 📲 PL Office
	🗄 🖳 001 - Network
	님 문_ Sample Apps BACnet 나 3
	🖕 🖳 001 - Wet Systems

.

.

3. Right-click on the controller in the Site Tree, and select the filename



4. Select the controller in the Site Tree, and select Open from the File drop-down

File 🔹 Home	Controller Strategy
<u>N</u> ew	Recent Documents
C Open	1 001_01.s32
Save As	2 C:\CXproHD\\001_03VAV.s32
Save All	
Footers	
Page Size	
I Printer Scaling	
Print Setup	
Print Print	
Licence Details	
🗙 <u>C</u> lose	
	(?) <u>H</u> elp (i) About X E <u>x</u> it
	1113 - CT Single Pump Speed

Note: If the strategy for the selected controller is already opened, all of these options will be disabled (greyed-out).

Note: If you want to open a different strategy file for a controller you must first remove the existing association, then associate the controller with the required strategy.

STRATEGY ASSOCIATIONS

WHAT IS AN "ASSOCIATED" STRATEGY?

Each of the Field Controllers in the Site List can have a strategy drawing file 'associated' with it, which means that CXpro^{HD} is aware of the filename of the strategy corresponding to that Field Controller. When a Field Controller is selected, its associated strategy can be opened by double-clicking, or by selecting from the right-click menu.

The icon representing the field controller changes when the strategy file is associated with it.

The relationships between controllers and strategy filenames for a particular site are stored in the file

```
C:\CXproHD\[siteFolderName]\SYSTEM\associations.xml
```

Note: CBXi controllers at the 'network' level can also have strategies associated with them.

CREATING ASSOCIATIONS

New strategies

When a new strategy drawing is created, a target controller must be selected. When that strategy is saved for the first time, it is associated with the selected target controller.

Existing strategies - manual



A strategy can be associated with a field controller by right-clicking on the Field Controller and selecting "**Select**". A list of all existing strategy files that are eligible to be associated with the selected controller will be displayed.

BREAKING ASSOCIATIONS

Associations can be broken using a toolbar or right-clicked popup menu option; the link between the Site Tree Field Controller and the strategy drawing is removed.

Site List		Π	×
B→S Sites B→B BACnet IP B→B BACnet Serial B→D 001 - Networ L→D 001 - 001 - 001 B→B PL Office B→D 001 - Networ	- UCU3213VAV		
네면, <u>001</u> 주작 표 <u>면</u> , Sample App (주)	Open '001_01.s32' Ctrl+C Configure FLX Hardware Modules Brepk)	
	Copy Strategy To Strategy operations	,	
	Export Aspect Data Update BACnet EDE Data		

If an association is broken for an opened strategy drawing, then the strategy drawing will be closed and the user will be prompted to save it if changes have been made. Breaking an Association allows the User to associate a different strategy drawing to the Field Controller, using a toolbar or right-click popup menu option on the Site Tree Field Controller.

COPYING ASSOCIATED STRATEGIES

From the Site List, it is possible in a single operation to create a copy of the strategy associated with any Field Controller node and associate that copy with another Field Controller node, as long as the target is of a compatible controller type and does not already have a strategy associated with it.

Note: A strategy cannot be copied if it is open and has been modified but not saved (the user is prompted to save the strategy so that the strategy can be copied).

To copy a strategy in the Site List interface:

- Right-click on the source Field Controller node i.e. the controller to which the existing strategy is 1. associated.
- In the pop-up menu, select Copy Strategy To

	□ <u>=</u> PL Office □ <u>.</u> 001 - Netwo 	
	⊞ <u>₽-</u> Sample App 🗁	Open '001_01.s32' Ctrl+O Configure FLX Hardware Modules
		Break
		Copy Strategy To
•		Strategy operations

In the Copy Strategy dialog that appears, click on the Field Controller to which you want the copied strategy to be associated

	Copy Strategy
Copying Strategy '001_01	1.s32' from
Site	PL Office
Comms Controller	001 - Network
Field Controller	001 - 001 - CBM24
습- 🛛 🔂 BACnet 습- 🗌 🖳 001	- Network 001 - 001 - UCU2213VAV Serial

.

The Copy Strategy dialog displays the source Site, BACnet Router, and Field Controller node details as well as the strategy that will be copied.

The To box contains a "tree" list of potential target Field Controllers, grouped by Site. Potential target Field Controllers are those that:

- are of a Controller Type that is compatible with the source Field Controller Node
- do not already have an Associated strategy
- do not have a newly created Strategy

The next available Field Controller node is always selected on the source Site. If no Field Controllers are available on the source Site then no Field Controller is selected and the Site Tree is shown collapsed (closed).

The Copy button is enabled when a Field Controller Node is selected. When it is clicked, a new strategy is created and opened with the contents of the source strategy being copied, including the Database names and Keypad Details. The copied strategy is then Associated with the Target Field Controller node.

IMPORTING A STRATEGY

The Copy Strategy To function applies to strategy files that reside in the current Site file structure. It is possible that files which were associated with a specific folder have been copied to locations outside the Site folders, and will not be found by the Copy Strategy To process. In that case, the Import Strategy function may be used.

To Import a strategy in the Site List interface:

1. Right-click on the target Field Controller node

The target Field Controller is the controller to which the Imported strategy will be associated.

2. In the pop-up menu, select Import Strategy.

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Site List			џ	x
⊡ Sites				
BACnet IP				
BACnet Serial				
🖶 🖳 🛄 001 - Net	work			
	Select			
PL Office				
🔓 🖳 🖸 🗋	New	Ctrl+N		
	Import Strategy			
	6			
	Configure FLX H	lardware Modules		

The system will scan for suitable strategies for import

Import a Strategy	

And display a list of the results.

	Import a Strategy ×
	OK Cancel

Note: It is possible that the list will be blank because a strategy file will only be listed if:

- a. It does **not** reside in the current site.
- b. It has the correct embedded site, BACnet Router address, and field controller address.
- c. It is not already associated with any controller.

You cannot for example import a strategy from controller number 006 on BACnet Router 5 on a remote site onto controller number 005 on BACnet Router 5 on the local site. Neither can you for example import a strategy from controller number 006 on BACnet Router 5 on a remote site onto controller number 006 on BACnet Router 2 on the local site.

i.e. The file to be imported must have originated on the same controller on the same site.

3. Select a strategy file and click **OK**. The strategy will be copied to the current site, and the copy will be associated with the selected controller.

OPENING MULTIPLE STRATEGIES

CXpro^{HD} allows you to have several strategies open at once. Each strategy must be opened individually as described above. Each strategy can be minimized, maximized, and arranged in a number of ways in relation to the other open strategies.

DOWNLOADING A STRATEGY

When you have created a strategy in CXpro^{HD}, you must download it from CXpro^{HD} to the targeted controller before it will function.

Note: When downloading a strategy to a controller, CXpro^{HD} automatically wipes the controller's memory and sends set-up.

All downloads currently require a cycle of outputs, but by using this feature with certain modules, you can change constants and get around the outputs issue

Note: The targeted controller should not be powered down for at least 40 seconds after a strategy write has been initiated by any of the methods below.

To download a strategy to the targeted controller:

- 3. Open the strategy and connect to the controller
- 4. Download the strategy
- Note: When you download a strategy to a BACnet controller from CXpro^{HD}, any configuration that has been set by a separate B-OWS e.g. an Alarm Recipients list will be **wiped**. You must re-download the Alarm Recipients list, and any other B-OWS specific configuration after the strategy download is complete.

Note: Downloads generally require outputs to cycle, but in v1.04 and later, certain modules have a feature to change constants without this cycling.

In these modules a button is available at the top of the modules panel to download any changes to the highlighted constants parameters, without cycling the controller outputs:



Note:

Diaital 57: false Living Room Ov

te: Download of constants will only be possible when all other module parameters are synchronized between the **strategy** and controller.

The following modules may have their constants downloaded at run-time without causing a cycle of the controller outputs:

- Hysteresis
- Tuneable Hysteresis
- Enthalpy
- Boolean
- Forward PID
- Reverse PID
- Tuneable Forward PID
- Tuneable Reverse PID
- Real Constant
- Integer Constant
- Digital Extract
- Time Proportional Driver

- Raise Lower Driver
- Digital Constant
- Long Timer
- Minimum Off Timer
- Holiday Schedule
- Make Linear
- HX-Diagram
- Runtime
- Damping
- Rounding
- Control Changeover
- BACnet Accumulator

- Trigonometric Math
- Cooling Optimizer A
- Heating Optimizer A
- Heating Optimizer B
- Deadband Variable
- CBT Stat
- Custom PID
- VAV Actuator
- VAV Flow Calculation
- Analog Multiplexer
- Timer with Constant Inputs
- Digital Multiplexer

- Bitwise Logic
- Duty Standby
- Analog Select
- Out Of Range
- EquationStaging
- StagingMeter
- Alarm

Open the strategy and connect to the controller

Select the target controller in the Site List and open its associated strategy by double-clicking or selecting Open from the File menu or right-click menu.

Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

	Ŧ						
File	• [Home	Controller	Strat	egy		
ø	Con	nect onnect	Copy	Į.		Modules	Strategy
N ²⁴	Disc	onnect	Select All	Site List	Navigation		Reopen
	Sit	te	Clipboard			View	

Download the strategy

Download the strategy to the targeted controller by clicking on Download in the Controller tab of the Ribbon

Controller	Stra	ategy	
🍓 Communica	tions	📩 Download	[<mark>김</mark> Com
😼 Controller		Download Wipe Controller	-?- Shov
BACnet		💾 Auto Online	
Configuratio	n		

When you use Automatic Download, **CXpro^{HD}** automatically deletes all previous points and strategies from the controller as these could conflict with the strategy being downloaded. It then downloads the strategy and sends the set-up (i.e. it informs the controller of the number of blocks it must service in the strategy).

Downloading			Х
Controller			
Hardware Points		16	
Strategy Blocks		500	
Analog Setpoint Values		389	
Digital Setpoint Values		314	
BACnet Point Config		212	
Sending BACnet data via file tra	Close	Abort	

While this is happening, the **Downloading** window is displayed.

The progress bar at the top of the **downloading** window shows the progress of the download, while the status box (at the bottom of the window) tells which of the three stages in the download process (wiping the memory, downloading the strategy or sending the set-up) **CXpro^{HD}** is currently completing.

The Downloading window also includes a Complete box, which displays the number of the block of the strategy, analog point or digital point that is currently being downloaded. In the above example, the progress bar shows that the download is 79% complete, the complete box tells us that CXpro^{HD} is downloading block number 251 of the strategy and the status box tells us that CXpro^{HD} is busy downloading the strategy to the controller.

Wipe the controller's memory

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Wipe the controller's memory by choosing Wipe Controller from the Controller tab on the Ribbon.



This opens the Wipe Controller dialog box, allowing you to choose individual parts of the controller memory to be wiped

Wipe Controller ×				
Clear Strategy Clear Schedules Clear Points Clear Hardware Point: Clear Modem Strings Clear Keypad				
Clear BACnet Data Number of datalogs Wipe All	BACnet Options No change			
Current Status				
	Wipe Close			

Click Wipe to close the Wipe Controller box.

CXpro^{HD} will display a message to confirm that the controller's memory has been wiped. Click OK to close the message box.

CXpro^{HD} | Creating Strategies

How to check the controller type to which you are downloading

To find the type of the controller to which you are downloading, open the Strategy Details dialog by clicking on Strategy Details in the Strategy tab of the Ribbon



Click the Controller Limits tab.

Strategy Details		\times
Display New Line Strategy Blocks Controller Limits Resources Points Manager Reorder Modules BACnet units I/O Terminals	Controller Type CBX-8R8 Number of Modules per Strategy 1024 Number of Datalogs per Strategy 64 Inputs 0 Universal Inputs 0 Digital Inputs 0 Analog Inputs 0 Variable IO 16	
	OK Cancel Apply	

In the example shown, the Controller Type box shows that the selected controller is a CBX-8R8 controller.

Edit the strategy

Edit the strategy by placing and joining the required modules on the drawing area and editing their values and units.

Download the strategy

When you have completed the strategy, you must then download it.

Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

💻 👳		
File - Home	Controller	Strategy
S Connect	Сору	Properties Modules ? Strategy
Jisconnect	Paste	Site Navigation Macros Reopen
	Select All	List Page Names 🔍 Search
Site	Clipboard	View

Download the strategy to the targeted controller by clicking on Download in the Controller tab of the Ribbon

	Controller	Stra	ategy	
	👆 Communicat	tions	📩 Download	Compare
	Controller		Wipe Controller	Show Compare
	BACnet		🛃 Auto Online	
	Configuratio	n		Ope

A warning is displayed:

Warning: Downloading will wipe the controller a Continue?	and cycle the output:	
Do not ask me again during current session.	Yes	No

The Downloading window will appear, to display the progress of the download.

Downloading		×
Controller		
Hardware Points	1	16
Strategy Blocks		500
Analog Setpoint Values		389
Digital Setpoint Values		314
BACnet Point Config	2	212
Sending BACnet data via file tra		Abort

When CXpro^{HD} has downloaded all the blocks that you specified, it will automatically close.

STARTING A STRATEGY (SENDING THE SETUP)

When the memory of a Field Controller has been wiped and the strategy has been downloaded to it, the Controller must be told how many blocks are to be serviced. This is called the Setup of the strategy. Sending Setup is also referred to as **starting the strategy**. If you are using Automatic download, **CXpro^{HD}** sends the Setup automatically when you download a strategy to the controller. Otherwise, you must send the Setup as described below.

Select the Controller in the Site Tree, and connect to it by clicking on the Connect button in the Controller tab of the Ribbon



Open the Controller Configuration dialog by clicking on Controller in the Controller tab of the Ribbon



Controller Configuration				
Number Of Strategy Blocks To Service				
Last Composed Time 14:00:16 Time 1	Receive			
User ID 0 User Name Strategy ID 0 Drawing Reference				
Min Service Time 0 Time Synchronisation Wait After 0				
Current Status Attention ! Error receiving setup.	Close			

The number in the Number of Strategy Blocks To Service box, X (which is automatically entered by CXpro^{HD} but can be changed by the user), activates the first X blocks of the strategy in the Field Controller. This number, X, must be greater than or equal to the number of the highest numbered block used by the strategy. Otherwise, the parts of the strategy which occupy blocks with a higher number will not be serviced, and their point values will not be updated, which may cause the strategy to fail.

Note:	on Strategy Detail r Strategy Copy Paste Select All Clipboard Strategy Details	Is in the Strategy tab of the Ribbor	n gy Viev	ategy, open the Strategy Details dialog by	Cheking
	Display New Line Strategy Blocks Controller Limits Resources Points Manager Reorder Modules BACnet units I/O Terminals	Number Type 1 Comparator 2 BACnet Schedule 3 Absolute Value 4 Maximum 5 Analog Gate 6 Limit to 0 or 100 7 Rounding 8 Integer Constant 9 Real Constant 9 Real Constant 10 VAV Differential Pressure 11 BACnet Schedule 12 Holday Schedule 13 Time Schedule 14 Comparator 15 Hysteresis 16 Timer with Constant 17 Not Used 18 Real Constant 19 Adder/Scaler	^		
			OK Cancel	Αροίγ	

The Strategy Blocks tab lists all blocks in the targeted controller. The highest block number that is marked as used is the number of blocks the controller must service.

The Last Composed section of the Controller Configuration dialog automatically contains the current PC time and date. If the strategy is uploaded later, this time and date will indicate when the strategy was started.

The User ID parameter allows the application engineer to enter a unique identifying character. If the strategy is uploaded later, this number will indicate who started the strategy.

In the User Name field, the engineer can enter the name of the person that started the strategy and this can be retrieved from the controller if the strategy is uploaded. A string of up to sixteen characters can be entered in this field.

In the **Drawing Name** field, the name drawing can be entered. It is recommended that the name of the drawing containing information relevant to the strategy is stored here. If the setup is uploaded from the controller the drawing name will be displayed in this field.

The effects of sending the setup

Sending the setup to a controller has the following effects:

- All blocks entered in the Number of blocks to service section will be serviced, even if they are not occupied by modules. For example, if you entered 100 as the number of modules to be serviced, the first 100 blocks will be serviced by the controller.
- A controller that is sent a setup with blocks to be serviced, but without any strategy, will not send any output signals and will not read any input signals.

Note: If a strategy is downloaded after setup is sent, the strategy is serviced immediately. This means the outputs will receive values from the strategy immediately after downloading. It would be preferable to download the strategy before sending setup since untested strategies can cause problems in devices connected to the outputs if the output values are unstable or incorrect.

- Output points of modules that occupy serviced blocks take their values from the module.
- If the controller is running without a network (stand-alone), the green LED is constantly illuminated.
- If the controller is running on a fieldbus (connected to a BACnet Router), the green LED flashes with regular pulses.
- An alarm appears on the monitor of the connected PC if the alarm feature is active.
- The keypad program, if one exists and has been downloaded to the controller, will be started.

TESTING A STRATEGY WITH SCAN MODE

It is important to test a strategy at various stages in its creation, to check for mistakes or faults in its design. This is done by using Scan mode.

PREPARING TO TEST A STRATEGY

To test a strategy the following conditions must be satisfied:

- The strategy must be open (see How to open an existing strategy: on page 112).
- The strategy must have been sent to the controller (See Downloading a strategy on page 116).

Note: Make sure that the downloaded strategy and the open strategy are the same.

• The strategy must have been started (see *Starting a strategy* on page 121).

HOW TO TEST A STRATEGY

In Scan mode, CXpro^{HD} allows you to view the changes in values in a strategy as the strategy is serviced in the controller. This is useful for testing strategies and parts of strategies for correct operation. In Scan mode, the point values of an uploaded strategy are read by CXpro^{HD}, displayed next to their respective inputs/outputs, and updated in real time.

To activate scan mode:

- Open the strategy and Connect to the controller by clicking the Connect button on the Strategy tab of the Ribbon
- Display the strategy's point and constant values (page 124)
- Set the Scan mode (page 124)
- Activate scan mode (page 125)

In scan mode, the variable point values of a strategy are updated in real time as they are serviced by the strategy and displayed clearly in the module symbols on the drawing area. In the **Rescale to 0 or 100** module of the example above, the values of the 3 input points were changed to 10, 20, and 149.86, and its output was changed to 100 as they were serviced by the strategy.

• Watch the changing values of the modules in scan mode to ensure they are being serviced correctly by the controller.

How to Display the strategy's point and constant values

Display the point and constant values of the strategy by right-clicking on the Drawing Area and select Display Options > Display Labels > Show Value Only (simulation)

	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
			Di	spl	ay (Op	tio	ns		1			[Disp	olay	Lir	nes			►	
Ì													[Disp	olay	La	bel	s		•	Hide
	•											-									Show Number
																					Show Name
																					Show Valဖုe Only (simulation)
							·										·		·		

Setting the Scan mode

CXpro^{HD} can scan either the current active strategy or all of the currently open strategies. To set this, open the Applications Settings dialog by clicking Communications in the Controller tab of the Ribbon



Select the Scan Options tab in the dialog, and select either the Scan Active Strategy or the Scan all Strategies radio button.

Application Settings	>	<
Application Settings Download Options Scan Options Strategy Settings BACnet Configuration Serial Port Connection Commands Livelog	Strategy Scan © Scan <u>A</u> ctive Strategy © Scan all Strategies BACnet Properties Time Between Scan (s) 30	
	OK Cancel Apply	

Click OK to close the dialog.

Activate scan mode

Begin scanning by clicking Scan in the Controller tab in the Ribbon.

- <u></u>		Crip.0110 1100100 020	
Controller Str	ategy		
🕸 Communications	📩 Download 🛛 🖓 Compare	1.23 Version 🔍 Board Diagnostics	
😼 Controller	Wipe Controller 🚉 Show Compare	Time and Date 🖳 Statistics	40
BACnet	📩 Auto Online	Maximums 🛛 🔓 Lock and Unlock	Scan Override Point
Configuration	Ope	rations	
2			

The CXpro^{HD} window will change to the CXpro^{HD} scan mode window, hiding the Site List, displaying the Page Names pane and disabling all of the Ribbon items except the Scan button



• To deactivate scan mode, i.e. to stop scanning the point values of the strategy, click the Scan button again.

SUGGESTIONS FOR TESTING STRATEGIES

- If a number of modules are selected in the strategy when Scan mode is activated, then only those modules will be scanned.
- The module to be tested must have been downloaded to the controller. That is, the Block number of the module must be within the range of modules which were downloaded to the controller (see *Downloading a strategy* on page 116)
- A strategy should be tested in small steps during the creation process. Simple faults such as selecting the wrong module or joining to the wrong inputs and outputs can be difficult to correct in a finished strategy. There is also the danger that faults can result in other faults appearing in different parts of the strategy or in other controllers.
- At the end of the creation of a strategy, the whole strategy should be tested again. This prevents later problems and time losses during the setting-up process in the site.
- The strategy should be checked module by module from left to right, starting with the hardware inputs and finishing with the hardware outputs.
- Individual strategy parts can be functioning correctly themselves but cause problems when connected to other correctly functioning strategy parts. For example, the direction of analog values may fall in the range of 0 % to 100 % or the range of 100 % to 0 %. Digital values and their inversion may also cause confusion.
- Test a strategy before copying it or using it in another controller. Otherwise, all copies of the strategy will also have to be tested.
- Manually overriding hardware points allows simulation of each environmental situation to which the strategy would be exposed.

SECURING CBM DATA

Unlike other BMS controllers, in the CBM strategy information can be secured against accidental loss or unauthorized modification by password-protecting the ability to view or edit strategy information and system information.

HOW TO PASSWORD-PROTECT A RANGE OF BLOCKS IN A CBM STRATEGY

To lock a range of blocks in a strategy, select Lock and Unlock from the Controller tab of the Ribbon.

Controller Stra	itegy			
Communications	📩 Download 🛛 🖓 Compare	1.23 Version	Board Diagnostics	E
Controller	Wipe Controller 🚉 Show Compare	🖥 Time and Date	Statistics	-(
BACnet	🛃 Auto Online	Maximums	Lock and Unlock	Sci
Configuration	Ope	rations		

This opens the Lock and Unlock dialog

Lock and Unlock	×
Enter Password	Lock
,	Unlock
Current Status	
	Close

Enter a numerical password (note: the Enter Password field will only accept numbers) and click Lock

Lock and Unlock	×
Enter Password ****	Lock
	Unlock
Current Status	
	Close

The Lock Blocks dialog opens. Specify the start and end of the range of blocks that will be protected:

Lock Blocks
Enter Start Block 12 ÷ Enter End Block 24 ±
OK Cancel

Click OK to close the Lock Blocks dialog

When the lock command has been received by the controller a confirmation message is displayed in the Lock and Unlock dialog.

All of the strategy blocks within the specified range are now locked, and cannot be accessed until they are unlocked using the password set above.

HOW TO ACCESS LOCKED STRATEGY BLOCKS

If a range of strategy blocks in a **CBM** controller have been locked, it is only possible to access, view, and edit them by first unlocking them, using the password set during the locking process.

To remove password protection from a locked range of strategy blocks, select Lock and Unlock from the Controller tab of the Ribbon.

Controller Stra	ategy				
Communications	📥 Download	Compare	1.23 Version	Board Diagnostics	
Controller	Y Wipe Controller	Show Compare	🗟 Time and Date	Statistics	_
BACnet	🛃 Auto Online		Maximums	Lock and Unlock	Sci
Configuration		Oper	rations		

This opens the Lock and Unlock dialog. Enter the required numerical password (set during the locking process) and click on Unlock.

Lock and Unlock	×
Enter Password ****	Lock
Current Status	Unlock
Idle	
	Close

When the blocks are successfully unlocked in the controller, a message is displayed in the Lock/Unlock dialog.

The strategy blocks are now unprotected and can be accessed from CXpro^{HD} as normal.

HOW TO EXPOSE POINTS ON A BACNET SYSTEM

When the strategy has been configured for a controller that is part of a BACnet Site, the points within the controller that are to be available to the BACnet system must be specified by selecting BACnet Points from the Strategy tab of the Ribbon



The BACnet Points dialog opens, listing all of the points used in the strategy:

BACnet	Export	Point Name	Point Addr	Point Type
~		Room Setting	5	Analog Setpoint
~		MaxHWater	28	Analog Virtual
~		Adder/Scaler Block 19 Output	29	Analog Virtual
~		WeatherCom Block 8001 Inpu	30	Analog Virtual
✓		Heating Water Temp	2	Analog Input
~		Temperature	3	Analog Input
✓		Alarm Enable	2	Digital Setpoint
✓		DigVirt_3	3	Digital Virtual
✓		Schedule No. 1 (On)	4	Digital Virtual
✓		Hysteresis Block 15 Active High	9	Digital Output
Used Avail	mum BAC I BACnet able BACr rt Total	10	Maximum Bir Used Binary I Available Bin	Unit 3
tpoint Li Max I		d Setpoint and BACnet 324	Unexpos	ed 0
		ints / BACnet Points 314	эпскры	10

Tick the checkbox beside each of the points that are to be exposed, then click on OK.

In BACnet, the point name must be unique. In the ABB Cylon® BACnet system, they may not be unique, so Note: some duplicate names may appear in the list. If this is the case, click the Resolve Duplicate Point Names... button. This opens the Resolve Duplicate Point Names dialog, where names can be changed. The BACnet Points dialog also includes columns of the checkbox to identify points that should be included in Note:

any export to ASPECT[®] / INTEGRA[™] – see ASPECT[®] / INTEGRA[™] Export on page 202.

HOW TO VIEW BACNET POINTS FROM A CONTROLLER

You can view BACnet points from a Controller by selecting Upload BACnet Points on the Controller tab on the Ribbon

ne	Controller Stra	itegy						
	😫 Communications	📩 Download 🛛 🔁 Compare	1.23 Version	Reard Diagnostics	5		LiveLog Setup	
ct	😼 Controller	Wipe Controller 🚉 Show Compar	e 🛛 🖥 Time and Date	Statistics	4	-0	LTJ LiveLog Report	
	BACnet	💾 Auto Online	Maximums	Lock and Unlock	Scan	Point	LiveLog 🗣 Upload BACnet Points	Interfa Build
	Configuration	OI	erations				Testing 6	

This opens the **Controller BACnet Points** dialog. The points are automatically uploaded so that they can be viewed, and the dialog shows the progress of the upload and the points that have been uploaded:

Point Name Point .	Point Type	Active Unit	Inactive Unit
s			
bloading BACnet point 41 of 225			
Joading BACher point 41 of 225			
			Clo

7 Naming Objects

WHY OBJECTS ARE NAMED

Objects in the **CXproHD** system, such as controllers, points, time schedules, datalogs, etc. are given names to make them more identifiable. For example, it is easier to recognize a datalog named "Water Supply Temperature" than one named "datalog_1", which is the default name of the first datalog used inside a controller, automatically given by the database.

RULES FOR NAMING OBJECTS

When naming an object in the system, the following rules should be remembered:

- Names inside a controller must be unique.
- Names can have a maximum of 24 characters.
- All alphanumeric characters are permitted, except commas.
- If the name of an object in a controller is changed to a name that already exists in that controller, the name of the original object will be deleted.

PROCEDURES FOR NAMING OBJECTS

The following list contains some of the objects in the system that can be named:

- Sites
- Field Controllers and BACnet Routers
- Points (both hardware points and virtual points)
- Datalog and Time Schedule modules

NAMING POINTS

Types of point

There are three main types of point in the CXpro^{HD} system:

- A hardware point is an input or output of a Field Controller.
- A virtual point is used to save internal information for a controller.
- A setpoint is a type of virtual point, but its value is constant, whereas the value of a virtual point is determined by the strategy.

Hardware points, virtual points, and setpoints can be either analog or digital.

How to name points

Only hardware and setpoints can be named in **CXpro^{HD}**. Virtual points are identified by their block numbers. The procedure for naming or changing the name of a set point is the same as that for a hardware point. A brief summary of the procedure is presented below. (For a more detailed description of how to name a point, see *Defining hardware points* on page 75)

- Open the strategy.
- Select the Point module on the drawing area that is to be named or have its name changed.
- Enter or edit the text in the Name field of the Properties pane.
- Choose Save from the File menu to save the changes made to the strategy.

The Database Interface module can be used to enter/edit/delete names of hardware points non-graphically.

Virtual points which are placed in a strategy as digital setpoints or analog setpoints are points which are controlled from outside the Field Controller. The name of such a virtual point should indicate how its value is passed to it. The following table illustrates this:

Setpoint name	How to set point value is controlled
Outair Temperature_LG	Controlled by 3rd party block
Room Temperature_WG	Controlled by 3rd party block
Set point_KP	Can be changed via the keypad
Gain Factor_PC	Can be changed via PC (B-OWS)

NAMING FIELD CONTROLLER TIME SCHEDULES

Controller Time Schedules are saved and serviced just like modules in a controller. Naming Controller Time Schedules make it easy to locate them for editing, either using the PC, supervisor software, or a keypad.

How to name a Field Controller time schedule

The procedure for naming or changing the name of a Controller time schedule is defined below:

- Open the strategy.
- Select the Point module on the drawing area that is to be named or have its name changed.
- Enter or edit the text in the Name field of the Properties pane.
- Choose Save from the File menu to save the changes made to the strategy.

When naming the schedule, it is a good idea to indicate the module's function. For example, if the module is a time schedule for the heating system of the site, and is set for Monday to Friday only, the module might be named "Heating Schedule (Mon to Fri)".

NAMING DATALOGS

Datalogs are saved and serviced just like modules in a controller. The contents of a Datalog can be viewed and analyzed using the Datalog Manager module. So that they can easily be identified by the Datalog Manager, they are automatically given the same name as the point that they are logging. They are given this name when the point is connected to the datalog. In the **Reports** program, datalogs can be configured and archived.

How to name a datalog

Datalogs are automatically named as soon as they are connected to a point:

Open the strategy that contains the datalog.



Join the datalog to a point by clicking on the point to be logged, and dragging to the Datalog's input:



The name of the Datalog is changed to the name of the point and displayed in the Datalog module in the strategy.

			\vdash	_	Ove	int de l	(3)					. (3	Input Active High (9)	verride [
AI		Ana 「em			re								Hysteresis 15 DO Heating Ena	ble
													Trigger Options: Any Edge; Delta: 1.00: Extended length: 0	
													Datalog number: 1; Update interval: 900; Link: 0; Datalog	
													Log trigger	
													Enable	
												1	Digital input	
							- Ì	Ē	_	-		.(3	O Analog input	
													/V TemperatureA	
													Datalog 17	

If you want to modify the name that is automatically given, you can edit it by selecting the datalog module and editing the Name field in the Properties pane.

It is a good idea to give an indication in the name of what part of the site the datalog belongs to, but it is not necessary to indicate in the name that the module is a datalog, as it will only appear in list boxes allowing the selection of a datalog. Names that are given to only speed up the copying of strategies (for example, "Temp. Channel 1", "Temp. Channel 2", "Temp. Channel 3", ...), and to save time for creating dynamic graphics, are not helpful for the end-user.

Choose Save from the File menu to save the changes made to the strategy.

8 Using Macros

MACROS - OVERVIEW

If your work in **CXpro^{HD}** involves creating the same or similar strategies repeatedly, you'll find Macros useful for reducing the time involved in these tasks. A Macro is a set of strategy modules grouped together into a single unit.

MACROS AND MACRO TEMPLATES

A Macro Template is used to create a macro within a strategy. It is a definition of module types and connections, and when it is inserted into a strategy a new Macro is created containing new instances of those module types connected together to match the Macro Template.

- Each time a Macro Template is inserted into a strategy, a new Macro is created.
- Each Macro is an instance of a Macro Template, but a strategy can contain multiple Macros that are based on a single Macro Template.
- Macro Templates can be stored, and copied between strategies and controllers.
- Each Macro can be configured and adjusted independently of the Macro Template used to create it.
- When a Macro Template is saved, it acts as a CXpro^{HD} module.

Example: An "Adder" macro.

An Adder/Scaler module accepts four inputs A, B, C and D, and operates according to the equation Output = A*C + B*D

It can be made into an Adder, which operates according to the equation

Output = C + D

by ensuring that its A and B inputs are always set to 1. This can be done by connecting a Real Constant module to the A and B inputs as shown below.



This combination of modules can be saved as a Macro Template and reused whenever an adder is required.

MACRO STRUCTURE

Macro Templates are stored in CXpro^{HD} in groups and sub-groups. A maximum of 10 Macro groups can be created. Each Macro group can contain 20 sub-groups and each sub-group can contain up to 100 Macro Templates. In total, 20 000 Macro Templates can be created and stored in CXpro^{HD}.

For example, you may want to store all Macro Templates relating to heat control strategies in a group called Heat. This group may contain a sub-group called Boiler, which would contain Macros for boiler control strategies, such as Optimizer, Heating Curve, etc.

MACRO DESCRIPTION (HELP) FILES

A Macro **Description File** is a Help file generated by the person who created the Macro Template and is associated with the Macro Template (it is opened by right-clicking on the Macro button). It is normally used to describe the function and usage of the Macro Template.

When a user right-clicks on a Macro in the Macro property window, CXpro^{HD} opens the editable description file associated with that specific Macro Template. If none exists, CXpro^{HD} opens a blank text file, which when

saved will be associated with that Macro Template. This file can be used to provide documentation about how the Macro should be used or to record history, author, or changelog details for the Macro Template.

The program used by CXpro^{HD} to open the history file, e.g., MS Wordpad, must be specified in the C:\CXproHD\System\wn3000.ini file under UC16et.

HOW TO CREATE A MACRO TEMPLATE

There are a number of steps involved in creating a Macro Template:

- 1. Create the strategy.
- 2. Add modules to the Macro Template.
- 3. Select the inputs and outputs for the Macro Template and change their names if required.
- 4. Set names for each of the points within the Macro Template if required.
- 5. Choose a Macro group and sub-group and give the Macro Template a name.
- 6. Choose whether to insert the Macro Template into the active strategy as a Macro.
- 7. Save the Macro Template.

The following guide to creating a Macro uses as an example a typical strategy that you might want to save as a Macro – a "**weather compensator**" strategy. As an exercise in creating Macros, you may want to follow this guide, using the **weather compensator** as an example.

CREATE THE STRATEGY

Create the strategy or part of a strategy on which you are basing your Macro Template. (If you are forming your Macro Template from an existing strategy, then **open** that existing strategy).

Example - Weather Compensator macro

For example, if you were to create a Macro Template from a weather compensator strategy, you would place two Real Constant modules and two Rescale to 0 and 100 modules on the drawing area and join them as shown below:

The third input of the first Rescale module (Rescale to 0 and 100) is to be the input of the Macro. It is marked Outside Air Temperature in the diagram below.

The output of the 2nd Rescale module (Rescale from 0 to 100) is to be the output of the Macro. It is marked Flow Temperature Setpoint in the diagram below.



SELECT THE MODULES FOR THE MACRO

The next stage in creating a Macro is to select on the drawing area the modules and any text that you want to be included in the Macro. Selected modules are marked by red squares around their edges.

To select the modules for the Macro, you can drag the mouse from the top left-hand corner to the bottom right-hand corner of the strategy to draw a box around the entire strategy so that each module and its inputs and outputs are selected. It is not a problem if, when drawing the box, you included some unwanted modules – they can be easily removed at the next stage.



ADD THE SELECTED MODULES TO THE MACRO TEMPLATE

Select Create from the Macro section of the Strategy tab on the Ribbon.

er Strategy							
Copy The Paste	View Modules	Add Text	I/O Terminals	BACnet Units	Strategy Help	View Macros	Start/Paus

This will open the Add Modules to Macro dialog box, in which all of the modules that you selected for the Macro Template will be listed.

Modules Selected for	Modules Added to
020 Rescale to 0 and 100 021 Rescale from 0 to 100 022 Real Constant 023 Real Constant 1025 Outside Air Temperature (OA' 1026 A=20, B=80 1027 A=80, B=20	>>> <<
NOTE: Hardware modules can not be added to Macros.	Continue Cancel

Note: A Macro cannot include hardware points, so if any were included in the selection they will not be listed in the Add Modules to Macro dialog.

Note: If you click the macro button or macro menu without first selecting the modules for the macro, you will be prompted to do so with the following error message:



Select the modules in the left list box that you want to include in the Macro by holding down the **[Ctrl]** key and clicking each one with the left mouse button. The selected modules will be highlighted.

Add Mo	odules to Macro
Modules Selected for 020 Rescale to 0 and 100 021 Rescale from 0 to 100 022 Real Constant 023 Real Constant 1025 Outside Air Temperature (OA 1026 A = 20, B = 80 1027 A = 80, B = 20	Modules Added to
NOTE: Hardware modules can not b added to Macros.	e Continue Cancel

Note: For illustration, only the functional modules have been selected in this example. It is also possible to include text in a Macro Template for clarity.

Add the selected modules to the Macro Template using the following buttons:

Add a selected module or several selected modules to the Macro Template



>

Add all modules to the Macro Template

Remove a selected module or several selected modules from the Macro Template

Remove all modules to the Macro Template

This Add Modules to Macro list box displays all the modules that have been added to the Macro Template. If you add a module or modules that you later decide you do not want, you can remove that module or modules from the Macro Template using the remove buttons (see above).

Add Mod	dules to Macro	×
Modules Selected for 020 Rescale to 0 and 100 021 Rescale from 0 to 100 022 Real Constant 023 Real Constant 1025 Outside Air Temperature (OA 1026 A=20, B=80 1027 A=80, B=20	Modules Added to 020 Rescale to 0 and 100 021 Rescale from 0 to 100 022 Real Constant 023 Real Constant	
NOTE: Hardware modules can not be added to Macros.	Continue Cance	1

In this example, all 4 modules of the weather compensator strategy are required for the Macro Template and so they are added to the list box on the right. The text has been excluded in this case but could be included for extra information.

Click Continue... when you have added the required modules to the Macro Template.

DEFINE THE MACRO INPUTS, OUTPUTS, GROUP AND NAME (THE CREATE MACRO DIALOG BOX)

Pressing the Continue... button in the Add Modules to Macro dialog will open the Create Macro dialog box:

		Constant 27		100 B Rescale fro	m 0 to 100 25				
	\sim			0 _ A					Ċ
R Real Constant 26		Output A O 13		🛇 Lower Limit A	Output 🚫				
\sim		Output B 🛇 14		O Upper Limit B					
Output A O 16	A: 0.00; B: 0.00	· · · · · · · · · · · · · · · · · · ·	15	⊘ Input					
Output B O 17 A: 0.00; B: 0.00	B 100 Rescale	to 0 and 100 24							
A: 0.00) B: 0.00	. /	to 0 and 100 24							
	A_0								
[16 O Lower Limit A								
		4							
	🛇 Input								
					and a second				
									>
									-
lacro Inputs/Outputs					Macro Groupin	3			
Inputs	Outputs					_			
					Nai	ne			
					Gro		gacy Macros	· •	
						_	Jacy Macros	· _	
Click a Module node to add Ing	ut Click a Mor	dule node to add O	utput		Sub Gro	up We	et Systems	-	
								-	
						N	Macro Mana	iger	
1									

The Create Macro dialog shows the four modules that were added in the Add Modules to Macro box and allows you to edit input and output names, create Macro groups and sub-groups and create a history file to record any changes that may be made to the Macro Template later.

CXpro^{HD} | Using Macros

Define the inputs and outputs for the macro

This step refers to the Weather Compensator example (see page 134).

When you click on a module output or an unconnected module input in the drawing area of the Create Macro dialog, it is highlighted on the drawing area and added to the relevant Macro Inputs or Macro Outputs list at the bottom of the dialog.



- Note: If you click on a connected input, an error message will be displayed: "Cannot select a module input that is already connected to a line."
- Note: The number beside each module input is the Node number and does not relate to the module number.

Note: The default name for node 3 in the illustration is "Inpu", but this can be edited - see *Change input or output label if* necessary on page 140.

To remove an input or output that has been added to the Macro Template, click on it in the drawing area. The input/output will then no longer be highlighted in the drawing area, and it will be removed from the relevant Macro Inputs or Macro Outputs list.

You can rearrange the order of the inputs or outputs to the Macro, by clicking on an entry in the relevant Macro Inputs or Macro Outputs list and dragging it up or down within the list.

Change input or output label if necessary

By default, the text that will be displayed on the Macro module as a label for each input will be "Inpu" and for each output will be "Outp":



but these names can easily be edited.

To edit a Macro input or output name, select the input/output name in the relevant list box

Outpu	Outputs						
005	Output						
-							
-							
-							

Type a new name in the relevant Name edit box and press [Enter].

An input or output label can have no more than 10 alphanumeric characters.

Outputs					
005	Output				

Name and group the Macro

In order to use a Macro Template that you have created, you must give the Macro Template a name, and assign it to a Macro group so that it can be accessed from the Macro bar.

Macro Name

In the Macro Name box, enter a name for the Macro Template.

The name provided here will appear on the Macro instance when it is displayed on the drawing area. It can have up to 63 alphanumeric characters.

In this example, the name given to the Macro Template is "WeatherCom".

Macro Grouping	
Name	WeatherCom
Group	Cylon Macros 💌
Sub Group	BACnet 💌
	Macro Manager

Note: The following names cannot be used when naming a macro, because they are used to indicate Inputs, Outputs, constants, etc. internally within CXpro^{HD}:

pi (n) where n = a numeric value in the range 0-9
po (n) where n = a numeric value in the range 0-9
sb
c (n) where n = a numeric value in the range 0-9
bc

When the Macro Template is named, choose a Macro group and sub-group for it

Macro Group and Sub-Group

From the **Group** box, select the group to which the Macro you are creating will belong.

The Macro Group chosen for this example is heating.

If no Macro Group exists, you must create a new group (see *How to create a new macro group and sub-group* on page 144) by clicking the Macro Manager... button.

From the **Sub Groups** box, select the sub-group to which the Macro Template you are creating will belong.

The sub-group chosen for this example is **Boiler**.

If no sub-group exists, you must create one (see *How to create a new macro group and subgroup* on page 144) by clicking the Macro Manager... button.

Set names for all points in the Macro



Macro Grouping	
Name	WeatherCom
Group	Heating 💌
Sub Group	Boiler
	Boiler Macro Manager

CXpro^{HD} | Using Macros

When creating a Macro Template, there is a facility to edit the names of all the points in the Macro in a single interface. A Macro Point Configuration button is available on the Create Macro dialog:

Clicking the Macro Point Configuration button opens the Macro Point Configuration dialog:

Simply enter text in the Name column against each point and click the OK button.

Note: If the modules selected when creating the Macro included any Setpoints, it is possible to set labels for specific setpoint values

M	lacro Point Conf	iguration			
	Ма	cro Point Conf	ïguration		
	ame WeatherCom oup Cylon Macros				
Num	Name	Туре	Value	High U	Low U
8		Analog		°C	
9		Analog		°C	
10		Analog		°C	
11		Analog		°C	
12		Analog		*C	
<					
				OK I	Cancel

Note: This is different from setting the Input and Output names (labels) as described in *Change input or output label if necessary* on page 140. Those input and output names are labels displayed on the Macro module; the point names set here are the descriptive names stored for each of the points in the strategy.

CHOOSE WHETHER TO INSERT THE MACRO INTO THE ACTIVE STRATEGY

The Insert into Strategy checkbox allows you to immediately insert a new Macro based on this Macro Template into the active strategy.

If you want to insert the Macro into the active strategy, select this option before saving the Macro Template.

Insert into strategy on save	Sa
-0	

SAVE THE MACRO TEMPLATE

To save the Macro Template, click the Save button.



The Macro Template is saved to the C:\CXproHD\Macros\ directory if it was created in a UCU or UC16 strategy, or in the C:\CXproHD\UC32Macros\ directory if it was created in a CBM or CBT strategy. The group and subgroup information is stored in the macro_database.db file in the same directory.

If you decide not to save the Macro Template, click the Cancel button to close the Create Macro dialog box without saving.

When you save the Macro Template, an entry is added to the Macro pane:



The Macro symbol is the bitmap that represents the Macro on the drawing area. (See *Working with Macros* on page 151).

Τ	WeatherCom		
0	OAT	Dmnd 🛇	

HOW TO CREATE A NEW MACRO GROUP AND SUB-GROUP

Macro Groups and Sub-Groups are defined in the Macro Manager interface.

Open the Macro Manager by selecting Manager from the Macro group on the Strategy tab of the Ribbon

Strateg	у							
Copy	View	 I/O Terminals	<u>. </u> ‡	Strategy Details	Strategy Help	View Macros	Create Manager Save New	Start
Cipboard			Suracegy				viacios	

or by clicking the Macro Manager... button on the Create Macro dialog

Macro Grouping	
Name	
Group	Cylon Macros 💌
Sub Group	BACnet 🗨
	Macro Manager

This opens the Macro Manager window



To add a group, click the Add button while the Macros root is selected in the explorer pane (left hand side of the window)

A new group appears in the Right-

Type in a name for the new group.

hand side Group pane.

 Image: Strong Strong

To make a sub-group in the new group, first, make groups visible by clicking on the + sign to the left of the Macros root.
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To close the Macro Manager, click Exit.

When a new Macro group is created, it will be listed under Macros in the View menu. When a new sub-group is created, an icon is also created for that sub-group and displayed in the Macro sub-group bar.

HOW TO RENAME POINTS IN A MACRO TEMPLATE

Points can be renamed from the Macro Manager interface.

Open the Macro Manager by selecting Manager from the Macro group on the Strategy tab of the Ribbon

	Strategy									
_]Сору		Т	00		BACnet Points	?	F	Create	4
] Paste	View	Add		•	BACnet Units	Charles	10.000	La Manager	c1
C	Select All	Modules	Text	Terminals	Modules	Strategy Details	Help	Macros	Bave New	Start
0	lipboard				Strategy	1		}	Macros	

or by clicking the Macro Manager... button on the Create Macro dialog

Macro Grouping	
Name	
Group	Cylon Macros 💌
Sub Group	BACnet 💌
	Macro Manager

Clicking on a Macro Template in the left-handside 'Tree view' pane of the Macro Manager displays properties of the Macro Template in the right-hand pane.

The Macro Name, Macro ID, User Created flag, and the list of point names are displayed.

If point names have already been defined, then an **Edit Point Names** button will be displayed on the right-hand side of the dialog.

If there is no point names list, then a Create Point Names button will be displayed instead.

Clicking either button will open the Macro Point Name Prefix dialog, allowing point names to be edited for the current instance.

However, if this dialog is opened from the Macro Manager as shown here instead of from the Create Macro dialog, then when OK is clicked the Macro Template is changed and any Macro instances created afterward will use the updated point names list.



		Macro Point Conf	iguration		
	ame WeatherCom oup Heating				
Num	Name	Туре	Value	High U	Low Un.
13	1	Analog		°C	
14		Analog		°C	
15		Analog		°C	
16		Analog		°C	
17		Analog		°C	
<					>
				ОК	Cancel

HOW TO SET MACRO SETPOINT UNIT LABELS

In the Macro Point Configuration dialog, it is possible to set labels for specific setpoint values, so that a user can for example select "Night" and "Day" for a digital setpoint, or "off", "on", "trip" and "switch" for an analog point, without the need to know which numerical value matches each function.

To set an enumerated list for a setpoint, right-click on the setpoint in the Macro Point Configuration dialog and select Add/Edit Enumerates.

Note: This option is only available for setpoints.

Note: This option will not be available when a Macro is being added to a strategy, or when a Macro instance is being edited within a strategy – in those cases when the Macro Point Configuration dialog opens the user will be allowed only to select from an existing enumerated list, or to type a value.

Macro [
N	ame HtgFreeClg				
Gr	oup Cylon Macros				
	() Cylon macros				
Subgr	oup BACnet				
Num	Name	Туре	Value 🗸	High U	Low
4	ClgRange	Analog Setpoint	40.00	96	
33	HtgRange	Analog Setpoint	40.00	96	
2	FreeRange	Analog	1 00 00	l or	
7	HtgFrostStatPos	Analog Ad	d/Edit Enume	rates	
13	HtgWarmUpPos	Analog Setpoint		79	-
46	HtgFrost1 2Pos	Analog Setpoint	100.00	%	
5	DamperMinPos	Analog Setpoint	10.00	96	
8	FreeFrostStatPos	Analog Setpoint	0.00	96	
9	ClgFrostStatPos	Analog Setpoint	0.00	96	
14	FreeWarmUpPos	Analog Setpoint	0.00	96	
47	FreeFrost1_2Pos	Analog Setpoint	0.00	96	
48	ClgFrost1_2Pos	Analog Setpoint	0.00	96	
51	ClgWarmUpPos	Analog Setpoint	0.00	96	
16		Analog		°C	
17		Analog		°C	
19		Analog		°C	
20		Analog		°C	
21		Analog		°C	
22		Analog		*C	
23		Analog		°C	
25		Analog		°C	
26		Analog		*C	
27 <		Analog		•7	
					>

This will open the Setpoint Enumerates dialog.

Enter a Value and Description pair, and click the Add button. The Value/Description pair will be added to the list.

If an entry is made in error it can be removed from the list by selecting it and clicking the **Delete** button.

When the list is complete, click **OK** to close the **Setpoint Enumerates** dialog.





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Now, when editing the setpoint, the user can select the required value from a drop-down list.

Macro E	Details				
N	ame HtgFreeClg				
<i>c</i> .	OUD Cylon Macros				
01	oup Cylon Macros				
Subgr	oup BACnet				
	, jonener				
Num	Name	Туре	Value 7	High U	Low
			Turbe .		LOWI
4	ClgRange	Analog Setpoint	40.00	%	
33 2	HtgRange	Analog Setpoint	40.00	%	
2	FreeRange	Analog Setpoint	1:Ωn	1 %	
13	HtgFrostStatPos HtgWarmUpPos	Analog Setpoint Analog Setpoint	0:Off	96	
46	HtgFrost1_2Pos	Analog Setpoint	1:On	76 96	
5	DamperMinPos	Analog Setpoint	2:Trip	76 96	
8	FreeFrostStatPos	Analog Setpoint	3:Switchs	76 96	
9	ClgFrostStatPos	Analog Setpoint	20.00:CurVal	76 96	
14	FreeWarmUpPos	Analog Setpoint	0.00	%	-
47	FreeFrost1 2Pos	Analog Setpoint	0.00	%	
48	ClaFrost1 2Pos	Analog Setpoint	0.00	%	
51	ClgWarmUpPos	Analog Setpoint	0.00	%	
16	cigitatiloptos	Analog	0.00	°C	
17		Analog		°C	
19		Analog		°Č	
20		Analog		°C	
21		Analog		°C	
22		Analog		°C	
23		Analog		°C	
25		Analog		°C	
26		Analog		°C	
27		Analog		•7	
<					>

The setpoint value is displayed in the list with the text description.

	ame HtgFreeClg oup Cylon Macros				
Num	Name	Туре	Value V	High U	Low
4	CloRange	Analog Setpoint	40.00	%	
33	HtgRange	Analog Setpoint	40.00	%	
2	FreeRange	Analog Setpoint	2:Trip	%	
7	HtgFrostStatPos	Analog Setpoint	100.00	96	
13	HtgWarmUpPos	Analog Setpoint	100.00	%	
46	HtgFrost1_2Pos	Analog Setpoint	100.00	%	
5	DamperMinPos	Analog Setpoint	10.00	96	
8	FreeFrostStatPos	Analog Setpoint	0.00	%	
9	CIgFrostStatPos	Analog Setpoint	0.00	%	
14	FreeWarmUpPos	Analog Setpoint	0.00	%	
47	FreeFrost1_2Pos	Analog Setpoint	0.00	%	
48	ClgFrost1_2Pos	Analog Setpoint	0.00	%	
51	ClgWarmUpPos	Analog Setpoint	0.00	%	
16		Analog		°C	
17		Analog		*C	
19		Analog		°C	
20		Analog		°C	
21		Analog		°C	
22		Analog		°C	
23		Analog		*C	
25		Analog		°C	
26		Analog		°C	
27 <		Analog		•	>

The enumerated list is saved with the Macro template and will be available in all instances of the Macro created afterward.

Import

Delete

HOW TO TRANSFER MACROS FROM ONE COMPUTER TO ANOTHER

It is possible to use Macro Templates created on one PC on a different PC. They must be exported from the PC on which they are created, and added to the 'host' PC system (i.e. the PC on which they will be used) as follows:

EXPORT MACROS FROM THE PC ON WHICH THEY WERE CREATED

u macros ⊢C Legacy Macros ⊢C Cylon Macros E-C BACnet

Exporting Macro Templates as follows puts each Macro Template in a separate file with a user-identifiable name so that they can be easily identified and moved to the 'host' PC system.

Open the Macro Manager by selecting Manager from the Macro group on the Strategy tab of the Ribbon

Strategy								
샵 <mark>] Copy</mark>		Т	=		BACnet Points	2	Create	1
Paste			0	Ţ.,	BACnet Units		Manager	-
Select All	View Modules	Add Text	Terminals	Modules	Strategy Details	Strategy Help	View Macros	Start
Clipboard				Strategy	1		Macros	

or by clicking the Macro Manager... button on the Create Macro dialog

Macro Grouping	
Name	
Group	Cylon Macros 💌
Sub Group	BACnet 💌
	Macro Manager

Select the Macro group that contains the Macro Templates you wish to export,

select all of the Macro Templates within that group that you wish to export,

and click the Export button.

A Select Folder dialog will open. Select the location into which the selected Macros will be saved.

	hthDiff ost1_3 :gFCIgPID :gFreeCIg WSCtrl eter ATReset ptimizer :set :nAImLog	IftgFClgPD IftgFreeClg IftgFree		Kename
				Export Exit
Current Selection		Select Fo	lder	×
▷ Docun ▷ Docun ▷ Down ▷ Down ▷ Down ○ Music	ds			^
 Picture Videos OS (C:) 				~
Folder: Docur			OK	Cancel

Macro Manager

Damping

ADD EXPORTED MACROS TO THE HOST PC SYSTEM

Once all required Macros have been exported, copy them onto the PC on which they will be used.

Open the Macro Manager by selecting Manager from the Macro group on the Strategy tab of the Ribbon

	Strategy									
	Сору		Т	a	::•	BACnet Points	?	F	Create	
ů	Paste	1 Genu				BACnet Units			🛗 Manager	<i>.</i> .
\square	Select All	View Modules	Add Text	Terminals	Modules	Strategy Details	Strategy Help	View Macros	Bave New	Start
C	lipboard				Strategy	r			Macros	

or by clicking the Macro Manager... button on the Create Macro dialog

Macro Grouping	
Name	
Group	Cylon Macros 💌
Sub Group	BACnet 💌
	Macro Manager

Select the group and subgroup into which you wish to import Macro Tem

you wish to import Macro Templates, and click on the Import button.	□ □ </th <th>Macros B B WeatherCom</th> <th>Detete Detete Rename</th>	Macros B B WeatherCom	Detete Detete Rename
			Export
In the standard Windows Open dialog.	ß	Open	×
Multiple files can be selected by holding the	🔄 🄄 🔻 🕇 퉬 « temp	→ Macros v C	Search Macros 🔎
[CTRL] key while clicking on each file.	Organise 🔻 New folder)= - 🔲 🔞
	sources	^ Name	A Date mo
	📕 temp	A03.m32	03/12/2
Select the Macro Templates you wish to add	Macros	A06.m32 WeatherCo	5
and click the Open button.	ro VirtualMachines	× <	>
and click the open button.		"A06.m32" "A03.m32"	*.m32 v
			Open Cancel
The selected Macro Templates will be		Importing Macros	×
imported into the selected group.		Importing macros	
If the Macro Template already exists on the		nave matching IDs to existing ma previously. You can select which	
host PC, an alert box will be displayed			File
identifying the group and subgroup of any	Issue	ame ID as <a03> in <uc32 ma<="" td=""><td></td></uc32></a03>	
duplicates.		ame ID as <a06> in <uc32 ma<="" td=""><td></td></uc32></a06>	
If you wish to import any of the listed Macro			
Templates, tick the box beside its name			
before clicking the OK button. This will create	<		>
a new Macro Template on the host PC, in	C Select All		OK Cancel
addition to the existing duplicate.			

Macro Manager

Each newly imported Macro Template will be named "x New Macro", where x is the index of the Macro Note: Template in the list.

To change this name, select it in the Macro Manager dialog, and click the Rename button.

Once all Macro Templates have been added, they are available for use in the 'host' PC.

WORKING WITH MACROS

To access the Macro groups and sub groups that exist in a site, click on View Macros in the Strategy tab of the Ribbon.

er Strategy								
Copy	View Modules	T Add Text	I/O Terminals	Reorder Modules	 ■ BACnet Points ● BACnet Units ■ Strategy Details 	Charles		Create Manager Save New
Clipboard				Strategy	1		Ma	cros

The Macros pane will be displayed on the right-hand side of the CXpro^{HD} window



HOW TO INSERT A MACRO INTO A STRATEGY

To insert a Macro in a strategy, select it in the Macros pane and click in the drawing area (note the cursor changes to the "Module Cursor" i during this process)



CXpro^{HD} | Using Macros

ile Home	¢ <u>₩</u> ₹ Controlle	r Strateg		Ma	cro Point Config	uration						
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The Macro instance can be renamed, and its details viewed, through the Properties pane.



HOW TO VIEW THE MODULES IN A MACRO ("EXPANDING" A MACRO)

To expand a Macro, double-click on the Macro symbol on the drawing area.



CXpro^{HD} will open a new strategy for the Macro's constituent modules.

	01.s32:WeatherCom	001_01.s32:WeatherCo	m / 001_01.s32:Weather	rCom 🛛 👌 🗙
0 20 °C Outside Air Tem	Weathe perature is mapped to	r Compensator o a Flow Temperature Setp	oint of 20 80 °C	^
	A=80,			
A=20, B=80	R N	Real Constant 35	100 B Rescale fro	om 0 to 100 33
R Real Constant	34	Output A O 26 Output B O 37	26 O Lower Limit A	Output 🔿
Output A Output E		t A: 80.00; Constant B: 2	25 O Input	
Constant A: 20.00; Constant B:	2 ^B 100 A 0	Rescale to 0 and 100 32	· · · · · · · · · · · · · · · · ·	
		er Limit A Output O 25 er Limit B		
Outside Air Temperatu	re (OAT) OInpu Rescales i	input temperature		
	so that 0	20 °C becomes 0 100		
<				· · · · · · · · · · · · · · · · · · ·

- Note: The view settings for Lines and Point Numbers are saved with the Macro. They are not inherited from the parent strategy. For example, if lines are not visible when a Macro is expanded, simply right-click on the strategy drawing, select Display Options, and specify that lines are to be shown.
- **Note:** To distinguish between the inputs and outputs of individual modules and the inputs and outputs of the overall Macro module red highlighting is used to mark the connection points of the Macro module. It also provides the full path of the strategy file that it just created when expanding the Macro in the **Window** menu.
- **Note:** Any changes made to a macro within a strategy will only affect the current strategy. The macro and all of its module blocks are saved within the active strategy. To edit the macro strategy itself you must open the *.etm file.

HOW TO EDIT A MACRO

It is possible to edit an existing Macro Template or to re-save a modified Macro as a new Macro Template. To do this, expand the Macro by double-clicking on the Macro symbol in the drawing area.



CXpro^{HD} will open a new strategy for the Macro's constituent modules.

001_01.s32 001_01.s3	:WeatherCom	001_01.s32:WeatherCom	V 001_0	1.s32:Weat	herCon	a 🗌	⊳
0 20 °C Outside Air Temperat	Weathe ure is mapped t	er Compensator o a Flow Temperature Setpoint	t of 20 i	80 °C			
A=20, B=80	A=80,	B=20 Real Constant 33	10 	0 B Rescale	from 0 t	to 100	33
Real Constant 34		Output A O 26 Output B O 27 t A: 80.00; Constant B: 2	26 27 25 25) Lower Limit) Upper Limit) Input	B	Outpu	<mark>0</mark> ،
Constant A: 20.00; Constant B: 2	B 100	Rescale to 0 and 100 32					
	23 O Low	er Limit A Output O 25					
Outside Air Temperature (O	AT) ²⁴ OInpu						
		input temperature 20 °C becomes 0 100					

Make any required changes to the component modules of the Macro by clicking on the symbol and editing its properties in the **Properties** pane.

To save the changes select Edit Template from the Macros section of the Strategy tab on the Ribbon.



This opens the **Create Macro** dialog, but in this case, **Macro Inputs** and **Macro Outputs** cannot be added or deleted. The input and output point names can be changed, as can the **Macro Name**, **Group**, and **Sub Group**.



When all required changes have been made, click the **Overwrite** button to save the edits to the original template. Alternatively, if you want to retain the original template along with the edited one, edit the text in **Name** field to the name of the new template and then click **Save New**.

Note: This can also be launched when Macro is selected in the Macro Manager.

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MAN0133 rev 29

9 Communicating with Controllers

COMMUNICATING WITH ABB CYLON® CONTROLLERS

When you are using CXpro^{HD}, you will need to communicate with the ABB Cylon® controllers on the site.

- You may need to **send** information **to** a controller such as a control strategy, a command to erase its memory, details of its setup, etc.
- You may need to get information from a controller such as its version, current setup, and details of any strategies it may contain.
- You may wish to view events **within** a **controller**, such as changes in values when a **strategy** is being serviced. This can be done in **Scan** mode or by using the **LiveLog** menu option.

SENDING INFORMATION TO A FIELD CONTROLLER

When the strategy is ready to be downloaded, simply click the download button on the toolbar or choose **Download** from the **Communications** menu and **CXpro^{HD}** will download the strategy and send the set-up automatically.

WIPING A FIELD CONTROLLER'S MEMORY

Although it is no longer necessary to wipe the Field Controller's memory before downloading if automatic download is enabled, it is still necessary to wipe the controller's memory before using it for the first time. If you are not using automatic download, you must manually wipe the controller's memory before downloading.

The effect of wiping a Field Controller's memory

Wiping Field Controller memory has the following effect:

- All blocks are deleted (the strategy is deleted).
- The functions of the site (valves, pumps, dampers, etc. controlled by this Field Controller, are no longer available.)
- The number of serviced blocks will be set to zero. Field Controller Set-up has to be sent again.
- All virtual points are assigned the value zero.
- All hardware points are assigned the value zero.
- All outputs go to zero volts.
- Inputs do not read any signals from connected devices. This is true for manually overridden points too.
- The green LED on the Field Controller flashes rapidly. If the Field Controller is running without a network (standalone), the flashes are regular. If the Field Controller is running on a network (connected to a BACnet Router), the flashes are irregular.
- If the alarm feature is active, an alarm appears on the monitor of the connected PC.
- If a keypad program for that Field Controller exists, it will be deleted.

SENDING THE SETUP TO A FIELD CONTROLLER

If you are using **Automatic Download**, it is not necessary to send the setup to the controller after downloading. Otherwise, the setup must be sent manually as described in *Starting a strategy (sending the Setup)* on page 121.

GETTING CONTROLLER INFORMATION

HOW TO GET THE CONTROLLER VERSION

- Select the controller in the Site List
- Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

CXpro^{HD} | Communicating with Controllers



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•		Configuration	n I		Oper	rations	
•							

CXpro^{HD} will get the version from the controller and display it.

	Version	×
Version	UC32.8B 7.6.9 05/05/16 Boot Ver:06.00	
Serial Number	CU12205068F	
		Close

Click OK to close the Version window.

HOW TO GET THE CONTROLLER SETUP

- Select the controller in the Site List
- Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

	File - Home Cor	ntroller Strategy				
		iste	perties Modules ? igation Macros ne Names Search View	Strategy Reopen		
	Site List	₽ 🗙 4	Strategy1			
•	E Sites E BACnet IP E 001 - Net 	work 001 - UCU3213V		· · · · · ·		
•	Select Time and	Date from the	Operations sect	ion of the Co	ntroller tab in the	Ribbon.
	Controller Str	rategy				
	Communications		Compare er Eg Show Compare	1.23 Version Time and Date Maximums	_	
•	Configuration		Oper	ations		

CXpro^{HD} will get the Setup of the controller and display it.

Number Of Strategy Blocks To Service b	Send
ast Composed Time 11:57:35 Date 14/08/2018 Time 11:57:35 Date 14/08/2018	Receiv
User ID User Name User Name Strategy ID 0 Drawing Reference Min Service Time 0 Time Synchronisation Wait After 0	
Current Status eceived setup from controller	

Click OK to close the Time and Date window.

HOW TO GET CONTROLLER STATISTICS

- Select the controller in the Site List
- Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

	— =						
	File • Home	Controller Stra	tegy				
	🖋 Connect	Сору	Properties	Modules ? Strat	tegy		
	S Disconnect	Paste Site	Navigation	Macros 🗌 Reop	pen		
		Select All List	📑 Page Names 🔍	Search			
	Site	Clipboard		View			
	Site List	Д 🔀					
•		t IP - Network 001 - 001 - UCU3213\					
•	Select Statist	tics from the	Operations se	ection of t	he Controller	tab in the Ribbon	n
	ne Controller	Strategy					
	to Communic	cations 👌 📥 Dow	nload 🛛 🔁 Co	mpare	Version	Reard Diagnostics	
	rt 😽 Controller	Wipe	Controller 🚉 Sh	ow Compare	🐻 Time and Date	Statistics	
	BACnet	🛃 Auto	Online		Maximums	Lock and Unlock	
•	Configurat	tion		Operat	ions		

The Statistics dialog box, shown below, appears. The Statistics dialog box contains information that comes directly from the controller – this information allows you to check the status of the controller.

Statistics	×
Engineering Statistics System Statistics Serial Port Statistics	1
Number of Resets 0 Clear Number of Crash Detects 0 Comm. Checksum Errors 0 Number of Bad Blocks 0 Status 0 VatchDog On Real Time Clock present	
	ОК

The Statistics dialog box has three tabs - Engineering Statistics, System Statistics, and Serial Port Statistics.

CXpro^{HD} | Communicating with Controllers

Engineering statistics tab

Statistics	×
Engineering Statistics System Statistics Serial Port Statistics	
Number of Resets 0 Clear Number of Crash Detects 0 Comm. Checksum Errors 0 Number of Bad Blocks 0 Status Real Time Clock present	
	ОК

Number of resets indicates how many times the Field Controller has been powered up and down

Number of crash detects the number of crash events detected since the strategy started

Comm. Checksum errors the number of data errors that have occurred in communications

Number of bad blocks the number of bad or corrupted blocks that have been detected in the strategy

Watchdog on This shows the current status of the "Watchdog" on the Field Controller – the box is checked if the watchdog is switched on (a watchdog is a hardware component in the controller that checks if the controller is serviceable. When the watchdog is off, the controller is not operating)

Real time clock present indicates if a real time clock is present in the Field Controller

CXpro^{HD} | Communicating with Controllers

System statistics tab

This tab provides information on any problems the controller may have in servicing the strategy.

Engineering Statistics

Last reset Shows the date and time that the Field Controller was last reset

Set-up block indicates if the Setup block (the block in the controller that stores details of the number of blocks in the strategy) is in place.

Number of blocks servicing shows how many blocks are servicing in the Field Controller

Number of bad blocks shows how many bad or corrupted blocks are detected in the Field Controller

First bad block The number of the first of the bad blocks (if any)

Last bad block The number of the last of the bad blocks (if any)

Serial Port Statistics tab

CXpro^{HD} can display information about messages passing through the Field Controller's serial ports as follows:

ngineering Statistics	System Statistics	Serial Port Statistic	•		
Serial Port Type					
Subnet					Receive
C Service					Clear
C Internal K	(eypad				
C External	Keypad				
Total Number			Ke	ypad Information	
Bytes Received	0 0	Overrun Errors 0	Un	expected Responses	0
Bytes Sent	0	Framing Errors 0		Rx Timeouts	0
Packets Received	0	Parity Errors 0		Resends	0
Packets Sent	0 .	itandard Received Err	ore l	Packet Size NACKS	0
NACKS Received				Undefined NACKS	0
NACKS Sent	0	reak Conditions	Bro	adcast Information	
ACKS Received		0		Faults	0
ACKS Sent	0	,		CRC Errors	0
Checksum Errors	0		F	ackets Received OK	0
				Packets Received	0
					,

The first section of this panel, Serial Port Type allows you to select which of the four possible serial ports the displayed information refers to.

Pressing the Receive button causes CXpro^{HD} to upload information about the selected port from the Field Controller.

Clicking on Clear causes the Field Controller to clear its memory of port statistics for the selected port.

The information displayed is the number of each of the following messages that passed through the selected serial port since the controller's memory was last cleared:

- Number of Bytes received
- Number of Bytes Sent
- Number of Packets received
- Number of Packets Sent
- Number of NACKs received
- Number of NACKs sent
- Number of ACKs received
- Number of ACKs sent
- Number of Checksum errors
- Number of Overrun errors
- Number of Framing errors
- Number of Parity errors
- Number of break conditions

This information can be used to diagnose low-level problems with the Field Controller's serial-port communications, and this is usually done in consultation with **ABB Cylon**[®] Technical Support.

HOW TO GET FIELD CONTROLLER DIAGNOSTIC INFORMATION

CXpro^{HD} has a facility to display information about the operation of the UC32 controller's hardware system. This information referred to as 'board diagnostics' can be of use in troubleshooting unusual and low-level problems on a **ABB Cylon**[®] site, and is intended for use primarily when communicating with **ABB Cylon**[®] technical support.

Board Diagnostic information may be viewed by selecting Diagnostics from the Controller tab on the Ribbon.

Controller Stra	ategy			
tommunications	📥 Download	Compare	1.23 Version	Reard Diagnostics
Controller	Wipe Controller	Show Compare	🗟 Time and Date	Statistics
BACnet	🛃 Auto Online		Maximums	Lock and Unlock
Configuration		Oper	rations	

This opens a display panel showing categories of information about the Field Controller's hardware.

Battery Status		Vector			
Battery		VECTOR COUNT	VALU	JE	
DAC Reading for Ov switch to					
Port Setup Address Baud Rate	Ţ				
Board ID Resistors — Main Board Daughter Board					
eady		<			>

Clicking on the **Receive** button causes **CXpro^{HD}** to upload the relevant information from the targeted Field Controller.

HOW TO GET FIELD CONTROLLER CONFIGURATION INFORMATION

Field Controller configuration information can be of use in troubleshooting unusual and low-level problems on a **ABB Cylon®** site and is intended for use primarily when communicating with **ABB Cylon®** Technical Support.

To view this information, select Maximums from the Controller tab of the Ribbon

Controller Stra	ategy			
to Communications	📥 Download	Compare	1.23 Version	Reard Diagnostics
😼 Controller	Y Wipe Controller	Show Compare	🗟 Time and Date	Statistics
BACnet	🛃 Auto Online		Maximums	Lock and Unlock
Configuration		Oper	rations	

This opens a display panel showing the configuration of the Field Controller's hardware.

Maximums	×
Maximum Subnet Address	63
Maximum Strategy Block	1024
Maximum Number of Datalogs	32
Maximum Keypad Program Size	20003
	Close
	Close

HOW TO SET THE CONTROLLER TIME AND DATE

- Select the controller in the Site List
- Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon:

₩ ₹			
File 🔻	Home	Controller	Strategy
💉 Co		င်ြု Copy	Properties Modules Strategy
🔊 Di	connect	Paste	
		Select All	Site List Page Names 🔍 Search
	ite	Clipboard	View

• Select Time and Date from the Operations section of the Controller tab in the Ribbon.

ne	Controller	Strategy

		27	
	Communications	📩 Download 🛛 🖓 Compare	1.23 Version 🔤 Board Diagnostics
t	Controller	Wipe Controller 🚉 Show Compare	Time and Date 🖪 Statistics
	BACnet	🛃 Auto Online	Maximums 😼 🖪 Lock and Unlock
	Configuration	Ope	rations

This opens the Time and Date dialog.

Time and Date	Syster	n Time/Date	Send Receive
Date 14/08/2018		in mine/Date	Keceive
Time Based On			
C None			
C EU			
C US			
C Use Point	0		
Current Status			

In this dialog, you can check the time and date set in the targeted **controller** by clicking on the **Receive** button (time and date are automatically received when you first open the dialog).

The Time and Date can be changed by typing a new date, by scrolling, or by pressing the System Time / Date button, which sets the time and date to match the settings in the PC on which CXpro^{HD} is running.

The daylight saving time scheme can be selected in the Time based on the box on the Time and Date dialog:

- If the None option is selected for Daylight Savings, then the controller will not automatically adjust its time to match conventional Summertime and Wintertime.
- If the EU option is selected for Daylight Savings, then the controller will automatically adjust its time according to the standard European rules for Summertime and Wintertime.
- If the US option is selected for Daylight Savings, then the controller will automatically adjust its time according to the standard rules used in the USA for Summertime and Wintertime.
- If the Use Point option is selected for Daylight Savings, then you can specify a point whose value will determine Summertime and Wintertime.

If the time and date settings have been changed in the dialog box, they must be sent to the controller before they will take effect. This is done by clicking the Send button:

Clicking the Close button closes the dialog box without sending or receiving further information.

CHANGING THE ADDRESS OF A CONTROLLER (CBM ONLY)

CBM controller addresses must be set from software because there are no Address DIP switches on this type of controller. To set a controller's address from CXpro^{HD}:

- Make sure that the PC, running CXpro^{HD}, is directly connected to the Field Controller's service port.
- Make sure that there is a site set up in CXpro^{PD} with the PC connected to COM port:

Name: Directory:	Serial Site SerialSite	
Type of Connectio	n for this Site:	
Enable BBMD - S	ite Level 47808	_
Time to Live	60 seconds	

Make sure that the directly connected controller is targeted in CXpro^{HD}'s Site List •



.

(

Connect to the controller by clicking on the Connect button in the Home tab of the Ribbon: .

File 🕆	Home	Controller	Strat	egy		
🚿 Cor		Сору	Į.	Properties	Modules	-
🔊 Disc	tönnect	Paste	Site	Navigation		Reopen
Si	te	Clipboard	LISU		View	

Select BACnet from the Configuration section of the Controller tab in the Ribbon •

Controller	Stra	ategy	
tommunicat	tions	📥 Download	Compare
Controller		Wipe Controller	Show Compare
BACnet Configuratio		🛃 Auto Online	
Configuratio	n		Op

In the BACnet Configuration dialog, you can set the address for the controller .

BACnet Configuration			
	Controller	Config	New
Controller	1	1	25
Device Instance	41	41	
Device Name	001 - 001 - CBM08	001 - 001 - CBM08	001 - 001 - CBM0

10 Datalogs and Alarms

DATALOGS

Datalogs (Trendlogs) are a feature of Field Controllers that allows point values to be recorded over a period of time. The recorded data can be later retrieved, displayed, and analyzed with the Datalog Manager module.

Analysis of logged data is often useful in optimizing the effectiveness of an **ABB Cylon®** site's controllers and strategies, and Identifying opportunities for energy savings.

THE DATALOG FUNCTION MODULE

The collection of point values in a datalog is implemented in a strategy by either the Datalog module or the BACnet Trendlog module.

Datalog 2 Datalog_1	
Analog input Digital input	BACnet Trendlog 4 Outside Air Temperature Trend
Enable	Digital input
🗗 Log trigger	Analog input
Datalog number: 1; Update interval: 900; Link: 0; Datalog	Enable
Trigger Options: Any Edge; Delta:	Log trigger
1.00; Extended length: 0	Datalog Trigger Options: Any Edge

The content of a Datalog can be viewed with the **CXpro^{HD}** Datalog Manager, and the content of a BACnet Trendlog can be examined by a BACnet supervisor. Their use in the strategy is identical.

RESTRICTIONS ON THE USE OF DATALOGS

The number of Datalogs (Trendlogs) permitted in a strategy depends on the type of controller in which the strategy will be used.

Some controllers, such as the **CBM24** can have up to 32 datalogs, with a maximum of 1024 entries per datalog. Other controllers, such as the **CBT12**, have up to 6 datalogs, with a maximum of 1024 entries in each. You can determine the number of datalogs that a particular controller can hold using the **Maximums** dialog box, available from the **Operations** section of the **Controller** tab on the **Ribbon** menu.

STANDARD DATALOG SAMPLING PERIOD

Each standard datalog module can be configured with an individual time constant for sampling data. To make the evaluation of datalogs easier it is advisable to use the same time period for sampling data in all datalog modules. A sampling period of 15 minutes is suggested.

The period of time over which the datalog samples are equal to the product of number of entries (104 or 192) and the sampling frequency. For example, a datalog module on a UC16PG with a sampling frequency of 15 minutes (900 seconds) will take samples for (192 X 15) minutes = 48 hours.

TIME STAMPED DATALOGS

A time-stamped datalog records the time and date at which a value was recorded, along with the value. A logging interval is not set - instead, the value of the specified point is recorded:

- when the digital trigger point changes state
- when a logged digital point changes state
- or when a logged analog point changes state by more than a predefined amount from the last value that was logged for it.

There are several situations when such a datalog would be particularly useful. For instance, if you log the value of a point with a conventional datalog and set the logging interval to 10 minutes, the value of the point may change significantly and return to its original value over a period of 3 minutes, and that change might occur during the 10 minutes when the datalog is not recording. If so, the event would not be logged at all. On the other hand, if the logging interval was 30 seconds, the event would be recorded - but the datalog could fill up and the event could be 'flushed' before it is viewed. If so, the event would also be lost. In both of these cases, a time-stamped datalog could record data over the period of the event only, so that the necessary data is recorded without the datalog filling up.

The other primary use of a time-stamped datalog is to log conditions that surround an event. For instance, when a window is opened, the temperature of the surrounding area could be logged to see how it reacts.

DATALOG SAMPLING OF DIGITAL AND ANALOG POINT VALUES

Both digital and analog point values can be sampled. The datalog module has a digital input and an analog input.



HOW TO DEFINE A DATALOG

To define a datalog, proceed as follows:

Select the Datalog module in the Modules pane

Modu	lles	Ф <mark>Х</mark>
		×
Cont	rols	•
Func	tions	•
Math		•
Sche	dules, Timers, and Logic	•
Setp	oints, Inputs, and Outputs	•
Stati	stics	-
Â	Alarm	
Â,	BACnet Alarm	
Ν	BACnet Trendlog	
\square	Comment	
Ъ	Control Flags	
123 1111	Counter	
\sim	Datalog	
\mathbb{Q}	Meter	
	Real Time Clock	~
Macr	os Properties Page Na N	Adules

CXpro^{HD} | Datalogs and Alarms



and place it on the drawing area (note the cursor changes to the "Module Cursor" 🗔 during this process)

Select the datalog, and configure its properties

↓ 001_01.s32 001_01.s32 ▷	× P	roperties	부 <mark>×</mark>
	^	< > ? Datalog	, <u> </u>
Analog Input 1 Datalog 2	6	General Information	tion
AI Room Temperature Room TemperatureA		Туре	Datalog
Point () (1) (1) Analog input		Service Order	2
Override 🖸 🖉 Digital input		Name	Room TemperatureA
		Use point name	True
Datalog number: 1: Update		Synchronised St	Checking
interval: 900; Link: 0; Datalog Trigger Options: Any Edge; Delta:		Inputs	-
1.00; Extended length: 0		Analog input	Analog (1): 0.00 Ro
		Enable	Digital
			Digital
		Digital input	Digital
		Constants	Digital
Datalog 3		Datalog number	1
Dinital Input 2		Datalog type	Analog
DI Valve 209		Update interval	900
Point (2) (2) Digital input			
Override 🖸		Log trigger opti	Any edge
C Log trigger		Delta	1.00
Datalog number: 2; Update interval: 900: Link: 0: Datalog		Precision	0
Trigger Options: Any Edge; Delta: 1.00: Extended length: 0		Log trigger	Time interval
1.00; Extended length: 0		Extended length	0
			1
		Analog input	
		The analog value to b	e logged.
	v		
< >	1	Macros Properties	Page Na Modules

Name

A datalog is automatically given the same name as the point to which it is joined but can be edited if the Use Point name property is set to False.

Use Point name

If True, then the Name property matches the connected point and cannot be edited.

Analog input

This shows details of the point to be logged if an Analog point is connected

Enable

The Enabling Point is a digital point, connected to the "Enable" input of the datalog module, which restarts the sampling process if its value changes from 0 to 1. If this point is not connected, then the datalog samples continuously. In typical applications, this input is not used.

Log Trigger

In Time-stamped datalogs, it is possible to record data when this trigger point changes. If the trigger point is not connected, logging occurs according to the '**Minimum Change**' parameter.

Digital input

This shows details of the point to be logged if a Digital point is connected

Datalog Number

This shows the automatically-assigned number for the Datalog within the strategy.

Datalog Type

The type (analog or digital) of the point being sampled is shown in the Type of Point to Log.

Update Interval

This is the frequency of sampling (in seconds). By default, this is 900 (15 minutes) but can be edited in the **Properties** pane.

Delta

If the datalog type is set to 'Time Stamped', and if the type of point being logged is analog, it is possible to trigger a sample whenever the point value changes by more than a particular amount. This field specifies that amount of change.

STARTING A DATALOG

A datalog is part of a strategy and is saved with the strategy. The example below shows a datalog module linked to a strategy:



Datalogs are started along with the rest of the strategy in which they are contained, when the strategy has been saved (see page 111), downloaded (see page 116), started (see page 121) and tested (see page 123).

Note: If the block on which a datalog module is placed is downloaded again to the Field Controller, the sampled data is deleted.

VIEWING THE CONTENTS OF A DATALOG

This is done on a PC running **CXpro^{HD}** software.

The Datalog Manager program is used to view or print out datalogs, on screen or printer, as text or graphics. To open is, click on the Datalog Manager icon in the Home tab of the Ribbon.

Home	Controller	Strategy	
nnect	Сору	Properties Modules Strategy Help	
sconnect	[Paste	Reopen Strategie	
	Select All	Site List Page Names Search	Configuration Database Datalog Site Backup NB-Pro Interface Mana₄≷r Organiser
Site	Clipboard	View	Utilities

The Datalog Manager allows data from Field Controller datalogs to be viewed in a variety of ways:

- The data can be listed as text.
- A datalog can be viewed as a graph.
- Information from multiple datalogs can be superimposed on one graph.
- The status of data points can be viewed in real-time.
- 'Snapshots' can be made of data from any set of analog points in a controller strategy.

For further details on the display and printing of datalogs, see the *Datalog Manager* manual.

Archived datalogs can be statistically evaluated by using programs like Microsoft Excel. This provides valuable information about the operation of the site.

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ALARMS

Alarms are used in a BMS system to alert site supervisors/engineers to any difficulties that may occur on a Site. The **ABB Cylon® BACnet** range supports BACnet Alarm notifications which can be made available to BACnet supervisors such as Cylon's **Aspect™** UI.

The BACnet Alarm module is joined to a digital point (Binary Value). When the digital point has the value 1, the BACnet Alarm module is activated. The Binary Value may indicate an error condition, for example, a sensor going out of normal range or a fire alarm being activated.

Alarms can also be set up directly on BACnet points via standard BACnet protocol.

STARTING ALARMS

Alarms are parts of strategies and are saved with the strategies. The examples below show how alarm modules can be linked to a strategy.

Alarms are started after the related strategies have been saved, downloaded, started, and tested.

EXAMPLES OF STRATEGIES CONTAINING ALARMS

Alarms - Example 1: Pump Trip Switch

To illustrate the use of an alarm module in a strategy, this guide takes as an example a simple case where a digital hardware input represents a trip-switch contact of a pump. Joining the digital input to an alarm module means that an alarm will be generated if the pump goes off-line.



Alarms - Example 2: Pump Trip Switch with delay

This case joins a digital virtual point (a delay of 60 seconds on the digital hardware input) to the alarm record function module.



Alarms - Example 3: Room Temperature Input

In this case, an analog input (room temperature) is joined to the alarm record function module and will cause an alarm to be sent to the Alarm Handler program if the input value is not within the range specified in the real constant module.



11 Simulation Mode

INTRODUCTION

A **Simulation Mode** is available within **CXpro^{HD}**, which allows the operation of a strategy to be simulated without the requiring a controller to be connected. This is done, in most cases, by using actual Firmware code to ensure the simulation is as close as possible to real controllers.

Simulation Mode is accessed through the Simulation section of the Strategy tab on the Ribbon





Clicking this button will start and pause the simulation for the current strategy. It is enabled only if **CXpro^{HD}** is **not** logged into the site. When the strategy is paused, the current simulation state is still visible on the strategy.



Clicking this button will stop the simulation and clear the simulation information from the screen. However, the simulation state will still be preserved, and pressing the Start/Pause button will restart from where it stopped.



Clicking this button will stop the simulation, clear the simulation information from the screen, and clear any other simulation information for the strategy.



Clicking this button will enable or disable logging of data. When released, no point logging will happen. When pushed, any point that has logging information set will have its values logged accordingly.

Clicking this button opens the Simulation Configuration dialog.

CONFIGURING THE SIMULATION

Several aspects of the Simulation can be configured by pressing the **Configuration** button the **Simulation** section of the **Strategy** tab on the **Ribbon**. This opens the **Simulation Configuration** dialog.

Simulation Configuration ×				
General configuration				
Display Progress As Runtime 💌				
Current simulation configuration Start time/date 17:46:18 + 14/08/2018 +				
<u>O</u> K Cancel				

THE SIMULATION CYCLE

The basic unit for simulation is a **Simulation Cycle**. This corresponds to approximately 1 second of runtime on a controller. Some modules (Hardware, Globals, time dependent modules) will be processed a fixed number of time during a cycle. Most of the other modules will be processed a number of times that depends on the size of the strategy. The bigger the strategy, the less the modules will be processed.

Simulation speed

The Simulation can be run manually ("Step by Step") where each click on the start button runs one Simulation Cycle, or automatically at one of 3 speeds: **Slow** (once cycle every 5 seconds), **Normal** (one cycle per second) or **Fast** (5 cycles per second).

Display Progress As:

The progress of the current simulation is displayed in the right-most section of the Simulation Toolbar. This progress can be displayed as **Runtime** (number of seconds since the simulation started) or **Date/Time** (current simulation date and time)

CURRENT SIMULATION CONFIGURATION

Start time/date:

When the Simulation Cycle is run, any time and date dependent modules – such as Time Schedules or Datalogs/Trendlogs - will use a simulated time. The value used will be the time and date set in the **Current simulation configuration Start time/date** field of the **Simulation Configuration** dialog, incremented by one second on each Simulation Cycle.

This allows a strategy to be tested for unusual behaviors at specific times such as daylight savings time, yearend, leap years, etc.

The value of this time and date will be displayed in the right-most section of the **Simulation Toolbar** if the **Display Progress As** field is set to **Date/Time**.

RUNNING A SIMULATION

When a Simulation runs, the labels at the end of lines will be updated to show the point values.

log Setpoint 1 t Protection	A>B Comparator 1].		
Point O 1: 10 1: 10	O Input A Output	(17):	1	
	O Input B Complement 🗗			. (
alog Input 1 Itside Air	Datalog 2 Outside Air TemperatureA] .	•	•
Type: Input og/Digital Type: Analog thered/Dithered: Dithered	O Analog input Digital input Enable			

A green background means that the value is calculated by the simulation.

A red background indicates that the value has been overridden by the user.

Note: It is possible to add, update, and delete modules and lines while the simulation is running. The simulation will take it instantly into account in its calculations.

LIVELOG

During a simulation, the livelog will display values from a simulation run so that it is possible to viewpoint values from different parts of the strategy simultaneously.

POINT PROPERTIES

The Simulation mode has two sets of point properties:

- one for input points that feed into the strategy (hardware inputs and Globals' destinations),
- one for all the other points whose values result from the strategy's internal calculation.

ACCESSING THE POINTS PROPERTIES

To open the Simulation Properties for a specific point right click and select Simulation properties. This can be done on either Lines, Hardware I/O modules or connected nodes:

Lines



Hardware I/O modules

AI	Analog Input 1 Outside Air Temperature (1):	<u>^</u>
	Simulation properties	
_		
		Data

Connected nodes



POINT VALUE OVERRIDE

In a point's **Simulation** properties dialog you can specify whether the value for the point will be calculated by the Simulation, or set to a fixed value:

Analog points:

Point calculated automatically:

Point Value Point Logging	0.00
Input points	

Point is overridden and set to 18.5:

Point Value Point Loggin	g	
Verride	18.50	
- Input points		

Digital Points:

Point calculated automatically:

Point Value Point Loggi	ng	
All Points	Γ	
Input points	_1	

Point is overridden, and set to "Off" (boolean 0)

Point Value Point Loggi	ng	
Verride		
Input points		

Point is overridden, and set to "On" (boolean 1)

Point Value Point Loggi	ng	
✓ Override		
None	v	

INPUT POINT OPTIONS

For an input point, a selection of options is available to simulate different types of inputs. For Digital points there are two options, for Analog points there are 7:

Digital Input point options

None	-
None	N
Fixed	6
Periodic change	

Fixed value

The point will have a fixed value throughout the Simulation run.

Value is "Off" for the whole Simulation run:

Input points		
Fixed	▼	
Value:	Γ	

Value is "On" for the whole Simulation run:

Input points		
Fixed	•	
Value:	$\overline{\mathbf{v}}$	

Periodic change

This option will change the value of the digital point during the Simulation run.

If the Random period box is unchecked, the value will change after the Basic Period specified:

Input points	
Periodic change	•
Random period	
Basic period	2 Secs. 💌

If the **Random period** box is checked, the value will change after a random period which is less than the specified **Basic Period**:

•		
2	Secs.	•
	▼ ▼ 2	

Analog Input point options:

Random Value	Л
None Fixed	7.00
Random Value	
Up (down) only Up (down) only with limit Up and down Values from File	1.00

None

The point is not assigned a value. The value will either be the last value that the point had, or zero if no previous value existed.

Input points
None

Fixed

The point will have a fixed value throughout the Simulation run.

Input points		12	Ĩ
Fixed	•	10	-
Value:	10	8	-
		6	Series1
		4	
		2	
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

Random value

During each simulation cycle, the point will be assigned a random value between a given minimum and maximum.



es1

Up (down) only

The value will change in only one direction (up or down). Use a negative step limit to go down.

Input points	180
Up (down) only	160
Start value 5	140 120 100 80 60 40
Fixed step	8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Input points	00
Up (down) only	80
Start value 5	
	40 Series1
	30 20
Random step up to	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Up (down) only with limit

The value will go from a Start value to a Stop value.

Input points		120
Up (down) only with limit	•	100
Start value	5	80
Stop value	100	60 40
Fixed step	- 3	20 0 1 4 7 101316192225283134374043464952555861646770
nput points Up (down) only with limit	•	120 Chart Area
Start value	5	80
Stop value	100	60
Random step up to	▼ 3	20 0 1 4 7 101316192225283134374043464952555861646770

Up and down

The value will go up and down continuously between two limits either by a specified step (fixed or random) with a specified period (specify the time to go from one limit to the other).



Values from file

The point value will be taken from a datalog file – at each simulation cycle, the next value will be read from the file.

This allows using real data such as a datalog of outside air temperature in the simulation. It also makes it possible to repeat a simulation exactly if the input points from the original simulation have been logged.

Input points		
Values from File	•	
File]

POINT LOGGING

Point Value Point Logging	
Point Value Point Logging	
File	
Sample interval 9	00
Datalog capacity (50-4096)	024

Any point in the strategy can be logged to a file. This can be used to review values after the strategy has run, and analyze issues. It can also be used to feedback the value in another simulation (see "Input points options").

Note: Logging will occur only if both

1. the settings in the point Simulation properties dialog are set and

0

2. the logging button Start/Pause is pressed in the Simulation section of the Strategy tab on the Ribbon. This means that logging can be switched on or off during a simulation by clicking the logging button.
12 Sites

OVERVIEW

A site is the name given to one or more controllers, optionally connected to a PC. The following are examples of sites.

- A standalone Field Controller.
- One BACnet Router with a Fieldbus of one or more Field Controllers
- A network of BACnet Routers, each with a Fieldbus of one or more Field Controllers, connected to each other via TCP/IP.

Sites are configured in the Configuration program.

Some common procedures carried out on sites include:

- Installing a new site on the PC (see page 181)
- Site backup (see page 181)

INSTALLING A NEW SITE ON THE PC

To install a new site on a PC, the CXpro^{HD} must be installed already.

A new site is one which has not been installed on this PC before, and for which a backup from another PC does not exist.

WHAT HAPPENS WHEN A NEW SITE IS INSTALLED

Installing a new site involves the following events:

- Site-specific directories are created on the hard disk.
- Site-specific information (information about network ID, telephone number, ID code, etc.) is entered in the WN3000.ini file.
- The network size (the number of BACnet Routers) is specified.
- The BACnet Routers and Field Controllers are named.

Note: Do not manually make entries to the WN3000.ini when installing a site on the PC. All necessary changes will be made to the WN3000.ini file by the Configuration utility.

HOW A NEW SITE IS INSTALLED ON THE PC

Installing a new site on the PC involves the following procedures:

- Naming the new site in the Configuration program.
- Entering the size of the site (number of BACnet Routers) in the Configuration program.
- Naming the BACnet Routers and Field Controllers in the Configuration program.
- If the site is not a remote site, it can be configured as the default site (see *System Configuration* on page 30).
- Restarting Microsoft Windows and the CXpro^{HD} for the changes to take effect.

SITE BACKUP

Making a site backup means making a copy of all site-relevant data on the PC onto removable media such as network, USB flash drive, external Hard Disk, or tape. A site can then be recreated on another PC running **CXpro^{HD}** from this site backup.

MAKING A SITE BACKUP

To backup a site, right-click on the site in the Site Tree, and select Backup Site from the context menu:



You will be prompted for a location to save the backup file:

→ ~ ↑ Is PC > Local		✓ ₫ Search CX;	
Deganise = New folder			II • 🚯
This PC	^ Name ^	Date modified	Type
3D Objects	10020801	04/12/2018 14:55	File folder
Desktop	APPLBACN	04/12/2018 14:07	File folder
Documents	Archive	04/12/2018 14:07	File folder
Downloads	BACNETIP	04/12/2018 14:07	File folder
h Music	BACNSERI	04/12/2018 14:07	File folder
Pictures	Bitmaps	04/12/2018 14:07	File folder
Videos	CAMPBLOR	04/12/2018 15:58	File folder
Local Disk (Cr)	Help	24/04/2019 08:46	File folder
	PLOFFICE	02/05/2019 12:56	File folder
CKproHD	STORES	01/02/2019 11:50	File folder
10020601	Symbolsti	15/03/2019 12:21	File folder
APPLBACN	System	02/05/2019 10:16	File folder
Archive	Temp	01/02/2019 12:01	File folder
BACNETIP	Template	04/12/2018 14:07	File folder
BACNSERI	UC32Macros	15/03/2019 12:23 24/04/2019 09:46	File folder File folder
Bitmaps	Utilities	24/04/2019 08:46	Hile folder
CAMPBLOR	~ <		
File name: PL Office.C/B			
Save as type: CXproHD Backup (".0	C(B)		~

Select any suitable device or folder and click Save.

RESTORING A SITE FROM A BACKUP FILE

To restore a site from a backup, right-click on the Sites node in the Site Tree, and select Restore Site from the context menu:



Choose the required backup file and click Open:

一 个 ● 、 个 ● 、 This PC > Local D	sk (C:) > CXproHD	V Ö Search CXp	م, NHD
rganise 🔻 New folder			Bi • 💷 🔞
🖳 www	🖈 ^ Name ^	Date modified	Туре
manuals	10020801	04/12/2018 14:55	File folder
source	APPLBACN	04/12/2018 14:07	File folder
source	Archive	04/12/2018 14:07	File folder
temp	BACNETIP	04/12/2018 14:07	File folder
	BACNSERI	04/12/2018 14:07	File folder
Desktop	Bitmaps	04/12/2018 14:07	File folder
ConeDrive	CAMPBLOR	04/12/2018 15:58	File folder
Eugene Peelo	Help	24/04/2019 08:46	File folder
This PC	PLOFFICE	02/05/2019 12:56	File folder
3D Objects	STORES	01/02/2019 11:50	File folder
Desktop	Symbols6	15/03/2019 12:21	File folder
Documents	System	02/05/2019 10:16	File folder
Downloads	Temp	01/02/2019 12:01	File folder File folder
h Music	Template UC32Macros	04/12/2018 14:07 15/03/2019 12:23	File folder
Pictures	UC32Macros	24/04/2019 12:23	File folder
	Utilities	24/04/2019 08:46	File folder
Videos			
Local Disk (C:)			
CXproHD	v «		
File name:		CKnroHD	Backup (*.CXB) V
		Chprorito	ouckup (icho) -

If no site with the same name exists, then the restored site is added to the system as a new site.

If a site by the same name exists, the user will be asked to choose either to overwrite the existing site or to create a new site.

- If you choose to overwrite the site that has the same name, the existing site will be completely overwritten. You will be asked to confirm that you want to proceed.
- If you choose to create a new site, you will be asked to enter a new name, and a new site will be added to the site tree. The chosen name must be unique.

You can cancel the restore process at any time.

SITE DISCOVERY

Strategy block data can be uploaded from **ABB Cylon®** controllers and re-assembled into an easy-to-view layout. This is useful when you have a Site where you do not have existing strategy drawings or other information.

The purpose of the discovery process is to determine all of the Subnets (i.e. a Fieldbus connected to a BACnet Router) on a Site.

Note: All Subnets are searched so that the integrity of the data passed between Subnets (e.g. wide globals) remains intact. This happens even if you are looking for information on a single Subnet.
 This process can be lengthy, so please ensure that sufficient time is allocated for it.
 However, you do not have to upload all Subnets at one time. If you specify a Subnet Range for a specific upload, you can retrieve the other Subnets at a later point in time.

The upload process is started from the Site Tree, either from the Sites Icon (if the Site is not already in the tree) or from the relevant Site node.

IF THE SITE IS NOT YET CONFIGURED IN THE SITE TREE

Click on the Sites icon in the Site Tree, and select Discover Site



This opens the Discovery Site Details dialog with all fields editable.

Discovery Site E	Details
Enter the details of the site you would like to dis large number of devices, please ensure the Timeo	
Site Details	Network Type
Site Name	O BACnet Serial
Site Directory	BACnet IP
Site Number 4 (Next free: 4)	
Device ID Range 1 to 4194302	
Wait Timeout (s) 25	
MSTP Network	
	Discover Cancel

Enter the Site Name and Site Directory directory.

If you do not want to retrieve all Fieldbusses on the Site, specify a Subnet Range.

Sites can be uploaded either through TCP/IP or through a serial connection. For TCP/IP connections, include the IP Address and verify the port. Port 4950 is the default.

When configured, click Discover.

IF THE SITE IS ALREADY CONFIGURED IN THE SITE TREE

If the Site is represented in the Site Tree – i.e. if it has been configured locally configured using the Configuration Utility (CCConfig), click on its node in the Site Tree and select Upload Site:



The **Discovery Site Details** dialog will be displayed as before, but in this case, the **Site** details are not editable. When configured, click **Discover**.

After the discovery process is started, the Site Discovery Progress dialog appears showing its progress:

	Site Disc	overy Progress
		rocess. Please wait until this is finished before r site or press cancel to finish the process early
Site Details		Summary
Name	Campus block R	"I-Am" Received Count 0
Number	5	Properties Read Count 0
Network	BACnet	
Controller Di	scovery Calling Whols on Network	k
	Reading Device properties	\$
Attempting to	connect to site <campus i<="" td=""><td>block R> Cancel</td></campus>	block R> Cancel

If you click Cancel to stop the process, any uploaded information is discarded and not applied to the Site in CXpro^{HD}.

When the discovery has concluded, the discovered Fieldbusses /BACnet Routers are displayed in the BACnet Explorer dialog:

Site Details	outer or CXpro, it is not possible	to place M	IS/TP controllers	under the cor	Tect DACHELTO	uters.			
Name Manual Demo	Number of Devices 3								
] 불효 Manual Demo	Name	MAC	Туре	No. Types	Model	Instance	Vendor ID	MS/TP Network	IP Address
E- FBXi 915023 (915023)	FBXi 915023 CBX Chris Desk	1	FBXi-X256 CBX-8R8	8	FBXi CBx	915023 6000	171	502, 503 502	192.168.6.25
🕀 🗇 Object-List	CBM Chris Desk		CBM12	1	UC32.12	3000	171	502	
□ I Network 503 ⊕ ♥ P Network 502									
				G.					
	<								

and any discovered sites are added to the Site List



FULL UPLOAD AND DOWNLOAD

DOWNLOAD

FBXi, CBXi and FBVi controllers with Firmware v9.1.0 and later have additional capabilities over previous **ABB** Cylon controllers and are referred to as "Smart Routers". One of these features is the ability to store the strategies and configuration for the controller, and also support full upload and download of data for MSTP fieldbus controllers.

When changes are made to the strategy of a selected Controller, and then the Connect button is clicked,

Download Upload Audit Log	Select All	View Are dules	dd U		order and	BACnet Poir BACnet Uni Strategy De		View Macros	Create Manage Edit Tem	C Start/P	ause S			Logging Configu	a iration	Displa	v						
Site Controller Connect (Ctrl+0	Clipboard	4 0	01 00.s32		ategy		 1		Macros			Simu	lation			Settin	gs	_					_
Connect to a site.	-	-	01_00.532	-			 			 												-	-
Hg Desk		1.1.1.2																					
To Disc Desk		1.																					
To Disc Desk		1.1.1																					
To disctest		1.1.1.1																					
FBVi Site		1.1.1																					
FBXi Test		1.1.1																					
E FBXiTest2																							
Te FBXiX48_BLANK		1.1.1																					
To fud test		1.1.1																					
FUDReview		- · · · ·																					
To fudreview2																							
Reg heatingOptimizer - Input Z																							
To MadisonOnsite																							
To Manual																							
En Manual Demo													_							2	0.000		
													×+	(A × C)	er/Scaler				Ava	Au	erage	1	
T real and the second		1.1.1.										10.00	O I		0	Autput Q			1 O Inp.		Average	0	
		1.0.00											01		4				O Inp.			1.0	
To newCBXiFUDTEST3		1.1.1									1.00		01		-				O Inp.				
-Ho NEWSITE1.04													0.0	poro					O Inp.			1.0	
- 🗄 OptimizerInputZ		1.00																	O Inp			1.0	
To Sample Apps v2.0																			O Inp.			1.0	
- To Sample Apps v3.0	~																		O Inp.		1	- 1 × 1	

CXpro^{HD} checks whether or not the controller is connected to a Smart Router – i.e. a router that supports full upload and download of controller data.

If it is, then downloading will proceed as follows:

1. Click the Download button. it may be accessed from the Strategy tab or the Controller tab.



The Audit Log dialog will open. The User field will be auto-populated with the current Windows user, but this can be edited if required. An optional Comment (change message) may be entered, for example a description of and justification for the changes made to the strategy. The timestamp is added automatically.

udit Log User 1	- Tara		Date/Time	2022-05-05 13:45:00	
Comment					^
					~
	Recent Comments				
User	Date/Time	Comment			
Tara	2022-05-05 13:44:44	test			
Tara	2022-05-05 13:40:28	sec			

Note: By clicking the Recent Messages button you can reuse one of the 10 most recent messages to speed up entry of the Comment (change message).

- 3. Click the OK button on the Audit Log dialog to continue with the download process.
- 4. Next, the data currently held in the router is uploaded,

ownload	
ownloading to controller	
Jploading blob from router	
Jploading blob from router	
Uploading blob from router Comparing uploaded strategy with strategy on PC	

- 5. Then **CXpro^{HD}** compares the upload with the strategy on the PC to identify 'breaking' changes (changes that would significantly impact the operation of the controller). For example new modules added to the strategy might be considered 'breaking' changes, whereas changes to internal constants in a module might be considered 'non breaking'.
 - If 'breaking' changes are identified, **CXpro^{HD}** will display a message informing the user that a Full download is required, which will cause the outputs of the controller to cycle.



- If no 'breaking' changes are identified then a partial download will be carried out, where only the changes are sent to the controller and the outputs are not cycled.
- Note: During the conversion from CXpro^{HD} v1.5 to CXpro^{HD} v1.6 and the upgrading CBXi/FBXi/FBVi to v9.1.0, if there is no upload file present then breaking changes cannot be identified meaning that the alert will not appear. Once there is an uploaded file to compare with the PC version of the strategy, then the breaking changes alert will appear if appropriate.

UPLOAD

FBXi, CBXi and FBVi controllers with Firmware v9.1.0 and later have additional capabilities over previous **ABB** Cylon controllers and are referred to as "Smart Routers". Features include the ability to store the strategies and configuration for the controller, and also support for full upload and download of data for MS/TP fieldbus controllers.

Note: An FBVi controller will allow upload of its own strategy only. A CBXi or FBXi controller will allow upload of its own strategy or upload of strategies from an MSTP network controlled by it.

For example: If a site contains a mix of **CBXi** controllers some with v9.0.0 and a some with v9.1.0, only those MSTP devices connected to the v9.1.0 **CBXi** routers will have the option to upload **strategies**. Any MSTP controllers under any of the v9.0.0 **CBXi** routers will not have that option. Once those **CBXi** routers are updated to v9.1.0, the MSTP devices connected to them will have the option to upload strategies.

Sample Update Scenario:

- 1. Update CBXi controllers on a Site to v9.1.0 firmware
- 2. Run Discovery on the Site in CXpro^{HD} v1.6
- CBXi controllers that were formerly at v9.0.0 and the MSTP devices under those controllers are now recognized by CXpro^{HD} as being capable of upload/download. However, in order to make the upload facility available strategies must first be downloaded as follows:
 - a. When converting a site from CXpro^{HD} v1.5 to CXpro^{HD} v1.6 make sure that all setpoint values have been saved to the PC copy of the strategy. To do this, right-click on the controller and select Strategy Operations > Upload Setpoints.
 - b. After upgrading the smart router, download the strategy back to the controller. The facility to upload the strategy back to the PC is now available.

If a fieldbus is controlled by a Smart Router, then the strategy and configuration of that controller and also all MSTP fieldbus controller data can be uploaded as follows:

1. Right-click on the controller and select Upload Strategy or the Upload button, accessed from the Strategy tab or the Controller tab.

Ē. Ŧ				Ēn Ŧ			
File - Hom	e Controller	Strategy		File -	Home	Controller	Strategy
Ø Connect Disconnect Site	Download Upid of	Log	Copy Paste Select All Clipboard	🚿 Conn 💉 Disco Site	onnect	Communication Controller BACnet Configuration	by Download T V Dupload C C C Aud Log S
Site List			P	Site List			13

2. Data is uploaded from the Smart Router.

Upload	
Uploading from controller	
Uploading blob from router	
Uploading blob from router Comparing uploaded strategy with strategy on PC	

3. **CXpro^{HD}** compares the upload with the strategy on the PC, and if there are differences, they are displayed in the dialog below:

Туре	Service Or	Block Type	Difference	
Strategy Blocks	3	Absolute Value	The block of type Absolute Value at address 3	on the strategy is not preser
<		Show only blocks	with differences C Show all blocks	2
		^		^
		~		~

- If the listed differences can be overwritten on the PC, click the **Continue** button, and the strategy in the PC will be replaced with the uploaded version.
- If the differences are such that you don't want the strategy on the PC overwritten by what is on the controller, click Cancel and the strategy in the PC will be maintained, and can later be downloaded to the controller.

ABB	Dev	Device name: FBXi Series 123456 192.168.1.2								
😤 Dashboard	Device	es (click row for details)		🔿 refresh						
BACnet The	Name	Instance	Network	Address	Status					
HP Network ♥ ♥0 RS 485 Ports ♥ ▲ Smart Router ◀	001 - FBXi-X256 CBX001	123456 749283	500 502	192.168.1.2 ID:125	✓ ±					
Platform Captures Diagnostics) Sites				

SMART ROUTER CONTROLLER REPLACEMENT (WEB PAGE)

Smart Routers (such as FBXi-X256, FBXi-X48 or CBXi v9.1.0 or later) can facilitate controller replacement through the Router Web page, allowing an **ABB** MSTP controller to be easily replaced and restored of without the use of CXpro^{HD}.

Devices List

In the Web UI of a Smart Router, an overview of the MSTP controllers connected to it is displayed by selecting Smart Router > Devices from the left-hand menu:

		-	-
	▶.		
_	٦	₽	

A Dashboard		Devices (click row for details)		O refresh	
BACnet	▼ Name	Instance	Network	Address	Status
H IP Network	001 - FBXi-X256	123456	500	192.168.1.2	✓
RS 485 Ports Smart Router	CBX001	749282	502	ID:125	✓
T Devices					
O Platform	*				
💝 Captures	Ŧ				
Diagnostics	*				

Device name: FBXi Series 123456 192 168 1 2

For Smart Routers that have no strategies downloaded to them, no controllers will be listed.

If the Smart Router itself contains a strategy that has been downloaded, the router will be the first controller on the list.

If any of the MSTP controllers that are directly connected to the smart router have downloaded their strategies, they will appear on the list.

Overview information such as Device Instance, Network, Address and Status information for each controller is displayed in this view.

If the Smart Router can communicate with a controller, a green checkmark is displayed in the Status column for that controller.

If the Smart Router cannot communicate with a controllers, a red X symbol is displayed in the Status column for that controller.

Авв		Device name: FBXi Series 123456 192.168.1.2									
脅 Dashboard		Devices (click row for details)		refresh							
BACnet	* Name	Instance	Network	Address	Status						
움 IP Network • RS 485 Ports	v 001 - FBXI-X256	123456	500	192.168.1.2	×						
🏝 Smart Router	CBX001	749282	502	ID:125	×						
 Devices Platform 	•										
Captures	v										
1 Diagnostics	v										

If one of the controllers is replaced with a new one that is configured with the same MSTP address, a blue download icon is displayed in the Status column:

ABB			ê. -		
A Dashboard		Devices (click row for details)		🔿 refresh	
BACnet	* Name	Instance	Network	Address	Status
H IP Network	001 - FBXi-X256	123456	500	192.168.1.2	×
RS 485 Ports Smart Router	CBX001	749283	502	ID:125	<u>+</u>
T Devices					
O Platform	*				
💝 Captures	¥				
😻 Diagnostics	¥				

. -

Accessing a controller manually

To view detailed information about a specific controller (including the current and previously discovered state of the controller, as well as relevant timestamps), and to backup/restore it manually, click on that controller in the Smart Router > Devices list.



There are 3 buttons at the bottom of this page:

1) Restore to Device

Clicking this button restores the state of the previously configured controller <u>at the same MSTP</u> <u>address</u>. This would be used if a new controller was put in the place of an existing one, and the new controller was assigned the MSTP address of the one it is replacing. Select the old controller from the **Smart Router** > **Devices** list and click the **Restore to Device** button. The stored strategy and device data will be restored to the new controller and the green checkmark will appear in the **Smart Router** > **Devices** list.

2) Backup From Device

The Backup from Device option allows the manual transfer of the device strategy and BACnet data (including setpoints, k-factor etc.) to the Smart Router.

Note: This step is required in the case of a controller that has been commissioned while **CXpro^{HD}** is not available on site. This could happen if, for example:

- A VAV was balanced using Aero^{BT} or
- A BACnet program such as NBPro is used to change values in a controller strategy

If the controller is replaced at a later stage, the **Backup from Device** step will ensure that the commissioned data (such as k-factor) will be available for the replacement controller.

If **CXpro^{HD}** is subsequently connected to the site, it can be updated by running the **Batch Upload** command, and the saved setpoints will be uploaded to the strategy on the PC for backup.

3) Delete from Router

The Delete from Router option will delete the controller information from the Smart Router so that it will no longer appear in the Smart Router > Devices list. The functionality of the controller will not be affected, and it will continue to run the existing strategy file.

Note : This will delete the backup and will not be recoverable. Please ensure that the strategy has been saved in CXpro^{HD}.

BATCH UPLOAD AND DOWNLOAD

BATCH DOWNLOAD

It is possible to download multiple strategies from the PC to multiple controllers in a single action. To do this,

1. Right-click on a site in the Site Tree, and select Batch Download:



2. Select the controllers for which strategies will be downloaded from the list of all of the controllers on the selected site

Note: If a controller does not have an associated strategy it will not be displayed in this list



3. When the required controllers are selected, click the Continue... button. The Select Batch Download Options dialog will be displayed:



This allows you to define the conditions under which download would stop:

• If a strategy contains disabled modules (e.g. hardware points in the strategy for which there is no corresponding physical FLX configured, or Modbus modules for which no Modbus device is

selected), then the download will stop for that controller and download moves to the next controller.

- If the strategy contains obsolete modules, then the download will stop for that controller and download moves to the next controller.
- If "Breaking" changes are found, then the download will stop for that controller and download moves to the next controller.

And to specify what should happen if extended I/O on FLX units is configured differently from what is expected:

- o Abort the download
- Send the I/O configuration from the PC to the controller
- Leave the I/O configuration on the controller, and update the PC configuration to match

If there is at least one **Smart Router** on the site, then there is also an opportunity to add a comment to the **Audit Log**.

Devenie	ad Options		
	with download if:		
	Strategy contains dis	abled modules	
	Strategy contains obs		
	Breaking changes fou		lv)
		changes requires con	
Warnin	ng: All controllers not u	under Smart Routers	will be fully wiped.
FLX Cor	figuration		
	C Abort the downloa		
Audit Lo	Send the local cor Update the local co g (Smart Routers only	nfiguration to the cont configuration with dat	
Audit Lo	 Send the local cor Update the local of 	nfiguration to the cont configuration with dat	
	Send the local cor Update the local cor Grant Routers only	nfiguration to the cont configuration with dat	a from the controller
User	Send the local cor Update the local c g (Smart Routers only chris	nfiguration to the cont configuration with dat () Date/Time	a from the controller

4. Click Download. Download will proceed for the selected devices, showing conflicts and if any of the 'Continue with download if' in the previous dialog were unchecked, an error message will be displayed if the condition is encountered.

Downloading Data		
Completed. Processing 1 of 1		Stop
Download Success for FBXI 915023 : Download success.	I	
		Close

BATCH UPLOAD

It is possible to upload multiple strategies from multiple controllers on a site to the PC in a single action:

Note: If a site is restored from a backup that was made when a specific Router's firmware was earlier than v9.1.0 and then a Batch Upload is carried out, the router will not be recognized as a Smart Router. In this case you should either open the strategy and connect to the controller, or else run a Site Discovery. CXpro^{HD} will then register the Router as a Smart Router and Upload/Download will proceed as normal.

1. Right-click on a site in the Site Tree, and select Batch Upload



Upload is a feature of Smart Routers only, so when Batch Upload is selected for a site, CXpro^{HD} checks each of the routers on the selected site and displays devices that are connected to a Smart Router in the Select Devices dialog:

Check \ Uncheck all items under	the selected node
Check All	Uncheck All
⊡- 🗹 😜 Sites	
É- ◯ <u>₽</u> Manual Demo É ◯ ■ FBXi 915023 É ◯ ■ Network	
CB>	< Chris Desk
	M Chris Desk1

This will show all devices under a smart router, whether they have a strategy or not, because they may still have a strategy on the smart router.

2. Select the required devices:



3. Click Continue. CXpro^{HD} uploads data from the router.



When complete, the selected controllers for which there were strategies on the Smart Router will have Associated strategies even if they didn't have any before.

Site List 🛛 🕮 🖬	4	/ 1	001_0	0.s32	Y	001_	1_01	.\$32																						
由-료 CYLON ^ 由-료 Desk 由-료 Disc Desk										-										•									-	
⊕- <u>∃</u> disctest	- ·																													
⊕-12 FBVi Site ⊕-12 FBXi Test																														
B-2 FBXiTest2																							_			kcum				
E FBXiX48_BLANK	1												Inalog	Setp	oint	_	-							1111	^	ACCUM.	ator	•	-	
⊕ <u>₽</u> fud test										0	100		an	ltest			L)		-		-	 	 16) Inpu	t		Accumul	ator 🛇		
E FUDReview										F					P	oint 6	21							Scal		_				
⊕- <u>₽</u> _ fudreview2 ⊕-₽_ heatingOptimizer - Input Z	- I									1		5.2	1	1										Clea		-				
⊕- <u>∓</u> e heatingOptimizer - Input Z ⊕- <u>∓e</u> MadisonOnsite																														
H - Ho Manual																														
Hanual Demo	1									0	#1	10	Digita	Setp	oint	-	۲.						E		BAC	Onet 5	chedule	;	1	
E										Ŀ	1		er	able									 L			edule	No. 1/			
Retwork 502 GBX Chi Desk GBM Chris Desk1										F					P	oint [-	8 8 4 9			 1	TE] Enai	ble	(omplem	ent D nds ()		
Network 503																							Pr 17	riority: 7:00: 1	16: Mo Tuesday	onday yı 09:	09:00 - 00 - 17:0	-		
由-문_ newCBXiFUDTEST3 由-문_ NEWSITE1.04																							Th OS	hursda 9:00 -	day: 0 y: 09:0 17:00;	00 - 17 Satur	17:00; :00; Frid day: 09:	lay: 00 -	1	
⊕- <u>₽</u> _ OptimizerInputZ v																							17	/:00: 9	Sunday	1 09:0	0 - 17:0		1	
Navigation D 🗵																														

Setpoint values that are stored on the controller will also be saved back to the PC.

BATCH UPLOAD OF SET POINTS

To upload setpoint values from all controllers and update the local setpoint values to match, right-click on the Site in the Site Tree and select Batch Upload Setpoint Values:

표··물 <mark>··</mark> 물···물···························	et IP 1 - Network et Serial	· · ·
	<u>D</u> iscover Site <u>B</u> ackup Site	
	B <u>a</u> tch Download Ba <u>t</u> ch Upload	
···₽·	Batch Upload Setpoint Values	

This will open the Select Devices dialog.

Select some or all of the controllers on the Site:

Select Devices	×
Check \ Uncheck all items under the	selected node
Check All	Uncheck All
Sites S	31
	Continue Cancel

Click Continue... to start a batch upload process.

When the batch process has completed, the status of each controller will be displayed as follows:

Uploading Data	
Completed.	Stop
Processing 2 of 2	stop
Upload Success for CBXi 405151 Upload Error for FBXi-8R8_331131 : No Setpoints in strategy to upload.	
<u>]</u>	
	Close

VIEWING THE AUDIT LOG

Whenever data is downloaded to a controller that is under a Smart Router, the user has an opportunity to record a comment about the change, allowing them for example to explain why the change was made.

The last 10 changes that were sent to the Smart Router can be viewed by clicking the Audit Log button which is under the **Strategy** tab or the **Controller** tab:

Ēn Ŧ						En =				
File - Hom	e Controller	Strategy				File - Ho	ome	Controller	Strategy	
∯ Connect ₽ Disconnect Site	Download Upload	Audit	Copy Paste Select All Clipboard	View Modules	Ad Teo	Connect Connect Site	t 5	Communication Controller BACnet Configuration	t Upload	Wipe Controller Compare Show Compare
Site List			4	X 4	00	Site List				001_

FIRMWARE UPGRADE

CXpro^{HD} can load firmware from a local file on the PC to one or more controllers. To do this,

1. Right-click on a site in the Site Tree, and select Upgrade Firmware



2. select the controllers for which you want to upgrade the firmware.

Check \ Uncheck all items unde	r the selected node	>
Check All	Uncheck All	
E-VS Sites È-V₽ Manual Demo	•	-
	3	
-05,08	X Chris Desk M Chris Desk1	

3. Click Continue



4. Select the .flx files (for FLXeon controllers) or .bin files (for all other controllers) that represent the required firmware.

- 5. Select whether all controllers will be upgraded (Always Upgrade) or just specific versions (Upgrade if controller version older than:)
- 6. As firmware upgrade requires the controller to be wiped, specify if the strategy should be backed up before the upgrade and restored afterwards by checking the Retain Strategy on controller box. If Retain Strategy on controller is selected, it will be possible to select:
 - whether each controller will restart as soon as its firmware is upgraded (Restart each controller after each FW upgrade), or
 - if all controllers will be upgraded before any of them restart (Delay controller restarts until all upgrades completed). This second option will significantly reduce the amount of network traffic, saving time for the overall process.
- 7. When the dialog is complete, click Continue to download the Firmware.

To close the dialog without adding this Firmware Upgrade to the batch, click Cancel.

Note: When the firmware upgrade is run (i.e. when Actions > Run/Complete Batch is next selected) the Instruction window will list any firmware upgrades as they happen. If Restart each controller after each FW upgrade was selected, then the setup block sent with each restored strategy will restart the Controller. However, if Delay controller restarts until all upgrades completed is selected, then the setup in each strategy will be set to 0 blocks and an extra Setup command will be sent at the end of the Firmware Upgrade process as shown below:



Upgrading Firmware	
FBXi 915023 Sending Firmware to FBXi Controller - Please Walt Processing 1 of 1	Stop
I	
	Close

Any errors or warnings will be displayed in the bottom part of this dialogue

Note: This upgrade can take a long time if there are large files to be downloaded.

When the upgrade is complete, the Router reboots, and a timeout is displayed for this:

Jpgrading Firmware	
EBXI 915023 Waiting For Reboot - 32 Seconds Remaining Processing 1 of 1	Stop
	Close

Note: This can take some time, for example the FBXi device takes 65 seconds to reboot.

UPGRADE SENSORS TO FUSION AIR

Specific products (e.g. CBV-2U4-3T or FBVi-2U4-4T) which contain factory 'canned' strategies supporting CBT-STAT sensors, can be automatically upgraded to support FusionAir sensors instead of CBT-STAT if required.

1. Right-click on a site in the Site Tree, and select Upgrade Firmware



2. Select the devices to be upgraded:



- **Note:** If there are no relevant devices configured with factory strategies on the site, then nothing will be displayed in this dialog.
 - 3. Click Continue. Qualifying Strategies in the selected controllers will be updated to support FusionAir sensors.

ASPECT[®] / INTEGRA™ EXPORT

This feature saves data for a Controller, Fieldbus (Subnet), or Site into a JSON-formatted text file for import into ASPECT® or INTEGRA™, allowing applications to be automatically configured in ASPECT®-Studio or INTEGRA™ IT-8000.

STARTING THE EXPORT

To export a Field Controller, BACnet Router, or Site, right-click on its node in the Site Tree and choose Export ASPECT/INTEGRA Data.



If a Field Controller is selected, that controller's information is exported to the ASPECT[®] / INTEGRA[™] .json file, along with the parent network and parent site information as required to correctly import into ASPECT[®] or INTEGRA[™].

If a Fieldbus is selected, information for all controllers in that Fieldbus is exported along with the parent site information as required to correctly import into Aspect.

If a Site is selected, information for all Controllers on all Fieldbusses within that site will be exported.

The points that will be exported will be those that are specified in the Export column of the BACnet Points dialog. The BACnet Points dialog is opened by clicking on BACnet Points in the Strategy tab of the ribbon – see *How to expose Points on a BACnet system* on page 128.



After exporting, set a name for the export file that you want. By default, it is set to the name of the Site. The filename extension must remain as .json for easy import into ASPECT® or INTEGRA™.

Save /	As	×
(→ ↑) ≪ CXproHD → CAMPBLOR	✓ C Search CAMPBLOR	Q
Organise 👻 New folder		0
AITEMP CXproHD CXproHD APPLBACN Archive BACNETIP BACNSERI BACNSERI Bitmaps CAMPBLOR ARCHIVE	 Name ARCHIVE dbase DRAWINGS KEYPAD MACROS strat5 STRATEGY 	∧
File name: Campus block R.json Save as type: Hide Folders	Save Cance	

After setting the filename, click Save.

The process will begin to export information. The Creating Aspect Data... dialog will be displayed to show the progress of the export:

Creating Aspect Data	
001 - UC32netK - 007 - UC3224	
Processing: 6 of 12	Stop
001 - UC32netK - 012 - UC3224: Datalog block 14 has a connected point that is not named. 001 - UC32netK - 012 - UC3224: Datalog block 131 has a connected point that is not named.	^
001 - UC32netK - 012 - UC3224: Datalog block 250 has a connected point that is not named. 001 - UC32netK - 012 - UC3224: Datalog block 251 has a connected point that is not named. 001 - UC32netK - 012 - UC3224: Datalog block 252 has a connected point that is not named.	
001 - UC32netK - 012 - UC3224: Datalog block 253 has a connected point that is not named. 001 - UC32netK - 012 - UC3224: In path "/C/Aspect_v_Unitron/001_UC32netK/012_UC3224", 001 - UC32netK - 011 - UC3224: Datalog block 14 has a connected point that is not named.	"reset" is a reserved word
001 - UC32netK - 011 - UC3224: Datalog block 131 has a connected point that is not named. 001 - UC32netK - 011 - UC3224: Datalog block 250 has a connected point that is not named.	v >
	Close

For any errors or warnings encountered, you will see the network (Fieldbus) name, the name of the controller, and the action that should be taken. Correct these errors in the appropriate strategy or configuration and then start the Export process again.

You may stop the export process at any time and review the errors and warnings.

You may copy the errors and warnings from the dialog into a document or email.

When finished, click Close to complete the process.

IMPORT INTO ASPECT®-STUDIO AND INTEGRA™-PROPACK

Refer to *MAN0129 ASPECT®-Studio* for details about importing the .json data into ASPECT®.

Refer to MAN0140 INTEGRA™ ProPack for details about importing the .json data into INTEGRA™.

Launching CXpro^{HD} from INTEGRA[™]-ProPack

When an export file from CXpro^{HD} is imported into an IT-8000, it is then possible to launch CXpro^{HD} from the INTEGRA[™] UI – targeting a specific controller for engineering or debugging.

In order to do this, ensure you have CXpro^{HD} installed on your computer, and INTEGRA™ version 4.7 or greater is installed on the IT-8000 or supervisor. Also, ensure that the CylonService is installed.

You must also have a copy of the CXpro^{HD} project and strategies in CXpro^{HD}.

Note: The CylonService uses the site name and device instance numbers to locate the strategy in CXpro^{HD}, so you must ensure that the site name in the INTEGRA[™] station matches the site name in CXpro^{HD}. To verify or edit the site name in the INTEGRA[™] station, open the property sheet for CylonBacnetNetwork :

Pack)	: Config : Drivers	: CylonBacnetNetwork
Pr	operty Sheet	
0	CylonBacnetNetwork (Cylo	n Bacnet Network)
	🗎 Status	{ok}
	🗎 Enabled	🔵 true 🔍
	🗎 Fault Cause	
Þ	🖵 Health	Ok [06-May-19 10:34 AM EDT]
Þ	Alarm Source Info	Alarm Source Info
Þ	🖵 Monitor	Ping Monitor
- F	旦 Bacnet Comm	Bacnet Stack
- F	💼 Local Device	Local Bacnet Device [device:10000]
- Þ	X Tuning Policies	Bacnet Tuning Policy Map
	🗎 Site Name	ProPack
	🍙 uploadOnStart	true
•	INTEGRA	BacnetDeviceFolder:INTEGRA

To launch CXpro^{HD}, right-click on the ABB Cylon[®] controller and choose Launch CXproHD:

Drivers	Launch CXproHD	er	Cylon Bacnet Device Folder	
NiagaraNetwork	Eautien expreme	_8R8	Cylon Bacnet Device	00
CylonBacnetNetv	Views	Floor	Cylon Bacnet Device Folder	
Local Device	Actions	▶_ <u>1</u>	Cylon Bacnet Device Folder	
Bacnet Com	New	•	Cylon Bacnet Device	00
Monitor	Edit Tags		Cylon Bacnet Device Folder	
X Tuning Polic		_2U4_3T	Cylon Bacnet Device	0 C
🔻 🛅 Chiller	Make Template	12iVAV	Cylon Bacnet Device	0 C
EBX_8R	Cut		-,	
FirstFloor	Cut			

CXpro^{HD} will open at the project and the last-saved strategy for the selected controller, allowing you to debug, make code changes, and download it to the controller.



MAN0133 rev 29

Aero^{CT} CONFIGURATION

Aero^{CT} is a mobile application that allows users to commission Controllers, edit Setpoints, and view graphs for tuning Site performance.

In order to use the mobile app, the Site must be configured to expose setpoints and points to graph, from CXpro^{HD}.

Note: This feature is only available for controllers that have External Flash.

Note: Aero^{CT} Configuration is only supported on controllers with Firmware Version 9.1.0 or greater.

From the Ribbon Bar under the Strategy Tab, select Configure AeroCT.



This opens the AeroCT configuration dialog:

Name	Number	Туре	
✓ inputConfig	1	Analog	
✓ zoneSP	3	Analog	
✓ occSPDeadband	4	Analog	
unoccSPDeadband unoccSPDeadband	21	Analog	
✓ standbyOffsetSP	28	Analog	
✓ sliderSpanSP	36	Analog	
✓ NET_ShedPercent	40	Analog	
🖌 unitConfig	42	Analog	
✓ occCmd	63	Analog	
supplyAirSP	80	Analog	
Tuning Graphs in AeroC	Description	[Add
Name			
Counter			Edit
Name Counter Tuning Example			Edit Delete

SETPOINTS TO CONFIGURE

The list at the top of the AeroCT configuration dialog shows all of the BACnet exposed Setpoints in the strategy.

By default, all BACnet exposed Setpoints in the strategy are set to be configurable in the AeroCT application. However, you can select a subset of Setpoints to be configurable in the Aero^{CT} application by unchecking the box beside any setpoint that should not be visible in Aero^{CT}.

This list supports multiple selection to easily check/uncheck groups of Setpoints.

TUNING GRAPHS

The second list in the AeroCT configuration dialog shows Tuning Graphs that can be viewed in the Aero^{CT} application. The Description field will show if there's any issues detected with the Tuning Graph.

To define a Tuning Graph, click the Add button. This will open the Add AeroCT Tuning Graph dialog.

oints to Graph in AeroCT (0/10)						
Name	Number	Туре				_^
StrategyVersion	2	Analog Vi				
CBTStat_Temp	43	Analog Vi				
CBTStat_Humidity	44	Analog Vi	rtual			
CBTStat_HeatingSP	45	Analog Vi	rtual			
CBTStat_CoolingSP	46	Analog Vi	rtual			
activeCoolSP	49	Analog Vi	rtual			
activeHeatSP	50	Analog Vi	rtual			
zoneTemp	61	Analog Vi	rtual			
fanRuntime	60					
	68	Analog Vi	rtual			~
etpoints to Configure in AeroCT Name	Number	Analog Vi	rtual	1		
etpoints to Configure in AeroCT				1		_
etpoints to Configure in AeroCT Name	Number	Туре		1	 	_
etpoints to Configure in AeroCT Name inputConfig	Number	Type Analog		1		_
etpoints to Configure in AeroCT Name inputConfig zoneSP	Number 1 3	Type Analog Analog		1		_
etpoints to Configure in AeroCT Name inputConfig zoneSP occSPDeadband	Number 1 3 4	Type Analog Analog Analog		1		_
etpoints to Configure in AeroCT Name inputConfig zoneSP occSPDeadband unoccSPDeadband	Number 1 3 4 21	Type Analog Analog Analog Analog		1		_
etpoints to Configure in AeroCT Name inputConfig zoneSP occSPDeadband unoccSPDeadband standbyOffsetSP	Number 1 3 4 21 28	Type Analog Analog Analog Analog Analog		1		_

The Add AeroCT Tuning Graph dialog lists all BACnet exposed Virtual and Hardware points in the strategy. Up to 10 Points can be selected to Graph in the Aero^{CT} application

The second list in the Add AeroCT Tuning Graph dialog shows the BACnet exposed Setpoints in the strategy. Select any Setpoints that will be configurable for this Tuning Graph. You can also add a short description to each Setpoint that will be visible in the Aero^{CT} app.

All Tuning Graphs require a name, which must be set in the Name box at the top of the Add AeroCT Tuning Graph dialog.

When the Tuning Graph is configured, click OK to close the Add AeroCT Tuning Graph dialog and return to the AeroCT configuration dialog

When all required points and setpoints have been selected, click OK to close the AeroCT configuration dialog.

To send the Aero^{CT} configuration to the controller, carry out a Strategy Download.

CXpro^{HD} | Appendix :: Configuring Units of Measurement and State Strings

13 Appendix :: Configuring Units of Measurement and State Strings

ADDING UNITS OF MEASUREMENT

Additional units of measurement may be added to the existing list of units in a site to allow for a greater range of applications. Units must be added to the site.ini file in the C:\CXproHD\(SITENAME)\SYSTEM directory

Note: Before changing the site.ini file, make a backup copy (for example, site.ini.bak).

The site.ini file can be edited in a word-processing program such as Microsoft Windows Notepad, or Microsoft Word. If you use Word to edit the file, make sure to save the file as a "Text Only" document.

HOW TO ADD UNITS OF MEASUREMENT TO THE SYSTEM

- Make a backup copy of site.ini.
- Open site.ini, using a word processing program.
- Search for the [AnalogUnits] section if adding analog units, and the [DigitalUnits] section if adding digital units.
- Either
 - o edit one of the entries marked "spare"
- (e.g. change UNITS61="Spare1" to something like UNITS61="m/s")
- or
- o append the new units to the list of units
- (for example, add something like UNITS74="m/s" to the end of the list of analog units).
- If you add to the list in this manner, be sure also to increment the NumberUnits parameter so that it matches the final number of units. Ensure the number at the end of the units variable (e.g. UNITS74) has a number at the end that matches its place in the list of units.
- Save the amended ${\tt site.ini}$ file.
- Close and restart CXpro^{HD}, to allow the changes to take effect. The new units can then be selected from list boxes for point configurations.

CXpro^{HD} | Appendix :: Configuring Units of Measurement and State Strings

Old analog units list:	New list after changing:
[AnalogUnits]	[AnalogUnits]
NumberUnits=19	NumberUnits=21
Title="IU"	Title="Unit"
UNITS1=""	UNITS1=" "
UNITS2=" %"	UNITS2=" %"
UNITS3=" %rH"	UNITS3=" %rH"
UNITS4=" "C"	UNITS4=" °C"
UNITS5=" Bits"	UNITS5=" Bits"
UNITS6="g/kg"	UNITS6=" g/kg"
UNITS7="Hz"	UNITS7=" Hz "
UNITS8=" kj/kg"	UNITS8=" kj/kg"
UNITS9="kWh"	UNITS9=" kWh"
UNITS10=" L/s"	UNITS10=" L/s"
UNITS11=" Min"	UNITS11=" Min"
UNITS12=" mV"	UNITS12=" mV"
UNITS13=" Pa"	UNITS13=" Pa"
UNITS14="Sek"	UNITS14="Sek"
UNITS15=" Std"	UNITS15=" Std"
UNITS16=" Volt"	UNITS16=" Volt"
UNITS17=" bar"	UNITS17=" bar"
UNITS18=" K"	UNITS18=" K"
UNITS19=" Uhr"	UNITS19=" Uhr"
	UNITS20=" m/s"
	UNITS21=" kg/m3"

EXAMPLE OF ADDING UNITS TO ANALOG UNITS LIST

Note: Units are also listed in the C:\CXproHDCXproHD(SYTEM\WN3000.ini. However, this file is for legacy applications only and applies throughout the **CXproHD** system, and so **must not be edited**.

Note: Take care when editing site.ini not to change the section headings [AnalogUnits], [DigitalUnits], etc. in any way, because this can cause errors in the CXpro^{HD} system.

CXpro^{HD} | Appendix :: Configuring Units of Measurement and State Strings

CONFIGURING STATE TEXT STRINGS

The State Text strings are strings that can be displayed in the front end to represent the value of a Multi-state Value object. These strings can be configured (per strategy) as follows:

On the Strategy tab of the CXpro^{HD} Ribbon, click Edit State Text to open the Edit State Text dialog.



This dialog will show all State Text strings for the current strategy.

These strings are also used for the Low and High units of Digital Setpoints, Digital Hardware Points, and Digital Virtual Points.

Display	Text		Add
New Line	On Off		Delete
Strategy Blocks	Open Closed		
Controller Limits	Fault Trip		
Resources	Normal		
Points Manager	Frost Run		
Reorder Modules	Alarm Enable		
BACnet Units	Disable Fire		
Multi State Value Text	Smoke Reset		
	Start Stop		
	Heating Cooling		
	Auto Manual		
	Fall		
	Max		
	Low		
	State Text Used: 73 Available State Text:	182	
	Note: These are also used for High/Low Unit text for Digita	e points.	

To add a new string, click the Add button.

To delete an existing string, select the string and click the Delete button

14 Appendix :: File Management

FILE MANAGEMENT IN CXPROHD

On a large site with multiple BACnet Routers where more than one engineer will be commissioning software at any one-time file management becomes very important.

You must ensure that no one modifies the same strategies / global files that an engineer is currently commissioning. To guard against this, we would recommend that all files are stored on a central computer and only the files required for commissioning are copied onto the engineer's laptop. We would also recommend that each engineer is allocated a single BACnet Router to work on at any one time. At the end of each day/commissioning period, the data files for the BACnet Router are copied back onto the central computer.

The data files required to commission a single LAN are as follows:

C:\CXproHDCXpro^{HD}\ [SiteName]\dbase *

Where * is the address of the BACnet Router to be commissioned.

All files under

C:\CXproHDCXpro^{HD}\ [SiteName]\strat5***

Where *** is the address of the BACnet Router to be commissioned.

The same files should be copied back to the central computer at the end of each day/commissioning period.

15 Appendix :: BACnet Explorers

CXpro^{HD} includes two utilities that facilitate the commissioning of BACnet Sites: the **integrated BACnet Explorer**, accessible from the **Ribbon** and the **Site Tree**, and the integrated **Discovery Tool**, accessible from the **Site Tree**.

It is also possible to use the separate legacy application NB-Pro, available from the ABB Library.

INTEGRATED BACNET EXPLORER

The integrated **BACnet Explorer** allows users to discover BACnet devices on their network, explore BACnet Objects, and view and edit the **BACnet** Properties of each one. It can be used to discover a full network of BACnet Devices or a single BACnet Device.

The BACnet Explorer can be launched from a button in the Ribbon Bar or from the Site Tree context menu.



iite List	Ф 🔀	4 /	001_00.s32	
inte List ⇒ ⊕ Sites ⇒ ⊕ Ba BaCnet IP ⊕ ⊕ Ba BaCnet Serial ⊕ ⊕ Ba BaCnet Serial ⊕ ⊕ Ba BaCnet Serial ⊕ ⊕ Pa Nit ⊕ ⊕ PN Nit ⊕ ⊕ ONSemi ⊕ ⊕ Sample Ar	Open '001_00.s32' Break Association Upload Strategy Configure Modbus Devices Copy Strategy To			Ctrl+O
	Batch Download			
	Upgrade Firmware			
	Strategy Operations			>
	Export ASPECT/INTEGRA Data Export ASPECT/INTEGRA Data Update BACnet EDE Data			
	Commission MS/TP Network			
_	Commission this controller			
	BACnet Explorer - Network			
	BACnet Explorer - Device			

This will launch the **BACnet Explorer** window and begin discovering the BACnet Devices on the network, based on the BBMD settings.

	9121 (939121) : (192.168.5.214:47808)	Property	Value
P Network: Local		ANALOG VALUE	
	CBXi 939121 log Value (2)	object-name (77)	Analog_setpoint_2
	Analog setpoint 2	object-type (79)	Analog Value
	Analog setpoint 3	object-identifier (75)	Analog Value (2), Instance 1
	ny Value (5)	present-value (85)	0.000000
	Digital_Sepoint_1	description (28)	Unknown
🖸 FBVi 39164 (39164) : (192.168.5.116:47808) 🕀 🗁 Cale		status-flags (111)	
🖸 (Paulina) FBVi 39074 (39074) : (192.168.5.135:47 📄 🗁 File	(10) FLX Firmware	event-state (36)	normal
	FLX Firmware Fusion Firmware	out-of-service (81)	False
	Strategy	units (117)	degrees_Celsius
	BACnet Data	priority-array (87)	NULL NULL NULL NULL NULL NULL
🖸 (Ronan) FBVi 39162 (39162) : (192.168.5.134:478	CXPro Commissioning File	relinguish-default (104)	20.000000
	Application Firmware		20.000000
	Database	current-command-priority (431)	0
	ification Class (15) 5 Debug (128)	time-delay (113)	
	Bus Configuration (450)	notification-class (0-5) (17)	0
O (Paulina) FB/i 18025 (18025) : (192.168.5.109:47		high-limit (45)	0.000000
		low-limit (59)	0.000000
	work Port (56)	deadband (25)	0.000000
O FBVi 39163 (47809) (39163) : (192.168.5.117:478(Imit-enable (52)	
FBVi 39060 (39060) : (192.168.5.120:47808)		event-enable (35)	
FBVI 39089 9.3.4 (192.168.5.136) (39089) : (192.1 (Ronan) FBVI 39192 (39192) : (192.168.5.122:478)		acked-transitions (0)	
FBVi 39122 (39122): (192.168.5.124:47808)		notify-type (72)	Alarm
(Ronan) FBVI 39059 (39059) : (192.168.5.111:478		event-time-stamps (130)	01/01/0001 00:00:00, 01/01/0001 00:00
O FBVI 39186 (39186) : (192.168.5.131:47808)		cov-increment (22)	0.100000
🖸 Unitron FBVi 39030 (39030) : (192.168.5.138:478		profile-name (168)	Cylon-CBXi-001
		(AT) Auto-Clear Time to Live (49492)	0
Network: 506		(AP) Auto-Clear Priority (49488)	15
P Network: 503		(AC) Auto-Clear Countdown (49475)	0
CBX-8R8 (749271) (749271) : (1)		(SP) Save Priority Array Data Across Re	False
		event-detection-enable (353)	True
O UC328 CU08838078H (838078) : (78)		Current Command Priority (50000)	17.000000
P Network: 153		Override in Effect (50001)	False
O UC328 CU08838007H (838007) : (7)		reliability (103)	No Fault Detected
CBV-214-3T 905476 (905476) : (76)			
UC3224LC (818585) : (85)			

The BBMD IP Address and Port used are displayed at the top of the BACnet Explorer window.

The discovered BACnet Devices are displayed on the left side of the window.

The user can select one of the BACnet Devices to read all BACnet Objects of that device. These are displayed in the center of the window and are organized by Object type.

The user can select one of the BACnet Objects to read all BACnet Properties of that object. These are displayed on the right side of the window. The BACnet Property values can be edited here.

BACNET EXPLORER BBMD SETTINGS

The source of the BBMD Settings used by the BACnet Explorer depends on how the BACnet Explorer is launched:

- If launched from the Ribbon Bar or the root node of the Site List, it will use the System Level BBMD Settings
- If launched from a Site Node of the Site List, it will use the Site Level BBMD Settings. If BBMD is not enabled at the Site level, it will attempt to use the System Level BBMD Settings.
- If launched from a Router Node or a Device Node of the Site List, it will use the Router Level BBMD Settings. If BBMD is not enabled at the Router level, it will attempt to use the Site Level BBMD Settings or Site Level BBMD Settings.

DISCOVERY TOOL

The purpose of the **Discovery Tool** is to allow users to see all live BACnet devices, objects, and properties on the network via **CXpro^{HD}**. It also allows some or all of the discovered objects to be added to an existing **Engineering Centre** Site or allow a new Site to be created with the discovered objects.

For existing sites, this tool is used to compare the site configuration with the devices that are live on the network. It is possible to change the present_value property of some objects.

BACNET EXPLORER

The Explorer is an extension of the Discovery Tool. It is available in **CXpro^{HD}** by right-clicking on a BACnet Site in the Site Tree and selecting Discover Site.



This opens the Site Discovery dialog, which is prefilled with the selected Site's information:

Site Details		
Site Name	East Hall	Network Type © Serial Connection
Site Directory	EASTHALL	C Unitron C BACnet
Site Number	4	Remote Connection
Address Range	to 4194302	C Unitron TCP/IF BACnet IP
Wait Timeout (s)	25	
MSTP Network No	o.	

If the Discover Site option is selected from the context menu of the Site Tree's root node,



then the Site Discovery dialog will be blank and can be used to create a new Site.

enough.	ces, please ensure the Tim	leout value is large
Site Details Site Name Site Directory Site Number Address Range 1 Wait Timeout (s) 25 MSTP Network No.	to 4194302	Network Type C Serial Connection C Unitron C BACnet Remote Connection C Unitron TCP/IP C BACnet IP

The Site Discovery dialog has the following fields:

Network Type

(If an existing Site is selected, this selection cannot be changed).

If a site is not selected, select a Network Type that will apply if you choose to create a site from the Explorer during the current exploration:

- Network 1 for Serial and Modem Sites
- Network 2 for TCP/IP or BACnet Sites

Site Name

(If an existing Site is selected, this field will not be editable).

If a site is not selected, enter a new Site Name here. If you choose to create a site from the Explorer during the current exploration, this is the name that will be used for it.

Site Directory

The Site Directory is automatically generated from the Site Name, but it can also be user-defined. Do not use special characters in the Site Directory Name.

Site Number

(If an existing Site is selected, this field will not be editable).

If a site is not selected, specify a Site Number. If you choose to create a site from the Explorer during the current exploration, this is the Site Number that will be used for it.

Address Range

This can be used to limit the Discovery process. Only BACnet addresses within this range will be tested.

Wait Timeout (s)

This sets the length of time that the process will listen for I-Am responses during discovery.

Larger Sites require higher Wait Timeout(s) to explore the entire site (default 10 seconds)

Network

The user can choose a specific network to discover in this dialog box. If the user enters a network number, only devices on that network will be displayed. Leave this blank if you want to show devices on all networks.

The Discover button will launch the progress dialog.

Site Details		Summary	
Name	BACnetExplorer	Online Devices	0
Number	5	Current Device	0
Network	BACnet		
Re	eading Device properties		4

Calling WhoIs on Network...

A WhoIs call is made, and then the system waits for the specified timeout (default is 10 seconds) after which it reads the BACnet information for each Device that responded with an I-Am message. When this is complete, the results dialog opens:

Site Details Name BACnetExplorer T Number 5	his is the BACnet	Explore	r dialog.						
Num. Devices 9									
BACnetExplorer	ame	MAC	Def. Type	Types	Model	ID	Vendor	Network	IP Addr
	lon BACnet Ro	1	CBR	3	Cylon BACnet R	6000	171	0	192.168.6.38
	itron Slave UC	1	UC32.24 B	1	Unitron Virtual	1220	171	61000	
	ntroller type U	14	UC32.24 B	2	UC32.24	1054	171	60000	
	lon BACnet Ro	2	CBR	3	Cylon BACnet R	49	171	0	192.168.6.40
	ntroller type U	1	UC32.24 B	2	UC32.24	6767	171	51	
	ntroller type U	2		2	UCU12	3752	171	51	
<u> </u>	lon BACnet Ro	3	CBR	3	Cylon BACnet R	141077	171	0	192.168.6.35
	1 - UC3224 BA	1	UC32.24 B	2	UC32.24	141078	171	51	
. Controller type UC32.24 (67 00	2 - CBT12	2	UCU12 BAC	2	UCU12	141079	171	51	
Controller type UCU12 (375									
Cylon BACnet Router 49 (14107									
🕂 🗌 🗐 Object-List									
🗄 🖓 📼 001 - UC3224 BACnet (1410									
🛨 🔽 002 - CBT 12 (141079)									
4									
Select all devices to add to Site	Rescan Network	1			Add Sele	cted Devic	es to Site	1	Close
Select all devices to add to site	Research Network				Aud Sele	Lieu Devic	es to site		0.030

The results dialog contains two panels:

- The left panel contains a tree view list of the BACnet devices and objects discovered.
- The right contains information regarding the selected device or object.

It is possible that not all devices would be discovered during the specified Wait Timeout(s)., so if necessary you can re-scan the network for further devices by clicking the Rescan Network button. The Site Details dialog will open again so that the settings for Address Range, Wait Timeout(s) and Network number can be adjusted. Devices that have already been discovered will be skipped, so that further devices may be discovered even if none of the settings are changed.

The tree view is similar to the existing site list in other applications. The site is the root node of the tree, followed by the routers and then devices under those. Under the device nodes, there are other nodes in the Object List. Expanding this will show each object read in from the parent device.

As an extension of the **Site Discovery Tool**, the Explorer allows devices to be added to the Site specified in the top left corner of the **CXpro^{HD} BACnet Explorer** dialog (which may be an existing site or a new site that will be created when devices are added).

To add devices to the selected site, check the box beside each required device in the Site Tree and click on the Add Selected Devices to Site button. To quickly select all of the discovered devices check the Select all devices to add to Site box beneath the Site Tree. Non-ABB Cylon® devices will be added as virtual controllers and have a CXpro^{FD} address of 131 or above.

When the root of the tree view is selected, the right panel contains a list of the BACnet devices found, along with: device name, MAC address, vendor ID, model name, IP or MSTP Address, Network, and estimated Controller Type.

Cylon BACnet Explorer									- - X
Site Declars BACnet Explorer Name BACnet Explorer Number 9 Num. Devices 8	item in the list. T Any newly disco Green means tha	o begin vered de at the de	reading in the evices will be in evice discovere	object list of a white. Device d matches the	devices that were dis device expand its noc s that have already be addressing of the site levice information in th	de in the Tree ' een configured e configuration	View. 1 will be hig 1. Red mea	hlighted in (Green or Red.
BACnet Explorer	Name	MAC	Туре	No. Types	Model	Instance	Vendor	Netw	IP Addr
E → Cylon BACnet Router 49 (3000)	Cylon BACnet Ro	1	CBR	6	Cylon BACnet R	3000	171	515	192, 168, 6, 4
	Controller type U	4	CBT13VAV	1	UCU13	2221	171	515	152.100.0.1
🕀 🗇 Object-List	Cylon BACnet Ro	2	CBR	6	Cylon BACnet R	49	171	77	192, 168, 6, 3
🗄 🗹 🖾 Controller type UCU13 (222	Controller type U	1	CBM24	1	UC32.24	141078	171	77	
Cylon BACnet Router 49 (49)	UCU12 CT12229	2	CBT12	1	UCU12	141079	171	77	
Object-List									
Controller type UC32.24 (14	-								
- III	•								
Select all devices to add to Site Sort Objects By Instance Number	Rescan Network					ed Devices to S	Site		Close
Number of Devices found: 8									

There is also a column (No. Types) which shows the number of possible ABB Cylon[®] controller types this device could be.

ABB Cylon[®] devices are initially set as a **CBM24** controller type, but this can be changed in the **Controller Properties** dialog. The 'Type' of a non-**Cylon**[®] device cannot be changed in the **Controller Properties** dialog, but if they are added to the Site, they will appear as **CBM24** in **CXpro**^{HD}, and this can be changed in the **Configuration** utility (**CCConfig**).

To open the Controller Properties dialog, double-click on the device in the right-hand panel.

CXpro^{HD} | Appendix :: BACnet Explorers

Controller Properties		Controller Properties	×
Controller Details	BASRT-B	Controller Details Name	Controller type UC3224
Model	BASRT-B	Model	UC32.24
Address	4	Address	1
Possible Types	3rd Party 💌	Possible Types	CBM24
Device Instance Number	1920	Device Instance Number	141078
ОК	Cancel	OK	Cancel

You can then change the Name, Type, Address, and Device Instance Number before adding them to the site.

Note: This will only change the name of the device in the database on the PC, it will not change the name on the device itself.

When the device node of the tree is expanded or double-clicked, the object list of that device will be read in. As each object is received from the device it will be added as a child to that device node. At this stage, the right-hand panel will display the object list with a column for object ID, object type, object name, and present value and this list will be populated as objects are read in.

ite Details BACnetExplorer Name BACnetExplorer Number 5 Num. Devices 10	This is the BACnet Explor	er dialog.				
BACnetExplorer	Object Name	Object ID	Object Type	Value		
Cylon BACnet Router - Chris	Unitron Slave UC1 (2)	1220	(8) Device	0.00		
	1.17 analog	17	(2) Analog Value	0.00		
🕀 🔲 🗐 Object-List	1.18 analog	18	(2) Analog Value	0.00		
🖃 🖓 🖾 Unitron Slave UC1 (2) (1	1.19 analog	19	(2) Analog Value	0.00		
Unitron Slave UC1 (1.20 analog	20	(2) Analog Value	0.00		
	1.21 analog	21	(2) Analog Value	0.00		
🔲 🗐 1.17 analog (17)	1.22 analog	22	(2) Analog Value	0.00		
	1.129 digital	129	(5) Binary Output	0.00		
1.19 analog (19)	1.130 digital	130	(5) Binary Output	0.00		
	1.131 digital	131	(5) Binary Output	0.00		
🔲 🗐 1.20 analog (20) 💡	1.132 digital	132	(5) Binary Output	0.00		
1.21 analog (21)	1.133 digital	133	(5) Binary Output			
1.22 analog (22)	1.134 digital	134	(5) Binary Output	0.00		
	-					
🔲 🗐 1.129 digital (129)						
1.130 digital (130)						
🔲 🗐 1.132 digital (132)						
🔲 🗐 1.133 digital (133)						
🔲 🛑 1.134 digital (134) 📃						
🗄 🗹 😇 Controller type UC32.24						
Controller type UC3						
BACnet RTC Trendle						
🔲 🗊 BACnet RTC Trendlo						
V Z Cylon BACnet Router 49 (49)						
🗄 🗌 🚺 Object-List 🛛 👻						
Select all devices to add to Site	Rescan Network		[Add Selected De	uine to Cite	Close

When an object is selected in the tree view, the properties of that object will be read from the device and the right-hand panel will contain the properties and values of that object.

From the results dialog, the user will be able to change the present value property for some of the objects.

Note: To refresh a specific object, right-click on that object.
CHECK AGAINST EXISTING DEVICES

When using the **BACnet Explorer** on an existing site, any discovered devices must be checked against those that have already been configured. This is done by comparing the Device Instance Number of each discovered device against the Device Instance Number of any devices on the site configuration already.

For any discovered devices that have the same Device Instance Number as a device on the PC, there will be a comparison made between the MAC address discovered and the **CXpro^{HD}** address.

- If these match, the device will be highlighted in the list in green to signify that the devices match. A matching device cannot be edited.
- If they do not match, then the device in the list control will be highlighted in red to alert the user to this mismatch. The user will be given a choice to resolve the mismatch
- If the Device Instance Number does not match any other ID on the PC, then this discovered device will not be highlighted and will be left white. Non-matching devices can be edited.

CHANGING THE PRESENT_VALUE PROPERTY

The present value can only be written to commandable BACnet objects. Commandable objects always have the 'present value' property and two additional properties – Priority Array and Relinquish Default.

- Analog Output, Binary Output, and Multi-State Output objects are always commandable.
- Analog Value, Binary Value, and MultiState Value objects can be commandable, but this is decided by the vendor.

To change the present value of a commandable object, double-click on the present value property in the right panel. If the object has the required properties, this will open the Change Present Value Dialog:

Change Present Value Dialog			×
Below is the Priority Array of the		Priority	Value
selected object. To change a value, select the checkbox and	Г	1	NULL
enter the new value. Leave the	h	2	NULL
value blank or set to "NULL" if	17	3	NULL
you would like to relinquish this value.	17	4	NULL
value.	ī	5	NULL
Object Details		6	NULL
Device ID 1054		7	NULL
Device ID 1054		8	NULL
Object Name Analog		9	NULL
Object Instance 10		10	NULL
Object Instance 10		11	NULL
Object Type (1) Analog Outpu		12	NULL
		13	NULL
Present Value 12.57		14	NULL
		15	12.567
		16	2.58
Change Selected Values		Close	

The table on the right-hand side of this dialog shows the current priority array of the object. To change or relinquish the value, you must select the checkbox beside the relevant priority index. By selecting the checkbox, you can edit the value at that array. To relinquish that value, clear the contents in the box or set it to "NULL".

When the **Change Selected Values** button is clicked, the value for any priorities whose checkbox is ticked will be sent to the BACnet object. This will update the priority array on the device and to show this, the list items, present_value and priority_array, in the Explorer dialog will be updated too.

NB-PRO

NB-Pro is a generic commissioning environment for BACnet controllers. Using NB-Pro, users can setup and configure devices to create control programs and strategies for building automation systems, including ABB Cylon® BACnet. For details see *MAN0122 NB-Link & NB-Pro*.

Note: For NB-Pro to work with CXpro^{HD}, you must open the Settings menu NB-Pro and select Network Configuration. In the Network Configuration dialog, select the Remote IP radio button in the Communicate Via: section so that NB-Pro does not attach to the BACnet UDP port of the PC as this would block CXpro^{HD}. Also, register NB-Pro as a foreign device on a CBR on the network by entering the CBR's IP address in the Network Configuration dialog's BBMD Device field.

16 Commissioning Controllers with CXpro^{HD}

HOW TO CONFIGURE A CONTROLLER'S BACNET SETTINGS

When a Field Controller is first commissioned, its address must be set by connecting **CXpro^{HD}** directly to the controller by RS232 link (Service Port). If points on the controller are to be exposed on a BACnet network, or if **CXpro^{HD}** is to communicate with the Field Controller by BACnet Tunneling, then the Field Controller's BACnet address (Device Instance Number) must also be set.

These device settings, and others, can be set from CXpro^{HD} as follows:

Note: Some parameters can be set over Ethernet connection, but Controller Address and Baud Rate can only be set when the Engineering PC is connected to the controller by RS232 link.

In C	Xpro ^{HD} , select BA	Cnet Configuration f	rom the	Controller	tab of the R	ibbon
ome	Controller St	rategy				
ect	Communications Controller BACnet Config Stion	☆ Download ऒ Wipe Controller 삼 Auto Online	Co 같: Shi			
			д			

This opens the BACnet Configuration dialog, which defines how the Controller will communicate on the BACnet network, and how it will communicate with CXpro^{HD} for configuration over BACnet.

In this dialog, each current value and the proposed new values can both be displayed at once. Defaults can also be automatically generated.

	BACnet Co	onfiguration	
	Controller	Config	New
Controller		1	
Device Instance		666111	
Device Name		001 - 001 - CBM24	
Site		4	
Comms Ctrl		1	
MS/TP Max Masters			
APDU Timeout		3	
MS/TP Baud Rate			
		Use	Config Values
		Receive	Send
Reading from controlle	f		
			Close

Note: Only Device Name, Router Address, and MSTP Max Masters will be editable when the Engineering PC is connected over Ethernet. In order to edit the other parameters, it must be connected by RS232 serial link.

CXpro^{HD} | Commissioning Controllers with CXpro^{HD}

The parameters that define how the Controller communicates on the BACnet system are:

Device Instance

Enter the required BACnet address (0 - 4194303).

Note: The number set here in the Field Controller (when connected serially) must match the Device Instance Number set in CXpro^{HD}. **Device Name** Any descriptive text. **Tunneling Properties: Site and Comms Ctrl** Note: All of the ABB Cylon® controllers throughout the BACnet system must have the same CXpro^{HD} "Site Number". In the Device Properties dialog set the Site and Comms Ctrl matching the position of this Controller in the Site defined in CXpro^{HD}. **MSTP Max Masters** This must be equal to or greater than the highest address used on the BACnet MS/TP fieldbus, because this controller will not pass data to devices with addresses higher than this. The optimum situation is that this value is set in all devices to exactly the value of the highest address on the fieldbus. (1 - 127) Note: It is recommended that you address your controllers consecutively starting at 1, with the MAX Master value matching the Maximum Controller address value. For optimum efficiency, there should be no gaps in the device addresses. **APDU Timeout** (0 ... 60 seconds) this value should be left at its default unless there is a problem.

COMMISSIONING A RANGE OF CONTROLLERS QUICKLY (MASS COMMISSIONING)

CXpro^{HD} includes a utility to quickly commission the MAC, Max Masters, Device IDs and Names of **ABB Cylon®** controllers.

This utility is available through either the Commission MS/TP Devices and the Commission MS/TP Network options. The IP device option is only available at the Site level, and configures only CBXi, FBXi and FBVi controllers.

To open the BACnet comissioning utility, right-click on a Site or a Router in the Site List:



Note: The devices must be configured within CXpro^{HD} before they can be accessed by this utility.

Note: For IP comissioning (i.e. if the Commission BACnet Devices dialog was opened with the Commission IP Devices option), then in order for controller parameters to be editable, discovered devices must first be associated with configured devices as described in *How to Associate devices* on page 228.

If launched from a router, only the devices on that subnet will be pinged. If launched from the site, all devices on the site will be pinged.

Commission BACne	t Devices									
All Devices	al Actuator	Serial Number CX 16744168C CU 12142008F	Network 515 515	MAC 1 30	Device ins 4000 3001	Name CBX Chris Desk CBM desk test	Max Masters 50 127	Strategy Type CBV US - Integral Actuator Strategy ID: 0		
Offline / Misconfigur	Network M 515 3		PC) Insta	ance (Ctrl)	Name 001 - 003 - (Type (Ctrl)	Strategy Type Strategy ID: 0	Issues Offline	Apply
¢	515 2	4000000			001-002-(CBX CBX-8R8		Strategy ID: 0	Offline	> Reconcile Issues
Rescan Time	eout (s) 5									Close

When pinging is complete, the	Commission BACnet Devices	dialog is displayed:

ll Devices		Se	rial Number	Network	MAC	Device ins	Name	Max Masters	Strategy Type	
		cu	12142008F	515	30	3001	CBM desk test	127	Strategy ID: 0	
			Instance (P	C) Inst	tance (Ctrl)	Name	Type (PC)	Type (Ctrl)	Strategy Type	Apply
Offline / Misconfig Serial Number	Network	MAC	Instance (P	C) Inst	tance (Ctrl)	Name	Type (PC)	Type (Ctrl)	Strategy Type	Issues
			Instance (Pd 3443 4000	C) Inst	tance (Ctrl)	001 - 003 - C		Type (Ctrl)	Strategy ID: 0	
Offline / Misconfig Serial Number CX16744168C	Network 515	MAC 3	3443	C) Inst 400		001 - 003 - C	CB CBM08 CBX CBX-8R8	Type (Ctrl) CBX-8R8		Issues Offline

The upper-right pane of the Commission BACnet Devices dialog lists all of the devices configured in the CXpro^{HD} Site that have been successfully discovered on the BACnet network.

The lower pane of the Commission BACnet Devices dialog lists devices that are configured in the CXpro^{HD} Site but have **not** been successfully identified on the BACnet network. Devices that partially match the CXpro^{HD} Site configuration are highlighted in red – for example, a device has been found that matches the MS/TP Network Number and MAC Address of a configured device, but the Device Instance Number does not match.

If you want any of the devices highlighted in red to be included in the Commissioning process, tick the checkbox to the right of red highlight. When all such devices have been selected, click the **Reconcile Issues** button.

The configuration of the device in the **CXpro^{HD}** Site will be updated to match the corresponding discovered device, and the device listing will move to the top-right pane:

Devices		Seria	l Number	Network	MAC	Device ins	Name	Max Masters	Strategy Type		
CBV US - Integr	ral Actuator		744168C 1142008F	515 515	1 30		CBX Chris Desk CBM desk test	50 127	CBV US - Integral Actuator Strategy ID: 0		
)ffline / Misconfig Serial Number	ured Devices	MAC	Instance (P	C) Inst	ance (Ctrl)	Name	Type (PC)	Type (Ctrl)	Strategy Type	Issues	Apply
		MAC 3	Instance (P 3443	C) Inst	ance (Ctrl)	Name 001 - 003 - Cl	Type (PC) B CBM08	Type (Ctrl)	Strategy Type Strategy ID: 0	Issues	Apply
	Network			C) Inst	ance (Ctrl)	001 - 003 - C		Type (Ctrl)	Strategy Type Strategy ID: 0 Strategy ID: 0		Apply
	Network 515	3	3443	C) Inst	ance (Ctrl)	001 - 003 - C	B CBM08	Type (Ctrl)	Strategy ID: 0	Offline	
Serial Number	Network 515	3	3443	C) Inst	ance (Ctri)	001 - 003 - C	B CBM08	Type (Ctrl)	Strategy ID: 0	Offline	

Note: If reconciling might create duplicate IDs, the conflicting offline devices are renumbered to a value above 4000000 to ensure that they will be unique.

If no match is found for the MS/TP Network Number and MAC Address of a configured device, that device is listed in the lower pane as Offline, marked with a grey background and cannot be included in the Reconcile Issues process.

To retry pinging offline devices, click the Rescan button on the bottom left of the dialog.

The upper-left pane of the Commission BACnet Devices dialog shows categorized devices found organized by strategy ID.

Commission protect periods



This groups devices by the type of strategy they contain (e.g. single or dual duct VAV, or RTUs, Fancoils, etc), so that common properties can be edited together.

Clicking on All devices will show only the properties that are common to all devices of MAC, Max Masters, Device ID, Name, Serial Number, and strategy Type.

Clicking on a strategy type in the left-hand pane means that additional parameters common to that strategy type will become available in the right-hand pane:

- All Devices	Serial Number	MAC	Max Masters	Device ID	Name	Туре	Input Config	Output Config
 Single Duct VAV Dual Duct VAV 	12345671	1	127	12341	VAVST386	137	48	18
- Fan Coll	12345672	2	127	12342	VAVST388	137	48	18
RTU	12345673	3	127	12343	VAVST390	137	48	18
1110	12345674	4	127	12344	VAVST392	137	48	18
	12345675	5	127	12345	VAVST394	137	48	18
	12345676	6	7	12346	VAVST396	137	48	18

Each of the fields can be edited individually.

However, it is also possible to copy a single value to multiple controllers at once, so that device types that are installed identically - for example, VAVs – can be configured in bulk very quickly (similar to copy & paste in a spreadsheet program).

When appropriate, editing a single field will be assisted by a properties window that indicates what the setting value will mean:

Serial Number	MAC	Max Masters	Device ID	Name	Туре	Input Con	Output Config
12345671	1	127	12341	VAVST386	137	48	18
12345672	2	127	12342	VAVSTOOD	107	10	10
12345673	3	127	12343	VAVS1 VAVS	T386 Config F	Properties	
12345674	4	127	12344	VAVS1 AL	xillary heat	True	
12345675	5	127	12345		ontrol Method	Standard	
12345676	6	7	12346	VAVST			
							_
				Contr	ol Method		
					ol Method the control se	quence applied to t	this

When all of the fields have been configured, click the **Apply** button, and the full set of edited parameters will be sent to all controllers. A progress dialog will be displayed, indicating progress and highlighting any failures:

ierial N	MAC	Max Masters	Device ID	Name	Progress
2345671	1	127	12341	VAVST386	Complete
2345672	2	127	12342	VAVST388	Controller write failure.
2345673	3	127	12343	VAVST390	Complete
2345674	4	127	12344	VAVST392	In Progress
2345675	5	127	12345	VAVST394	
2345676	6	7	12346	VAVST396	

NTP Time sync enable/disable

To enable or disable NTP Time Synchronization on an IP Controller, right-click on the controller in the Site Tree, and select Commission IP Devices from the context menu:



In the Commission BACnet Devices dialog, set NTP Enable to true or false as required.

Commission BACnet Devices												×
All Devices	If the CXproHD n	ame and the co	ntroller name do n	ot match:	c	Use CXproHD Nat	me 👎 Use Uploa	aded Controller Name	2			
	Serial Number	Version	IP Address	Port	Device ins	CXproHD Name	Uploaded Name	Description	Location	NTP En	Strategy T	ype
	FBXi915023c	9.3.5	192.168.6.25	47808	915023	FBXi 915023	FBXi 915023	Test	Test2	false 🔻	Strategy I	D: 1234
										false true		
											_	
											Ap	ply

Port status change

To configure the RS-485 Ports on an IP Controller, right-click on the controller in the Site Tree, and select Configure IP BACnet Device Properties from the context menu:



This will open the Configure IP devices dialog, where the current port status is displayed in the Port Configuration column.

onfigure IP De	vices													- C	×
the CXproHD na	ame and the co	ontroller name do	not match:	C Use C	(proHD Name	 Use Uploaded C 	ontroller Name	Show/Hide Co	lumns						
Serial Number	Version	MAC	Hostname	IP Network		IP Address	UDP Port	Subnet Mask	Default Gateway			Port Configuration	Device ins		n
FBXi915023c	9.3.5	0c:1c:57:f		500	false	192.168.6.25	47808	255.255.255.0	192.168.6.253	8.8.8.0	4.4.4.4	[1-MS/TP.76800.502].[2-None.76800.503]	915023	Test	
												R			
												~3			
														_	
															Apply
Rescan	Timeout (s)	5													Close

Clicking on the Port Configuration column will open a dialog allowing the Port Type, Baud Rate, and Network Number to be configured for all IP Devices.

Serial Number	Name	Port 1 Type	Port 1 Baud Rate	Port 1 Network No.	Port 2 Type	Port 2 Baud Rate	Port 2 Network No
FBXi915023c	FBXi 915023	MS/TP	76800 ▼ 9600 19200 38400 57600 76800 76800 115200 √	502	None	76800	503

MS/TP Address change

To change the MS/TP Address of an MS/TP device, right-click on the device in the Site Tree, and select Commission MS/TP Network from the context menu:

Site List	부 🗵 🖉 001.
⊡¶BACn ⊡¶BACn ⊡¶BACn	
	Discover Site Backup Site
	Batch Download Batch Upload Batch Upload Setpoint Values
	Upgrade Firmware Upgrade Sensors to Fusion Air
	Export ASPECT/INTEGRA Data Create BACnet EDE Data
	Commission IP Devices Commission MS/TP Network
	Configure IP BACnet Device Properties

This will open the Commission BACnet devices dialog.

Enter the MS/TP Address in the MAC column.

Commission BACnet Devices											-		×
All Devices	vices If the CXproHD name and the controller name do not match:												
	Serial Number	Version	Network	MAC	Device ins	CXproHD Name	Uploaded Name	Description	Location	Max Masters	Baud		Strate
	CX16744168C	CBX 9.3.5	502	1	6000	CBX CX167441	CBX CX167441	Plant Controller	Location not se	125	38400 ((5)	Strate
					\square								
												Appl	у

CXpro^{HD} | Commissioning Controllers with CXpro^{HD}

Baud rate change

To change the Baud Rate of an MS/TP device, right-click on the device in the Site Tree, and select Commission MS/TP Network from the context menu:



This will open the Commission BACnet devices dialog.

Select the Baud rate in the Baud column.



CONFIGURE A SINGLE CONTROLLER

In addition to Mass Commissioning, it is possible to configure an individual controller without re-running. This can be useful if for example a mistake was made on a few controllers during Mass Commissioning, or if circumstances change and a small number of controllers must be changed.

To commission a specific controller, right-click on it in the Site Tree, and select Configure this Controller.

CXpro^{HD} attempts to communicate with the controller, find its serial number and read its strategy ID. If CXpro^{HD} cannot communicate with the controller, a warning will be displayed and the dialog will close. Otherwise, CXpro^{HD} will show a Config Properties dialog:

VAVST386 Config Pi	roperties	
Auxillary heat	True	
Control Method	Standard	
Control Method		
This is the control seq VAV	uence applied to this	

When the properties are set, click the Apply button to send the configuration and close the dialog.

	Serial Number	Version	IP Address	Port De	evice ins	Name D	scription	Location	Strategy Type		
	FBXi915023C	8.3.0-a10	192.168.6.25		15023				Strategy ID: 0		
										Apply	Close
If	strategy	ID is kn	own user	can edit t	he cor	figuration p	oint value	s in the sam	e way as f	for mass	
CO	mmissio		own, user g. for MS/			nfiguration po	oint value:	s in the sam	ie way as f	for mass	
	ommissio ice Version		g. for MS/		Descripti	on Location	Max Masters		Input	for mass Heating	Cooling

CONFIGURE IP BACNET DEVICE PROPERTIES

CXpro^{HD} includes a utility to quickly configure BACnet properties for IP devices. To launch this utility, rightclick on a Site in the Site List and select Configure IP BACnet Device Properities

u <u>t</u> u -, ⊡- t u Dest	
	Discover Site
	Backup Site
⊟… <u>te</u> dgf	Export ASPECT/INTEGRA Data
titl	Create BACnet EDE Data
	Commission IP Devices
₽₽₽	Commission MS/TP Network
	Configure IP BACnet Device Properties
⊞ <u>₽.</u> FB>	Edit Controllers
<u>⊨</u> ₽ _ Ma	Delete Site
	Properties

The utility will scan for all CBXi, FBXi and FBVi devices on the selected network.

Note: The devices must be configured within CXpro^{HD} before they can be accessed by this utility.

When scanning is complete, the Associate IP Devices dialog will open:

Associate IP Devices															
Discovered Devices												Site Devices			
Serial Number	Version MAC		Hostname	IP Net	IP Address	UDP Port	Device ins	Name	Description	Location		Name	Devic	Type	Associated
	8.3.0-t10 Oc:1				192.168.6.25		915023	CBXi 915023	Not Set	Not Set		CBXI 915023 003 - Network 004 - FBVi-2U4.	915023 45785		false false false
Associated Devices									1	4	Associate				
Serial Number	Associated Devices Serial Number Version MAC Hostname IP Net IP Address UDP Port Device ins Name Description Location Associated There are no items to show in this view.<														
Rescan	out (s) 10	_									Delete Association			ок	Cancel

The Site Devices panel on the right lists all of the relevant IP devices configured in the CXpro^{HD} Site that have been successfully discovered on the BACnet network.

The **Discovered Devices** panel on the top left lists all of the relevant devices that have been discovered on the network

The Associated Devices panel on the bottom left lists any Discovered Device that has been associated with a configured Site Device.

HOW TO ASSOCIATE DEVICES

To associate a Discovered Device with a Site Device, select a device in the Site Devices list and a device in the Discovered Devices list and click the Associate button. Alternatively, you can drag the Site Device and drop it over a Discovered Device.

Once this is done, the discovered device is moved to the Associated Devices list. The device on the Site PC is updated with the Device Instance of the physical devices.

The MAC address will be stored in the site configuration as the key, so associations are maintained if the tool is run again.

	s											Site Devices			
erial Number	Version	MAC	Hostname	IP Net	IP Address	UDP Port	Device ins	Name	Description	Location		Name	Devic		Associate
												CBXI 915023 003 - Network 004 - FBVi-2U4	915023 45785 12545	CBXI FBXI-X256 FBVI-2	true false false
					There are n	o items to sh	now in this view.								
											Associate				
ciated Device	s										Associato				
rial Number	Version	MAC	Hostname	IP Net		UDP Port		Name	Description	Location	Associated				
	8.3.0-t10				192.168.6.25		915023	CBXi 915023	Not Set	Not Set	CBXi 915023				
Xi915023C	8.3.0-t10														

When all required devices have been associated, click **OK** to open the **Configure IP device** dialog where the IP **Properties** of Associated devices can be edited.

Configure IP Dev	vices														-		×
Serial Number	Version	MAC	Hostname	IP Network	DHCP	IP Address		Subnet Mask	Default Gateway		Secondary			Description	Location	Strateg	
CBX915023C	8.3.0-t10	0c: 1c: 57:f	CBXi91502	. 500	true	192.168.6.25	47808	255.255.255.0	192.168.6.253	0.0.0.0	0.0.0.0	915023	CBXi 915023	Not Set	Not Set	Strateg	jy ID: 0
<																	>
Offline Devices																Ap	ply
Name		Туре	Network De	evice instance													
003 - Network 004 - FBVI-2U4		FBXi-X256		5785 2545													
Rescan	Timeout (s)	10														Clo	ose

The list on the bottom shows the unassociated or offline devices.

When the properties are set as required, click Apply to send the changes to that controller.



ABB CYLON CONTROLS

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