CYLON® TECHNICAL BULLETIN NO. 488
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CXpro^{HD} v1.06

Summary

Support has been added for FBXi-X48, Full Upload and Download, and changed Modbus limits.

Background

As part of ABB's policy of continuous improvement, new BMS products are being introduced. CXpro^{HD} is updated in parallel to support the new products.

Features

- Support for Full Upload and Download of strategies and configuration data has been added for controllers under a CBXi/FBXi/FBVi controller with firmware v9.1.0 or later
- New Modbus limits have been introduced.
- Support for FBXi-48 has been added.
- A Unit Free input has been added to the Fusion Air strategy module, which can be used with controller-connected sensors. For this input, the value but not the units are directly displayed on the FusionAir LCD. This could be used, for example, for PM$_{2.5}$ particulate sensing.
- Sample Apps have been updated to version 3.1
- Site Organiser has been discontinued:
  - Batch download moved to engineering tool
  - FW upgrade moved to engineering tool
  - Upgrade Sensors to Fusion Air moved to engineering tool

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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, 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.
2. The Audit Log dialog will open. Enter a User name and a Change message, for exampe a description of and justification for the changes made to the strategy. The timestamp is added automatically.

> **Note**: By clicking the Recent Messages button you can reuse one of the 10 most recent messages to speed up entry of the 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,
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.

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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
3. 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.
2. Data is uploaded from the Smart Router.
3. CXpro^HD compares the upload with the strategy on the PC, and if there are differences, they are displayed in the dialog below:
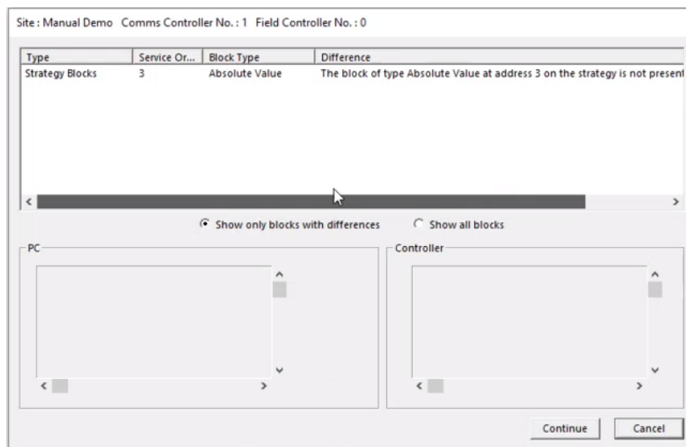
   o If the listed differences can be overwritten on the PC, click the Continue button, and the strategy in the PC will be replaced with the uploaded version.
   o If the differences are such that you don't want the strategy on the PC overwritten by what is on the controller, click Cancel and the strategy in the PC will be maintained, and can later be downloaded to the controller.

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.
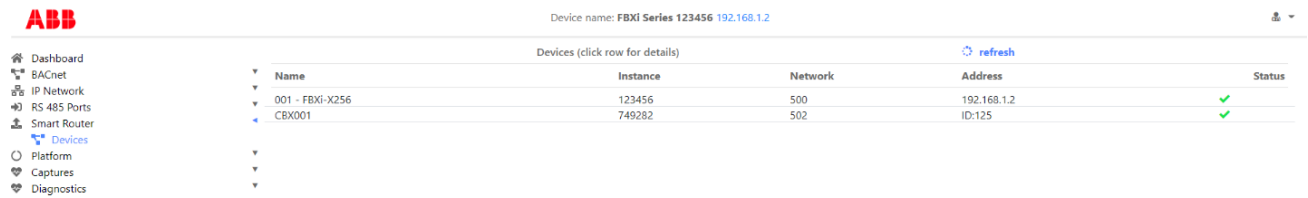
The last 10 changes that were sent to the Smart Router can be viewed by clicking the Audit Log button which is under the Strategy tab or the Controller tab.

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:

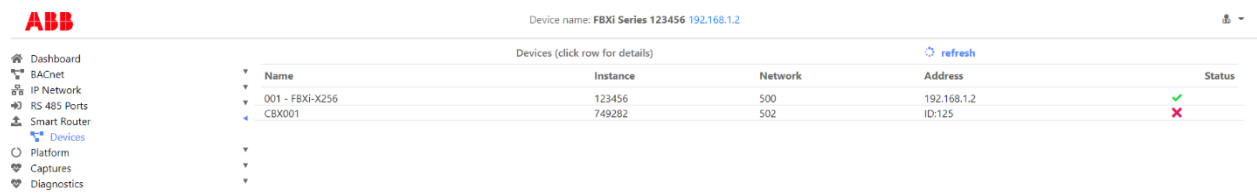For Smart Routers that have no strategies downloaded to them, no controllers will be listed.

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.
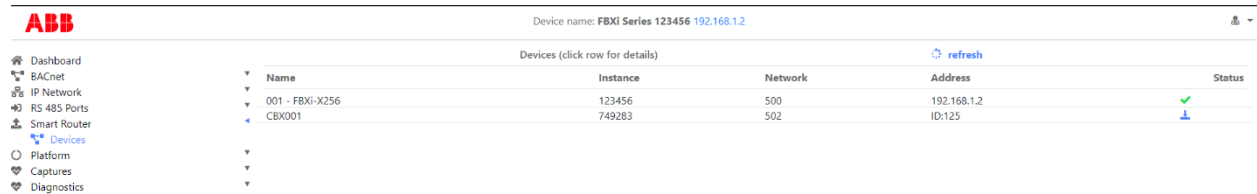
If the Smart Router can communicate with a controller, a green checkmark is displayed in the Status column for that controller.

If the Smart Router cannot communicate with a controllers, a red X symbol is displayed in the Status column for that controller.

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:

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 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: <u>This step is required</u> 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}.

SITE ORGANISER FEATURES NOW IN ENGINEERING TOOL

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:

   o 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.
   o If the strategy contains obsolete modules, then the download will stop for that controller and download moves to the next controller.
   o 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
   o Send the I/O configuration from the PC to the controller
   o 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`.

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.

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:

   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. Setpoint values that are stored on the controller will also be saved back to the PC.

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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.

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:

   o whether each controller will restart as soon as its firmware is upgraded (Restart each controller after each FW upgrade), or

   o 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:
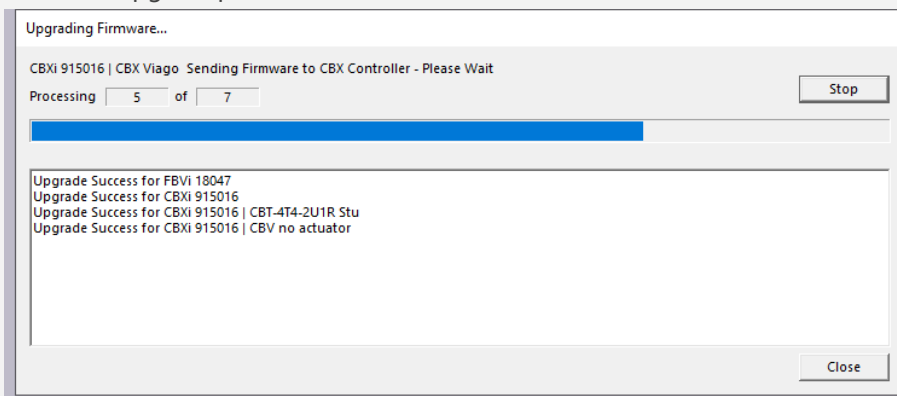
Any errors or warnings will be displayed in the bottom part of this dialogue

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:

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. Select the firmware file at v9.0.0 or later for .flx files (for FBVi) or .bin files (for CBV).

4. Click Continue . Qualifying Strategies in the selected controllers will be updated to support FusionAir sensors.

5. The strategy in the controller will be updated to the latest revision and the strategy in CXPro will also be replaced with the latest production strategy.

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ENHANCEMENTS

MODBUS LIMITS

The limits for Modbus devices have been modified in this version as follows:

Subject to Modbus point limitation:

- Up to 247 devices per RTU port

- Up to 1280 devices via Modbus Router

- Up to 600 Modbus IP devices

These limits do not overlap each other.

The Modbus configuration dialog in CXpro^{HD} will now always show the Used / Available totals for each type.

> **Note**: Modbus device names will be limited to 32 characters in length. For existing sites, if a name longer than 32 is present, it will be truncated and modified if necessary to ensure it is unique.


KNOWN ISSUES

1. A specific Firewall setting has been reported to block broadcast BACnet packets, causing a situation where users must enter BBMD settings in CXpro^{HD} to allow communication when PC and devices are on the same local network.

   This setting can be disabled as follows:

   o Open Windows Defender Firewall with Advanced Security
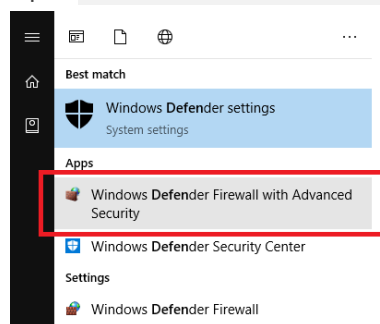
   o Select Inbound Rules and disable / delete rules associated with CXpro^{HD} and Datalog Manager:
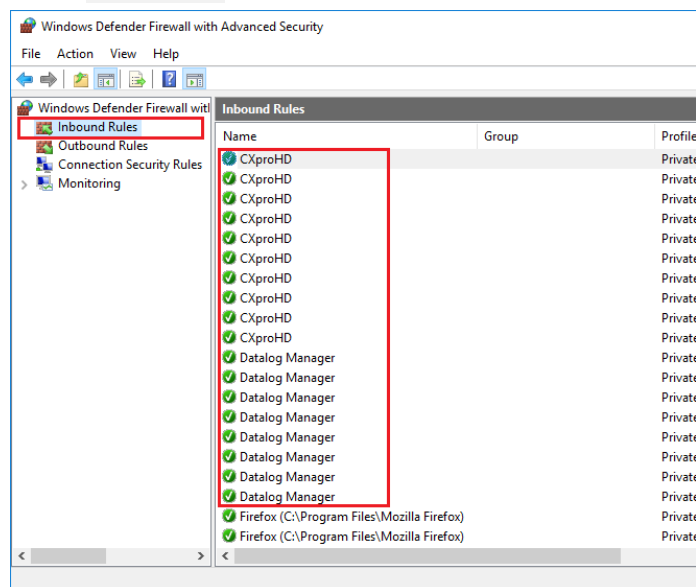
2. On all IP controllers with firmware versions earlier than `8.3.6`, some of the strategy may not be retained during a firmware upgrade.
   This version of CXpro^{HD} will detect the problem and warn the user that they must uncheck the 'Retain Strategy' option when upgrading firmware on these controllers. The strategy would then need to be re-downloaded separately following the firmware upgrade.

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3. The firmware upgrade of CBXi controllers can sometimes fail. This is usually resolved by re-running the upgrade operation or upgrading the controller firmware via the web page.

4. Full Upload and Download will only be enabled when CXpro^HD confirms that the target router supports it. This confirmation will only happen during discovery or after connecting to a controller. For this reason, you may need to re-discover existing sites and/or sites that have modified device instances to re-enable Full Upload and Download.

5. CXpro^HD uses port number `47808` to communicate with BACnet devices, so be aware that if you are running other BACnet client software that uses this port, you may see issues with CXpro^HD communications.

RESOLVED ISSUES

CCB-738 ST-9115   A verification check has been added if a user cancels or escapes the `IO configuration` dialog, so that edited data is not lost

CCB-743 ST-9130   Arrow keys can be used as well as mouse clicks to change the selection of a connector.

CCB-755 ST-9179   License no longer fails on software re-start.

CCB-790 ST-9252   Selection of modules no longer becomes slow when multiple connectors are used in the strategy.

CCB-790 ST-9229   CXpro^HD no longer crashes on a large module copy & paste.

CCB-754 ST-9153   Pasting a destination connector into a different strategy no longer causes a crash.

CCB 809 ST-9406   An issue with `Alarm` Module and Connector names becoming too long has been resolved.

CCB 631 ST-9413   A `Text` module issue with Cylon Macros has been resolved.

CCB 806 ST-9297   An issue with `IO Config` not getting point information from the database has been resolved.

CCB 811 ST-9393   An issue with saving the decimal part of `Analog Setpoint` values has been resolved.

CCB 837 ST-9476   When opening a strategy, Input `Z` is now removed from `Heating Optimizer B` module and any connections to this input are deleted.

CCB-791 ST-9465   Simulation values now show correctly for points on an `FLX` module.

CCB 815 ST-9411   Setpoints in nested macros no longer cause duplicate strategy points.

CCB-723 ST-9131   An incorrect point name is no longer be displayed in the `BACnet points configuration` dialog.

ST-9415   `IO Config` always no longer asks to confirm loss of changes when with none has been made.

ST-9461   Copy/pasting a strategy that contains Modbus modules no longer causes a crash.

ST-9512   Upper limit for Modbus inter-packet delay has been increased from `500` to `10000` ms

ST-9463   An issue with `Simulation` on controllers under dual-port routers has been resolved.

Customer Impact

Customers who are using CBXi/FBXi/FBVi controllers with Firmware `v9.1.0` or later should upgrade to this version of CXpro^HD.

Any customer affected by any of the issues listed above should upgrade when convenient.