

# FX Tools Software Package - FX Builder Express User Guide

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# FX Builder Express

## ***Introduction***

FX Builder Express is an easy-to-use and simplified version of FX Builder. FX Builder Express is used to select an application from a library of standard applications for Facility Explorer field controllers (Figure 1) and to configure that application using graphical plug-ins. See Figure 3 and Figure 4.



**Figure 1: Facility Explorer Controllers**

The library of standard applications includes the most common Heating, Ventilating, Air Conditioning, and Refrigeration (HVACR) applications, such as air handling units, central plants, terminal units, and zoning control applications.

The FX Builder Express wizard allows you to enable or disable predefined functions and strategies within the standard applications.

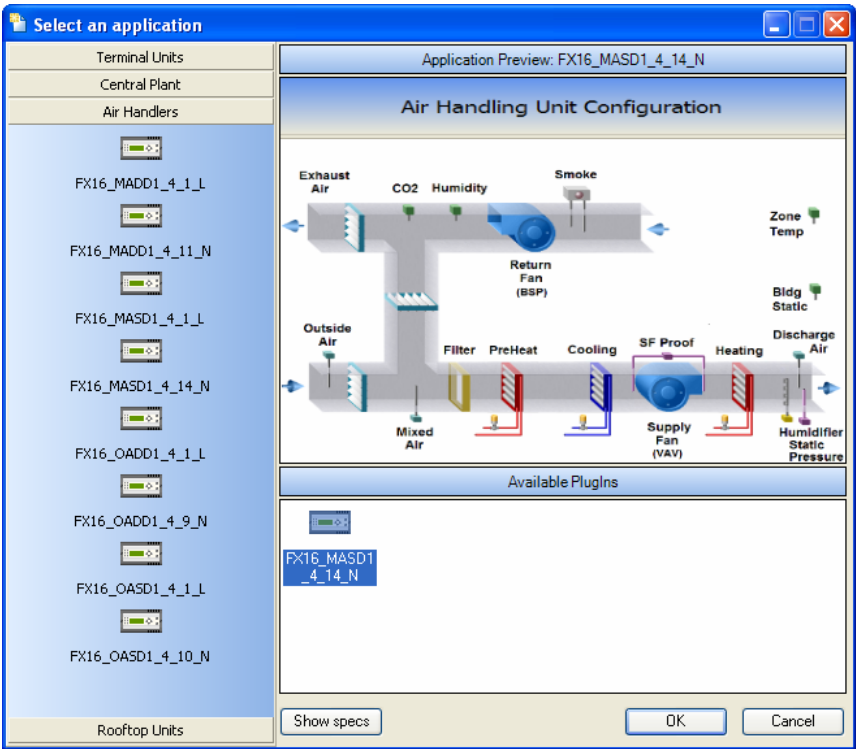


Figure 2: FX Builder Express Screen - Standard Application Selection

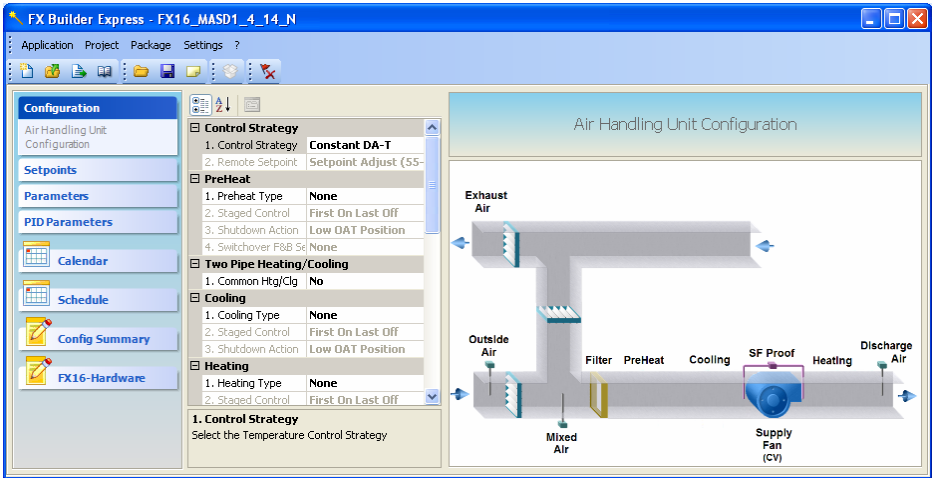


Figure 3: Standard Application Configuration Plug-in

# Installation

## ***Microsoft® Windows® Operating System (OS) Upgrade***

FX Builder Express uses Microsoft .NET Framework; therefore, you need to install Microsoft® .NET Framework Version 2.0 to run FX Builder Express.

Upgrade the Windows® OS on your computer before you install FX Builder Express.

## **The .NET Framework Version 2.0**

The .NET Framework Version 2.0 is a component of the Microsoft Windows OS used to build and run Windows OS based applications.

## **Checking the .NET Framework Installation**

You can check to see whether .NET Framework Version 2.0 is already installed.

To check the .NET Framework installation:

1. From the Start menu, select Control Panel.
2. Double-click Add or Remove Programs. A window displays a list of installed application.
3. Scroll down the list to locate Microsoft .NET Framework Version 2.0. If you find Microsoft .NET Framework Version 2.0, an OS upgrade is not necessary. If you do not find Microsoft .NET Framework Version 2.0, then you need to upgrade your OS using the FX Tools CD-ROM (which includes the .NET Framework Version 2.0 redistributable program).

## Installing FX Builder Express

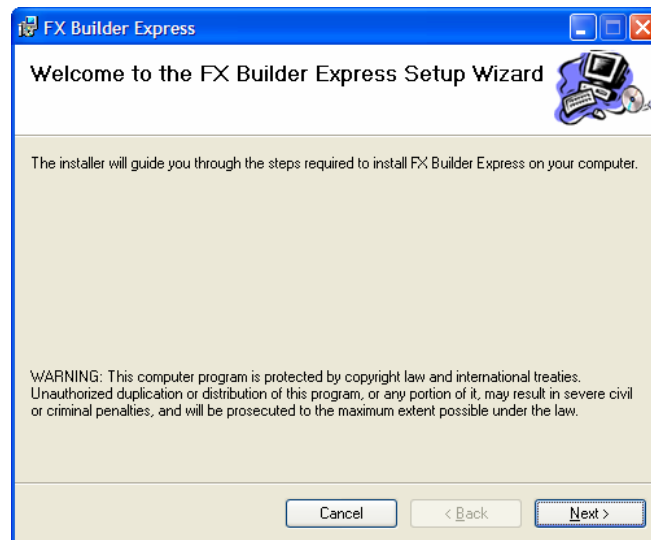
To install FX Builder Express:

1. Close all open programs.
2. Insert the FX Tools Pro CD-ROM or FX Tools Express CD-ROM into the CD-ROM drive. The FX Tools auto-run feature starts automatically.

**Note:** If it does not, select Autorun.exe to start it manually.

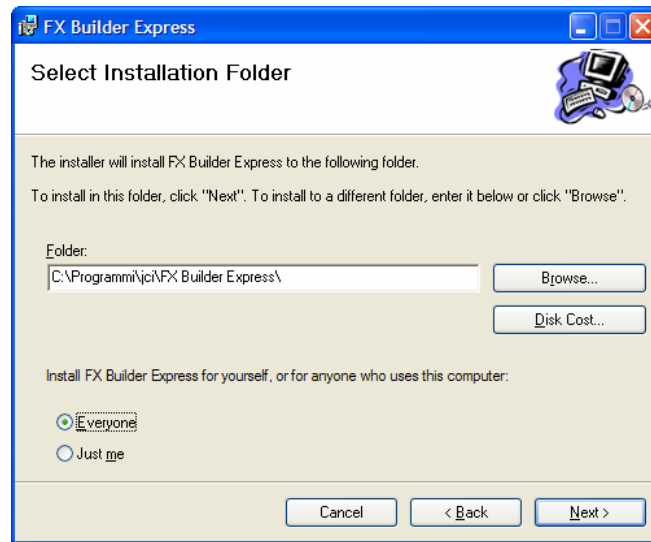
3. The CD-ROM Navigator appears. Click on the Software menu for a list of available options.

The FX Builder Express Setup wizard appears (Figure 4) and guides you through the installation. If the .NET Framework Version 2.0 is not found, the Windows Installer Loader alerts you.



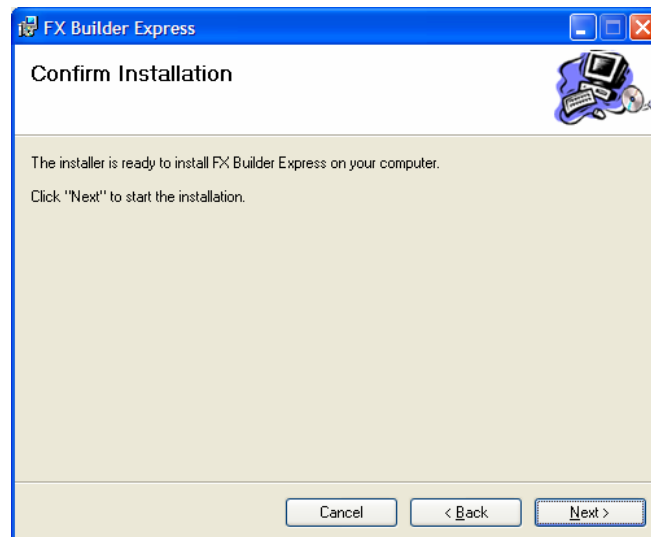
**Figure 4: .FX Builder Express Setup Wizard**

4. Click on Next. The Select Installation Folder window appears (Figure 5).



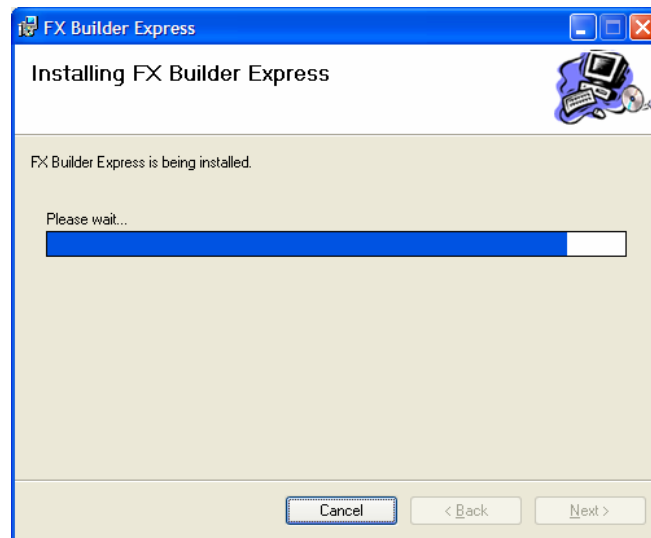
**Figure 5: Select Installation Folder Window**

5. To install the program in a directory different from the default path in the destination Folder box, click Browse and select different directory.
6. Click Next. The Confirm Installation window appears (Figure 6).

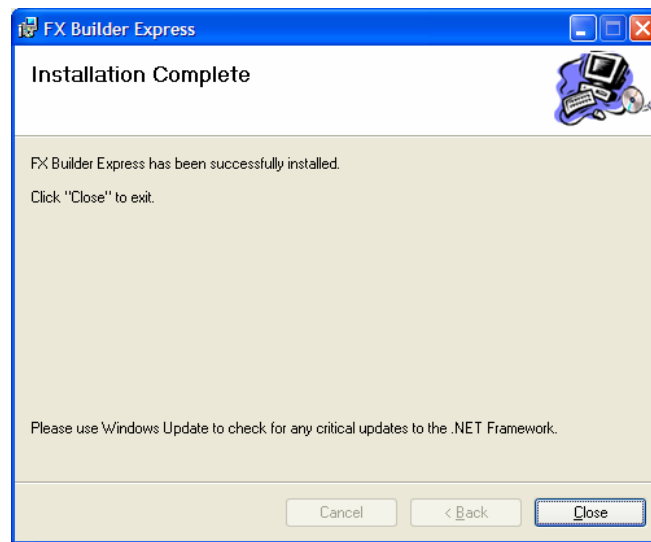


**Figure 6: Confirm Installation**

7. Click Next. The installation progress window appears (Figure 7). When the FX Builder Express installation finishes, the window in Figure 8 appears.



**Figure 7: Installing FX Builder Express Window**



**Figure 8: Installation Complete Window**

8. Click Close.

**Note:** Do not rename the program directory in which you installed the program.

# Using FX Builder Express

## ***Getting Started with FX Builder Express***

FX Builder Express enables the selection and configuration of applications from a predefined library specifically created for the Facility Explorer controllers.

FX Builder Express allows you to:

- select from a set of application templates for different system types
- easily configure the system application and parameters using an intuitive plug-in that is specifically developed for the selected application

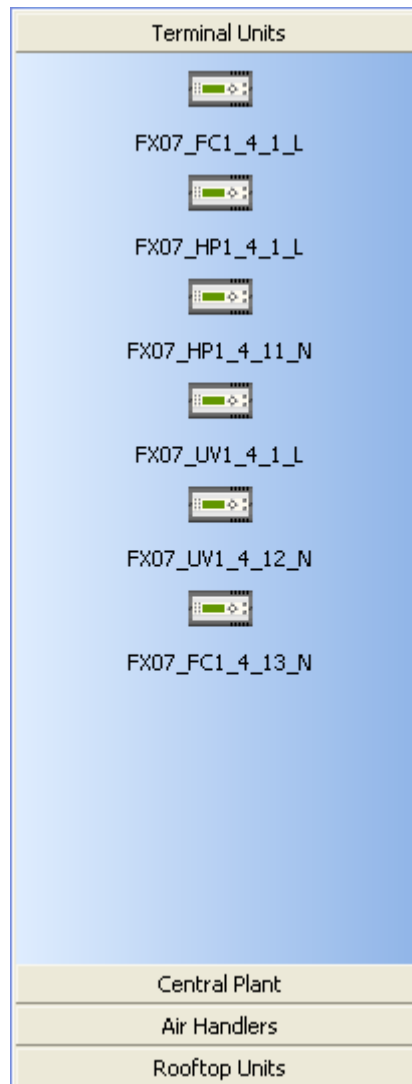


## FX Builder Express Key Topics

The key topics of FX Builder Express are:

- Library of Standard Applications

FX Builder Express works with a library of standard applications that includes predefined network profiles for network integration, alarm and event management, display configurations, and the application algorithms. See Figure 9.



**Figure 9: Library of Standard Applications**

- plug-in

The plug-in links the chosen system application to the underlying application programming level. The graphic presentation is tailored to the application selected.

The plug-in operates as a filter between you and the application programming level. The plug-in operates by writing to the Configuration Parameters (CPs) within the Network Profile (to enable or disable the preconfigured features of the application template).

- standard application package

The standard applications distribute separately as packaged files in \*.DBE format containing:

- application template file
- related Application Note documentation
- plug-in

These files populate the FX Builder Library.

- application compatibility

The application files are fully compatible with the comprehensive programming tool called FX Builder. FX Builder allows you to modify the standard application, if necessary.

- Standard Application Documentation

FX Builder Express provides access to standard applications within the library for rapid information recovery.

## FX Builder Express Entry Screen

The Menu Bar and Toolbar (Figure 10) provide an interface to the commands available for the selected item.

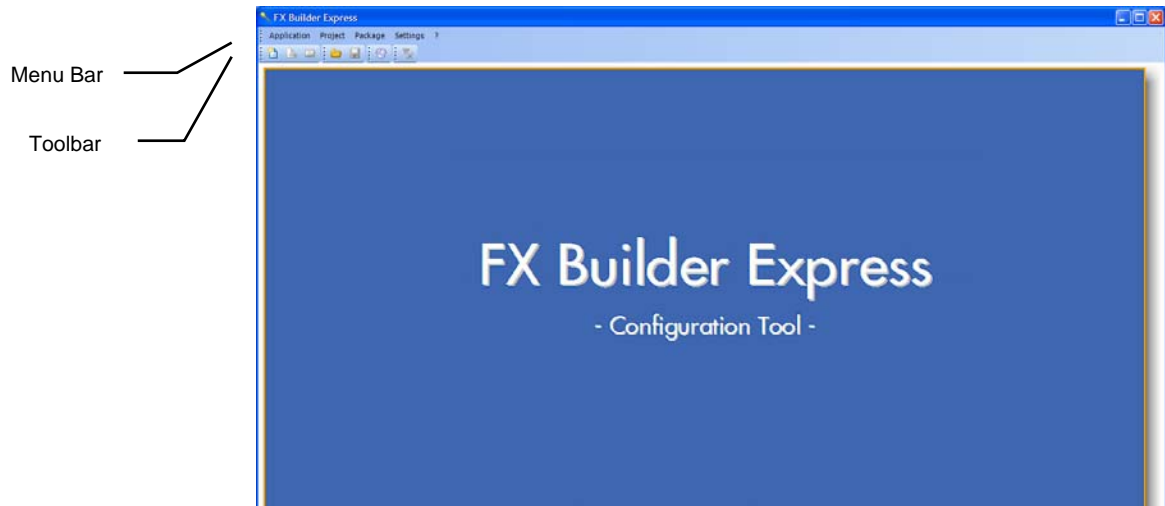


Figure 10: FX Builder Express Entry Screen

## Menu Bar

### *Application Menu*

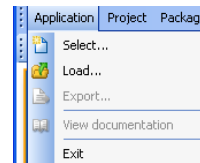
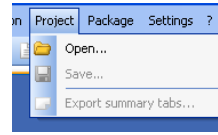


Figure 11: Application Menu

The commands in the Application menu include:

- **Select** - opens the application selection window showing the library of available applications.
- **Load** - allows you to load an extracted application.
- **Export** - enables the saving of the .apd file to download into the controller.
- **View Documentation** - opens the document in .pdf format, which describes how to configure the application. The document is specific for each application template.
- **Exit** - closes FX Builder Express.

### ***Project Menu***

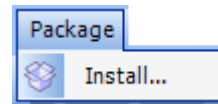


**Figure 12: Project Menu**

The commands in the Project menu include:

- **Open** - opens a work-in-progress file (.add) for further modification.
- **Save** - exports the work-in-progress file with an .add extension. You can reopen the file later for modification.
- **Export summary tabs** - exports the content for all summary tabs to a .txt file format.

### ***Package Menu***

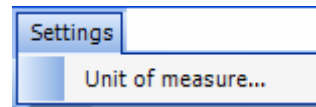


**Figure 13: Package Menu**

The command in the Package menu includes:

- **Install** - adds new applications to the library of standard application or replaces/upgrades the existing applications.

### ***Settings Menu***

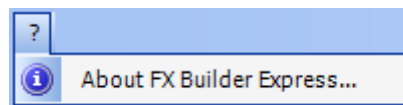


**Figure 14: Settings Menu**

The command in the Settings menu includes:

- **Unit of measure** - allows the selection of the unit of measure for the display of physical values on the plug-in. Metric is the default unit of measure.

### ***? Menu***



**Figure 15: ? Menu**

The command in the ? menu includes:

- **About** - displays details about the software version of FX Builder Express.

## Toolbar










The Toolbar (Figure 16) provides an interface to the commands available for the selected item.



**Figure 16: Toolbar**

Table 1 displays the buttons available in the FX Builder Express toolbar.

**Table 1: Toolbar**

Button	Description
	Selects an application.
	Loads an application.
	Exports the application file (*.APD) for download into the controller or later modification using FX Builder.
	Views the documentation available for the selected application.
	Opens an FX Builder Express <b>work-in-progress</b> (.add) file.
	Saves an FX Builder Express <b>work-in-progress</b> (.add) file that you can reopen later for modifications.
	Exports the content of all summary tabs to a .txt file.
	Installs application packages to populate the application library with new applications or to upgrade the existing ones.
	Checks for application inconsistencies within the various tabs and automatically applies the first parameter consistent and compatible with the other configuration parameters.

## ***Using FX Builder Express***

FX Builder Express contains the following features:

- intuitive menu selection and graphic configuration environment to create applications
- configuration procedures that do not require programming skills
- a library of validated and proven standard applications to lower the engineering, testing, and validation time
- Configuration options that are not applicable are disabled and red-flagged, preventing the user from making improper application choices
- plug-ins to configure commonly used features of the standard applications
- summary tabs providing information about the selections made during the configuration session

### **Standard Application Configuration**

To configure a standard application, use the standard application process:

1. Select a standard application from the library.
2. Select a plug-in for the selected application.
3. Select specific configuration options.
4. Check for consistency. If necessary, reselect specific configuration options to achieve consistency.
5. Save work-in-progress to continue at a later time.
6. Export the application (.apd and commissioning files).

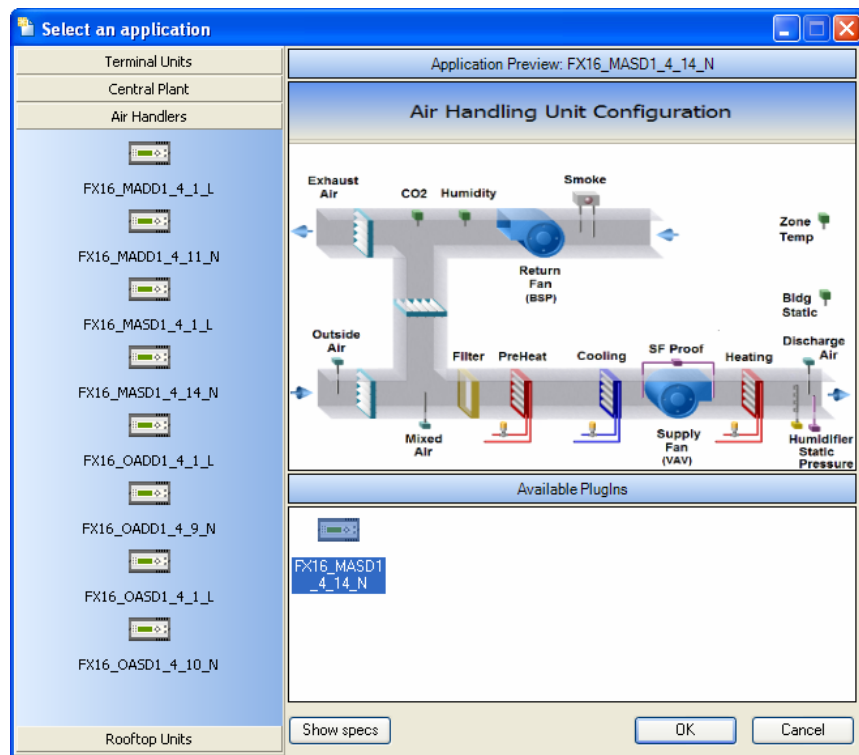
## Selecting a Standard Application

Standard applications are typically classified based on the following criteria:

- Air Handlers, Terminal Units, Central Plants, Rooftop Units
- Facility Explorer controller type (for example, FX05 or FX16 Master Controller)

To select a standard application:

1. Open FX Builder Express.
2. From the Application menu, select Start. The Select and Application window appears (Figure 17).



**Figure 17: Application Selection Window**

3. On the left side of the window select the category from which you want to select the application (for example, Air Handlers, Terminal Units, Central Plants, or Rooftop Units).

Each application name includes the target controller (FX07 or FX16), system type (UV = Unit Ventilator), the revision number, and the network profile protocol type (N = N2 protocol, L = LONWORKS® protocol, B = BACnet® protocol).

4. Select the desired application.

**Note:** FX Builder Express setup does not include standard applications. To populate the library, see *Populating or Upgrading the Application Library*.

### Selecting a Plug-in

Once the application has been selected, FX Builder Express provides a preview of the system and the available plug-ins.

To select a plug-in:

1. Select the desired plug-in.
2. Click OK. The specific plug-in for the application selection appears (Figure 18).

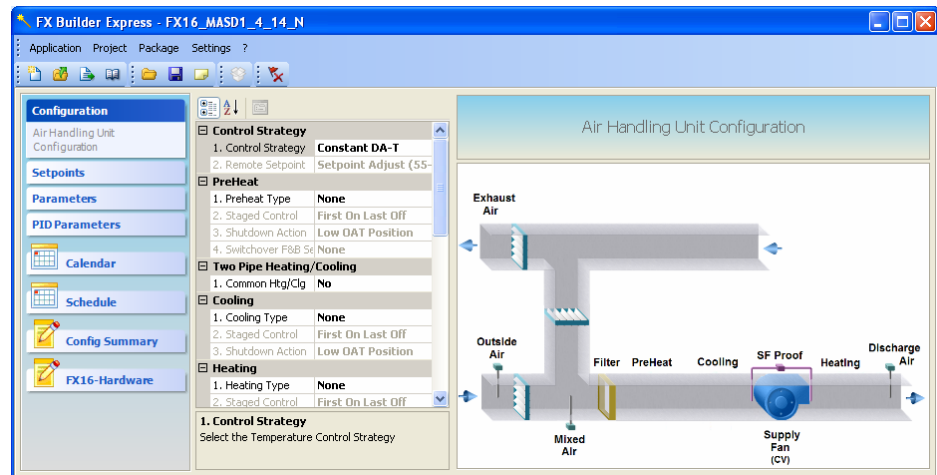


Figure 18: Specific Plug-in Loaded

### Selecting Configuration Options

FX Builder Express defines the control logic functions that Facility Explorer controllers execute, depending on the configuration selection.

To select configuration options:

1. In FX Builder Express, select a standard application and select Configuration. Configuration settings appear (Figure 19).

Depending on the components selected, the plug-in displays a system preview in a dynamically updated graphic presentation, which helps you easily identify selection errors in the configuration.



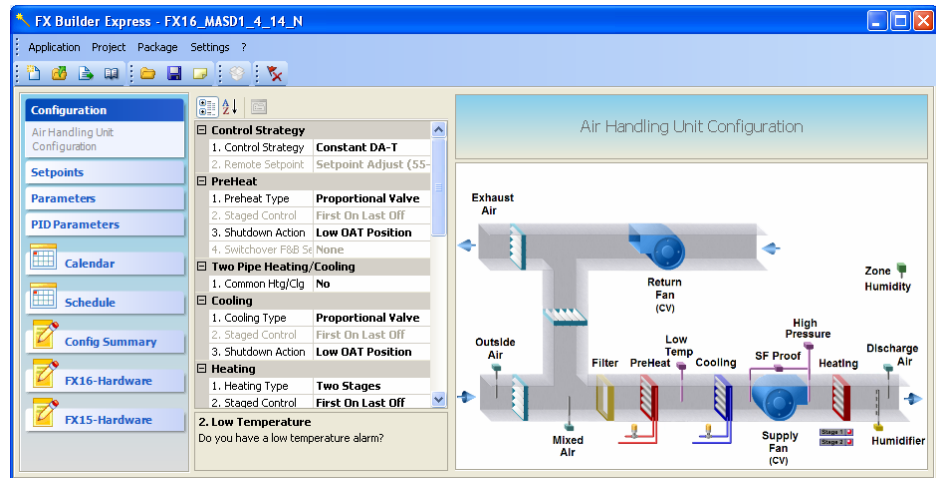


Figure 19: Configuration Tab

2. Modify the configuration settings as needed.

### Adjusting Setpoints

The Setpoints tab contains all setpoints that you can adjust within the selected application.

To adjust setpoints:

1. In FX Builder Express, select a standard application and select Setpoints. Setpoint information appears (Figure 20).

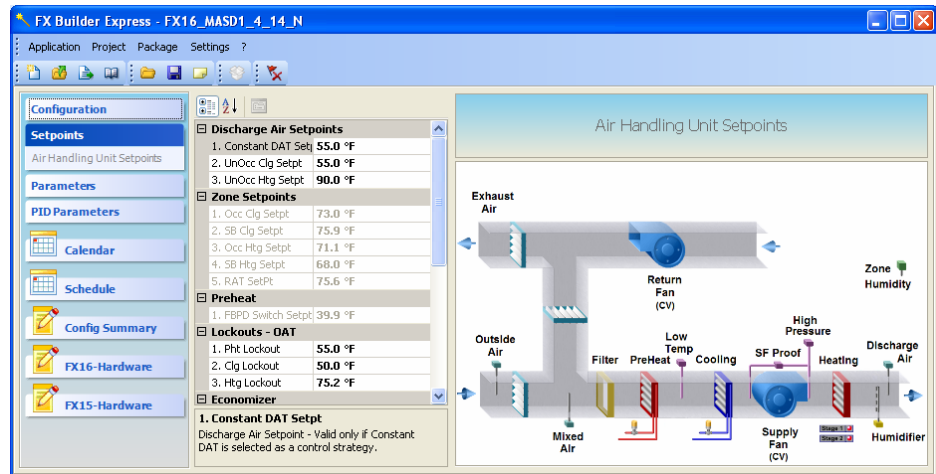


Figure 20: Setpoints Tab

2. Modify the setpoints as needed.

## Adjusting Parameters

The Parameters tab contains system parameters that you can adjust within the selected application.

To adjust parameters:

1. In FX Builder Express, select a standard application and select Parameters. System parameter information appears (Figure 21).

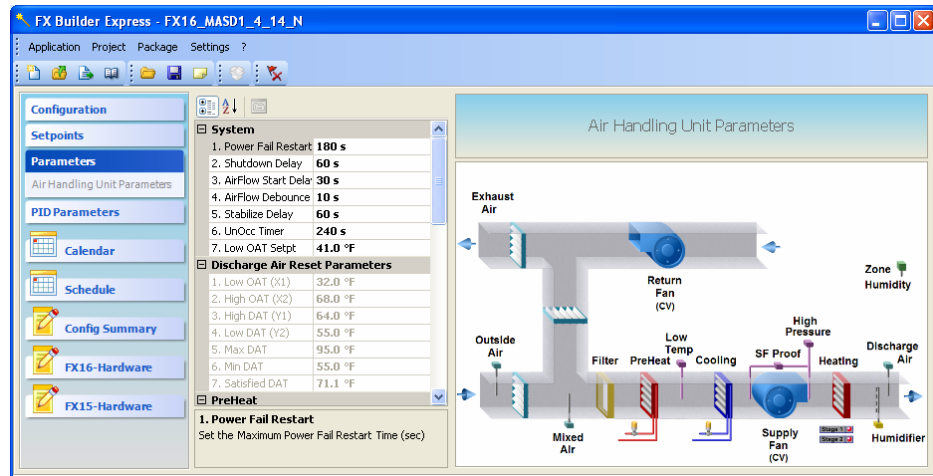


Figure 21: Parameters Tab

2. Modify the system parameters as needed.

## Adjusting Proportional plus Integral plus Derivative (PID) Parameters

The PID Parameters tab contains tuning parameters (proportional bands, integration times, and saturation times) that you can adjust within the selected application.

To adjust PID parameters:

1. In FX Builder Express, select a standard application and select PID Parameters. PID parameters information appears (Figure 22).

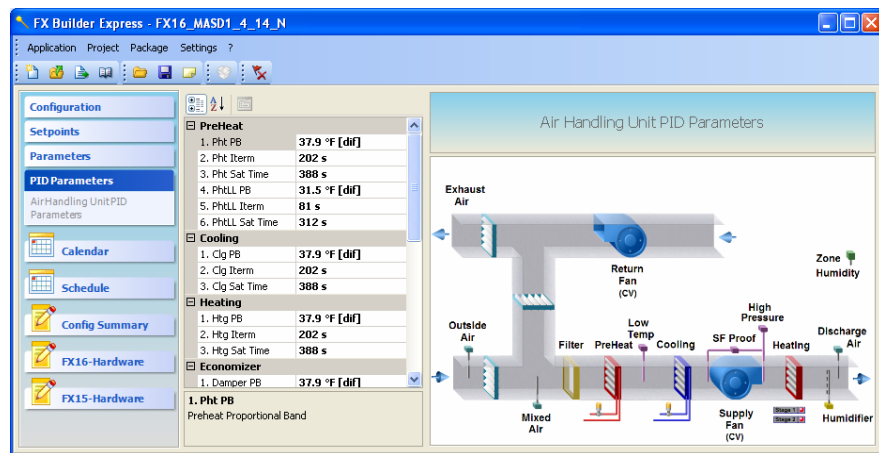


Figure 22: PID Parameters Tab

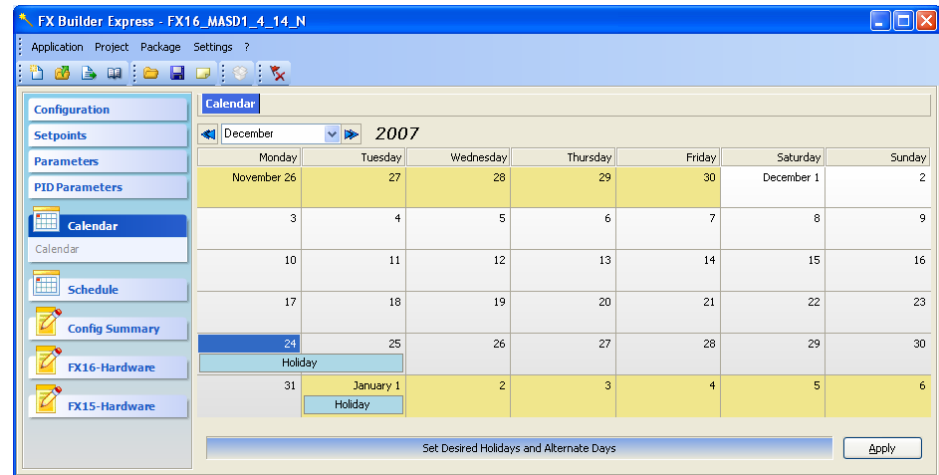
2. Modify the PID parameters as needed.

### ***Adjusting the Exception Day Calendar***

The Calendar tab guides you in the definition of the exception day calendar.

To adjust the exception day calendar:

1. In FX Builder Express, select a standard application and select Calendar. The Calendar window appears (Figure 23).



**Figure 23: Exception Day Calendar Configuration**

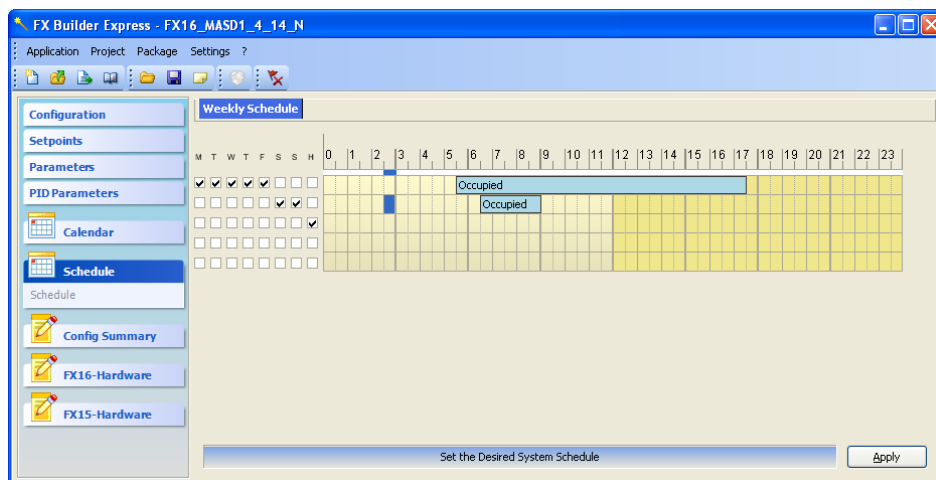
2. Modify the calendar as needed.
3. Click Apply.

### ***Adjusting the Weekly Occupancy Schedule***

The Schedule tab guides you in the definition of the Weekly Occupancy Schedule.

To adjust the weekly occupancy schedule:

1. In FX Builder Express, select a standard application and select Schedule. The Weekly Schedule window appears (Figure 24).



**Figure 24: Occupancy Scheduler Configuration**

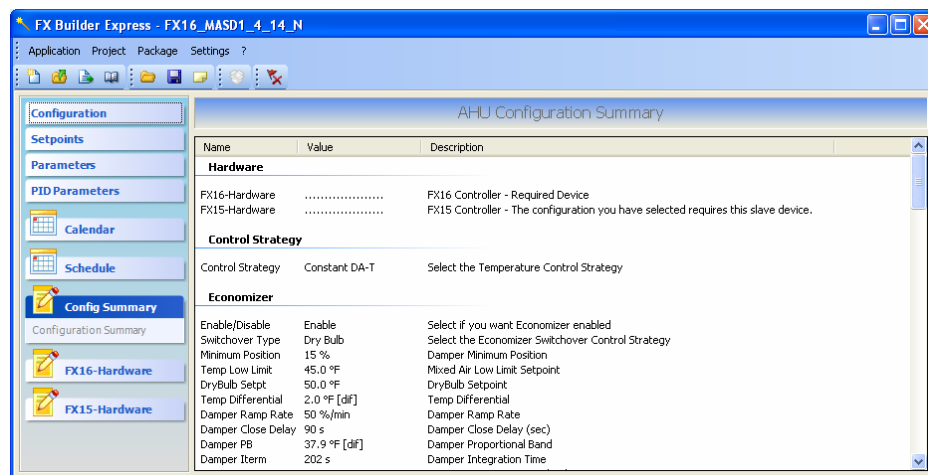
2. Modify the schedule as needed.
3. Click Apply.

### ***Viewing the Configuration Summary***

The Config Summary tab provides a summary for all configuration settings, setpoint, and parameter adjustments made during the configuration session.

To view the configuration summary:

1. In FX Builder Express, select a standard application and select Config Summary. The configuration summary appears (Figure 25).
2. If necessary, right-click on the configuration summary to copy the summary output to a clipboard and paste it into a document.



**Figure 25: Config Summary Tab**

## Viewing Input and Output Assignments

The FXxx Hardware tab provides input and output assignment for the target controller based on the selected application and configuration.

To view the configuration summary:

1. In FX Builder Express, select a standard application and select FXxx Hardware. Input and output assignments for the target controller appear (Figure 26).
2. If necessary, right-click on the input and output information to copy the information to a clipboard and paste it into a document.

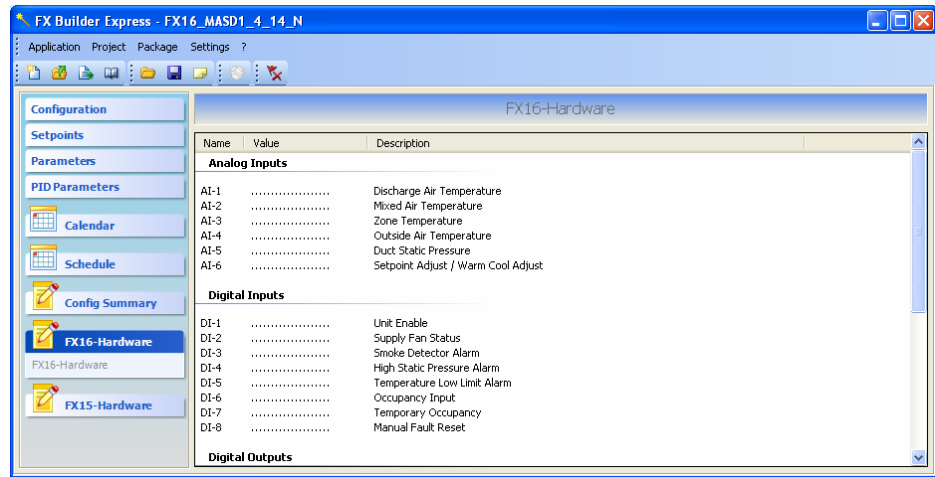


Figure 26: FXxx Hardware Tab

## Consistency Check

FX Builder Express continuously performs consistency checks to ensure that selected configuration options that are not consistent with other options are disabled and red-flagged. This prevents users from creating applications that may not work as intended.

At this stage, FX Builder Express does not allow you to export the application and displays a warning message (Figure 27).

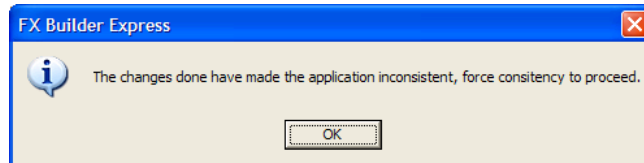



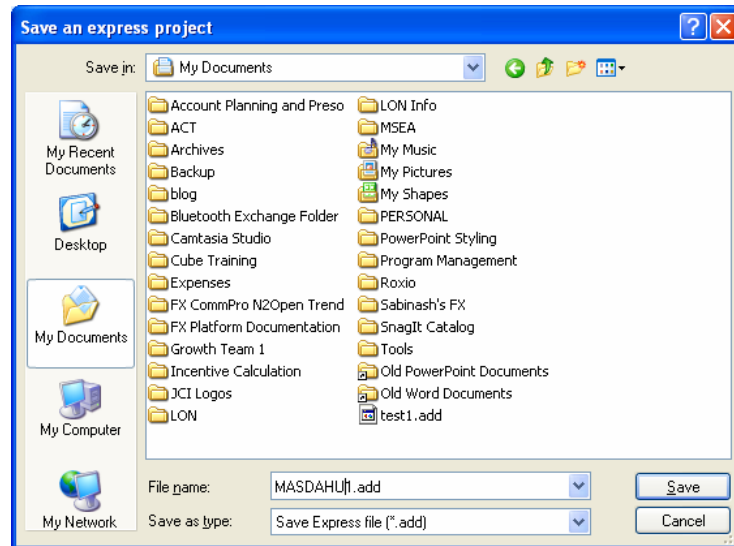
Figure 27: Inconsistent Configuration Warning Message

To recover from an inconsistent configuration, click  to automatically force the first parameter that is consistent and compatible with the other configuration parameters to be applied.

## Saving a Work-in-Progress (WIP) File

You can save on-going projects as a work-in-progress file for later modification. The file is saved as is (no consistency check or compiling operations are performed).

FX Builder Express saves a file with an **.add** extension. See Figure 28.



**Figure 28: Saving an FX Builder Express Work-In Progress File**

## Exporting an Application File

If necessary, you can export the application file (.apd file). The application file is compatible with FX Builder, where you can make more advanced modifications to the application. See Figure 29.

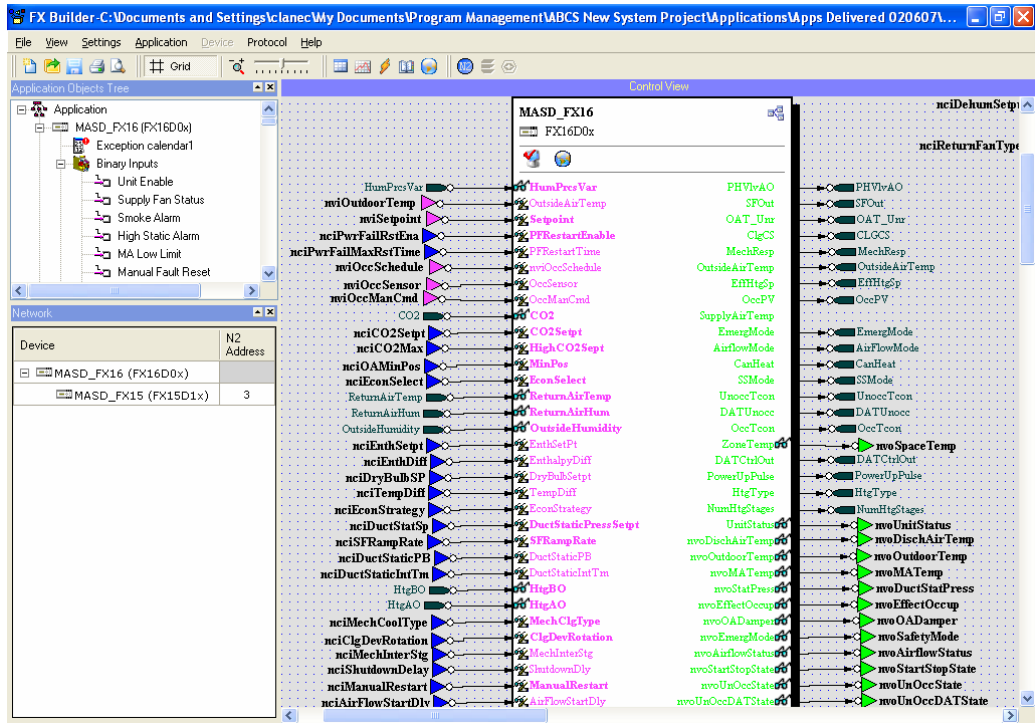


Figure 29: Standard Application View from FX Builder Tool


## Populating or Upgrading the Application Library

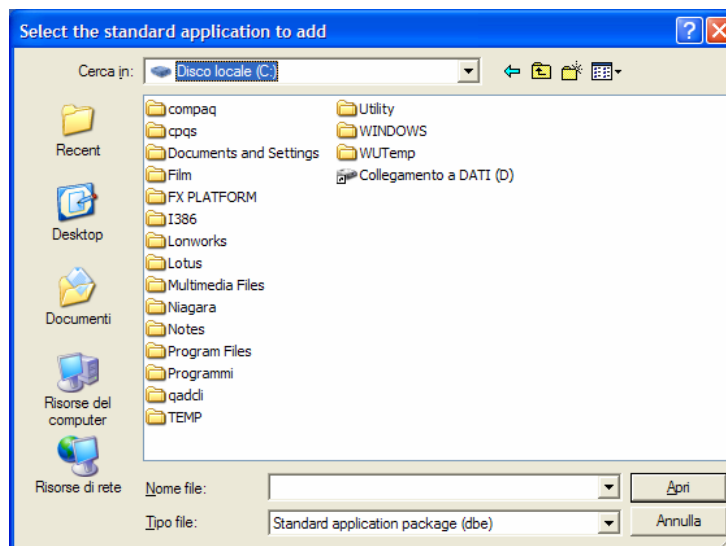
The standard applications are distributed separately as packaged files (.dbe file) containing:

- the application template file
- the related application note documentation
- the plug-in

These files are used to populate FX Builder Express Library.

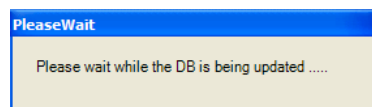
To populate or upgrade the application library:

1. In the FX Builder Express main screen, click  to add a standard application to the library.
2. Browse to the location of standard application packaged files with the .dbe extension. See Figure 30.

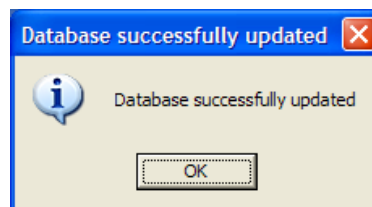


**Figure 30: DBE File Searching**


3. Select the file to add. The updating operation starts automatically (Figure 31 and Figure 32).



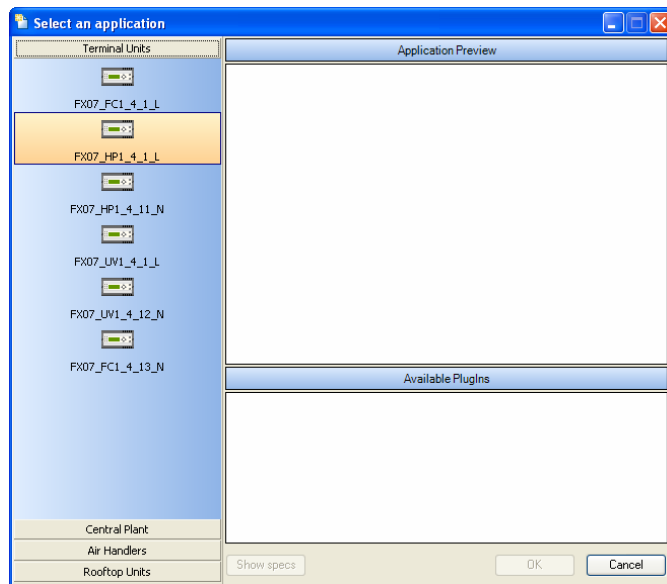
**Figure 31: Database Updating**



**Figure 32: Database Successfully Updated**

4. Click  to verify that the standard application was added to the library.





**Figure 33: Standard Application Template Added to Library**

The new standard application template is now available within FX Builder Express to be configured and exported as an application.

## File Generation

FX Builder Express generates the file types in Table 2.

**Table 2: FX Builder File Types**

Files	Contents
*.APD	The file contains the entire application including: <ul style="list-style-type: none"><li>▪ control and logic algorithms</li><li>▪ display configuration</li><li>▪ network and application profile configuration</li><li>▪ alarm and event definition</li></ul>
*.ADD	The file stores an application as work-in-progress. You can reopen the file for further modifications. You cannot download an .add file into a Facility Explorer controller.

## Network Integration

The application file exported by FX Builder Express includes a network profile that represents the interface of the controller application to an external network. A supervisory system over an N2 Open or LONWORKS network can monitor and change the variables within the network profile of an application (depending on the standard application template and the FX controller model). Refer to the application note for the standard application for details.

# Specifications and Technical Data

## Ordering Codes

Table 3: Software

Product Code	Product Description
LP-FXTPRO-0	FX Tools Pro CD-ROM (FX Builder, FX Builder Express, FX CommPro N2, FX CommPro LON, FX Loader Utility)
LP-FXTEXP-0	FX Tools Express CD-ROM (FX Builder Express, FX CommPro N2)

## Technical Specifications

System Requirements		
Operating System		Microsoft Windows 98 Microsoft Windows NT® Version 4.0 Microsoft Windows 2000 (with Service Pack 4 or later) Microsoft Windows XP (with Service Pack 1 or later)
Hardware Requirements	Processor	Intel® Pentium® Processor, 500 MHz or higher
	RAM	Minimum 512 MB RAM
	Hard Disk	60 MB available hard disk storage
	Display	Display resolution 800 x 600 16-bit (32,768) color minimum
	Interface	RS-232, Universal Serial Bus (USB)
Software Requirements		Microsoft Internet Explorer Version 5.0 or later

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.*



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