CXpro^{HD} Keypad Builder

Style conventions used in this document:

UI Text: Text that represents elements of the UI such as button names, menu options etc. is presented with a grey background and border, in Tahoma font which is traditionally used in Windows UIs. For example:

`Ok`

Standard Terms (Jargon): Text that is not English Language but instead refers to industry standard concepts such as Strategy, BACnet, or Analog Input is represents in slightly condensed font. For example:

BACnet

Code: Text that represents File paths, Code snippets or text file configuration settings is presented in fixed-width font, with a grey background and border. For example:

```
$config_file = c:\CYLON\settings\config.txt
```

Parameter values: Text that represents values to be entered into UI fields or displayed in dialogs is represented in fixed-width font with a shaded background. For example

`10°C`

Product Names: Text that represents a product name is represented in bold colored text. For example

INTEGRA™

Company Brand names: Brands that are not product names are represented by bold slightly compressed text:

ABB Active Energy

PC Keyboard keys: Text representing an instruction to press a particular key on the keyboard is enclosed in square brackets and in bold font. For example:

[Ctrl]+[1]

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1   Introduction

WHAT IS THE KEYPAD BUILDER?

The **CXpro^{HD} Keypad Builder** is an application within **CXpro^{HD}** that allows Keypads attached to Cylon BMS Sites to be configured. It does this by creating a 'Keypad Program' for each of the keypads, which when downloaded to the keypad present the user with hierarchical menus with which they can supervise the BMS Site.

The **CXpro^{HD} Keypad Builder** presents the Engineer with a simple overview of the Site and the Keypad Program side-by-side, with the Site database presented as a grid and the hierarchical Keypad Program as a 'tree' display.
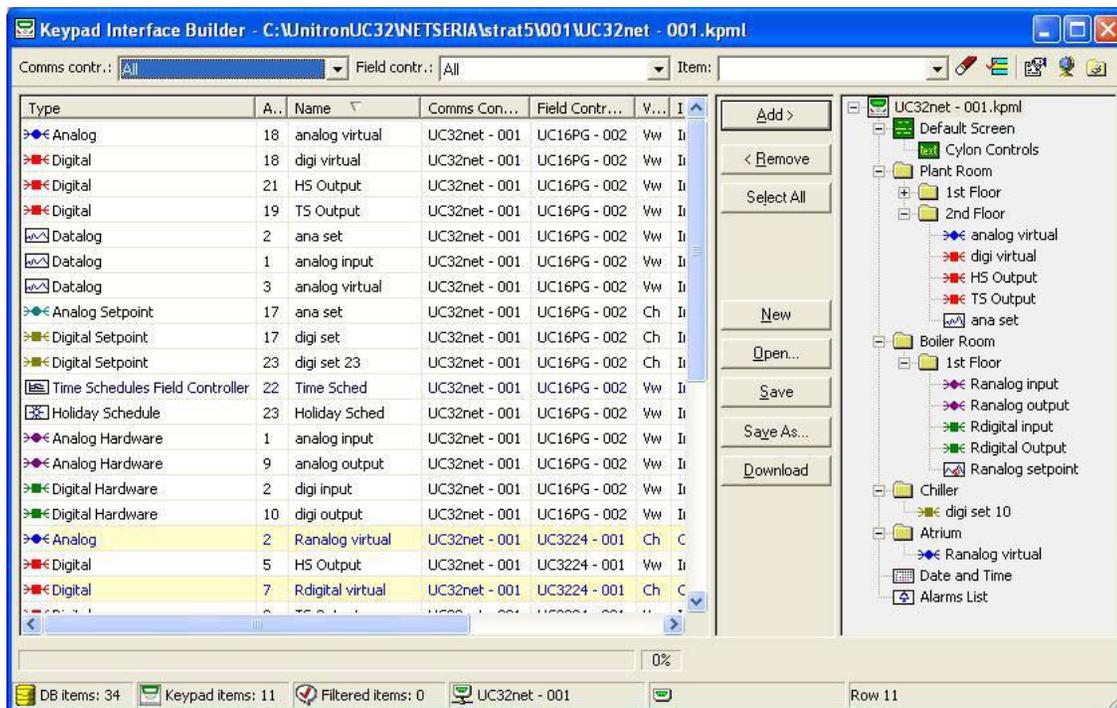
TREE STRUCTURE

When using a keypad on the Cylon system, the end-user navigates through features of the BMS site by selecting options from menus. Some selections give information or control options directly, while others lead to further menus.

The result of this is that the menus are structured hierarchically (menu may contain submenus, which contain submenus of their own etc.).

The **CXpro^{HD} Keypad Builder** represents this hierarchical structure graphically as a "tree" display - similar to that used in Windows Explorer. Menus can contain 'items' (points, setpoints, datalogs, time schedules and alarm lists) or sub-menus. The names of Menus that are at the same level within either the root node or another menu will be displayed on the keypad screen as items in a single menu.
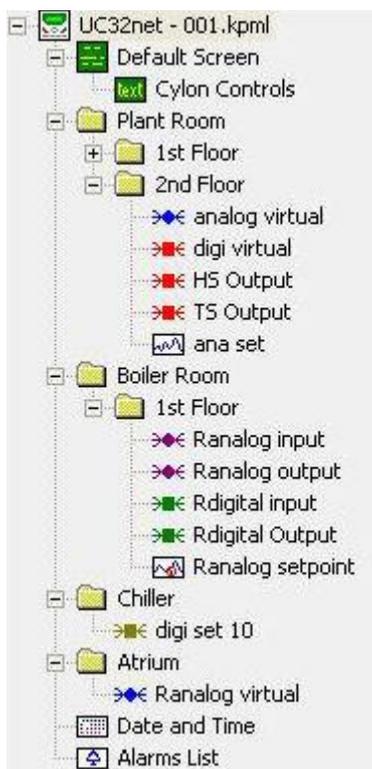
THE KEYPAD BUILDER INTERFACE

When the **CXpro^{HD} Keypad Builder** is started, it displays a window containing two major sections. On the left-hand side of the window is a list showing all of the items in the Cylon Database (Database Grid). On the right-hand side of the windows is the Menu Tree display, a hierarchical list of menus and items as described in the previous section.

The Keypad Builder Interface allows items to be located in the database using the Database Grid, and then added directly from the Database Grid to any appropriate place on the Menu Tree.

If the keypad is attached to a Comms controller, the database grid can show items from any controller on the site. If the keypad is attached to a stand-alone Field Controller, the database grid will show only items from that Field Controller.

The Database Grid can be sorted and/or filtered to allow specific items to be quickly located.

In the Menu Tree, menus can be expanded to display items and submenus, or collapsed to hide those items and submenus.

The Keypad Builder Interface also provides buttons and menus for saving, opening and printing keypad programs, and for downloading keypad programs to the relevant Cylon Controllers.

2   Creating a Keypad Program

STRATEGY - DEFINE OBJECTS

In order to add points, setpoints, datalogs, time schedules etc. to your keypad program, those items must be available in the Database Grid. This means they must be in the Cylon Database, i.e. they must be added to controller strategies.

So before creating a Keypad Program for a site, all of the strategies should be set up.

STARTING THE KEYPAD BUILDER

The **Keypad Builder** is started by selecting Interface Builder from the Keypad group in the Controller tab of the **CXpro^{HD}** Ribbon
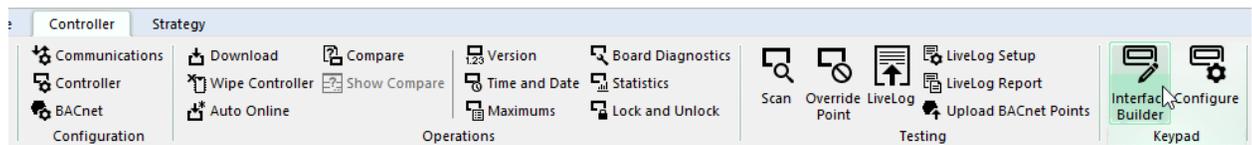
BUILDING THE TREE

THE DEFAULT SCREEN

Structure of the Default Screen

The Default screen has up to 4 lines, each of which can display point values, or text (editable in the **CXpro^{HD} Keypad Builder**).

Adding a point to the Default Screen

To add a database item to the Default Screen, either:

- Select the Default Screen 'menu', then double-click on the item in the database grid, or

- Drag the item from the grid to the Default Screen 'menu'.

An item can be moved within the Default Screen 'menu' by dragging that item.

The name of an item can be edited by right-clicking on it, and selecting Rename from the menu that appears.

An item can be removed from the Default Screen by right-clicking on it, and selecting Delete from the menu that appears. This removes the item from the Default Screen, but does not affect the database.

When you click on an item in the Default Screen, it will be located in the Database grid and highlighted.

Adding a point to the Default Screen

To add a text item to the Default Screen, right-click on the Default Screen 'menu', and select Add Line from the menu that appears. An item named "Line" will be added to the bottom of the Default Screen 'menu'.

The name of this item can be edited by right-clicking on it, and selecting Rename from the menu that appears.

The name of a text line in the Default Screen 'menu' is the text that will be displayed on the Default Screen of the Keypad.

CREATING AND NAMING MENUS

A menu can be created inside the Menu Tree Root, or inside any other menu. To create a menu simply right-click on its parent (the Menu inside which you wish the new menu to be positioned or the Menu Tree Root) and select Add Menu from the context menu that appears.

The new menu will be given the name "`New Menu`", which will be selected and highlighted - just type a descriptive name for the new menu.

To change the name of a menu, you can

- right-click on it and select `rename` .

- Select the item and press the `F3` button on the keyboard

- Select the item, then click on the item name

To change the name of a menu, you can

- right-clicking and selecting `Delete` .

- Select the item and press the `Delete` button on the keyboard.

A menu can be moved inside any other menu by dragging it to a point just below the other menu. However, if you want the menu to remain at the same level, and be inserted between two menus, hold the control button while dragging it.

ADDING ITEMS TO MENUS FROM THE DATABASE

Any item listed in the database grid on the left of the **Keypad Builder Interface** can be added to any menu in the `Menu Tree.`

To add a database item to a menu, either:

- Select the menu in which the item is required, then double-click on the item in the database grid, or

- Drag the item from the grid to the menu.

Multiple items can also be added, by selecting multiple items in the database grid (using shift or control buttons) before double-clicking or dragging as above.

The database grid can be filtered or sorted by Comms/Field Controller address (if the keypad is attached to a Comms Controller) and/or item type.

An item can be moved within a menu, or to another menu, simply by dragging that item.

The name of an item can be edited by right-clicking on it, and selecting Rename from the menu that appears.

Note: When naming items, you can only use characters that are part of the standard **UCKRA** character set. See *Appendix :: Allowable Character S* et on page 21

An item can be removed from the `Menu Tree` by right-clicking on it, and selecting `Delete` from the menu that appears. This removes the item from the menu, but does not affect the database.

When you click on an item in the `Menu Tree`, it will be located in the Database grid and highlighted.

ADDING NON-DATABASE ITEMS

Date and Time

Date And Time objects allow the date and time on the BMS site to be edited. Only one can be added per Keypad Program, and it can only be placed in the Main Menu.

As it is not a database item, it cannot be added from the database grid. Instead it is added from the context menu on the Menu Tree Root.

To add a Date and Time item, right-click on the Menu Tree Root.

Select Add Date&Time from the menu that appears. A Date and Time item will appear at the bottom of the Main Menu.

The Date and Time item can be dragged to any position within the Main Menu, but not to any submenu.

By default, the Date and Time item will be editable by the keypad user. This can be changed in the properties of the item.

Alarms List

The Alarms List shows all of the unacknowledged alarms existing on the BMS Site. Only one can be added per Keypad Program, and it can only be placed in the main menu.

As it is not a database item, it cannot be added from the database grid. Instead it is added from the context menu on the Menu Tree Root.

To add an Alarms List item, right-click on the Menu Tree Root.

Select Add Alarms List from the menu that appears. An Alarm List item will appear at the bottom of the Main Menu.

The Alarm List item can be dragged to any position within the Main Menu, but not to any submenu.

Password

A password can be added to the Keypad Program. It is not represented in the tree as an item, but acts as a feature of the menu in which it has been added. Only one can be added per Keypad Program, and it can only be placed in the Main Menu.

As it is not a database item, it cannot be added from the database grid. Instead it is added from the context menu on the Menu Tree Root.

To add a password, right-click on the Menu Tree Root.

Select Add Password from the menu that appears. A dialog will open, which allows you to set the password as a sequence of the keypad's 'up' 'down' 'left' and 'right' buttons. You can also enter a text string to tell the keypad user that a password is required. By default this is "Enter Password".

When a password has been defined, then the context menu on the Menu Tree Root will contain Change Password and Remove Password instead of Add Password.

3   Customising Menu Tree items (Item properties)

CUSTOMISING MENU TREE ITEMS (ITEM PROPERTIES)

All of the elements in the **Keypad Builder**'s Menu Tree have properties associated with them which define what part of the Cylon System they relate to, and how they will appear in the Keypad display. Some of these properties can be edited in order to customize the behavior of the Keypad Program.

This section lists all of the possible elements in the Menu Tree, and describes the properties associated with each.

To view or set the properties of an item, right-click on the item and select Properties from the menu that appears.

POINT ITEMS

ANALOG POINT

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the point is defined. [Not editable]
FieldController	Address within the Fieldbus of the Controller in whose strategy the point is defined. [Not editable]
pointObject	Address of the point within the Field Controller strategy. [Not editable]
displayValues	If this property is set ("1" or "on") then the value of the point will be displayed beside the point item in the Keypad menu. If it is not set ("0" or "off") then the user will have to open the point item in the keypad menu in order to view the value.
unitString	A text string that will be displayed beside the point value to indicate the units of that value, for example "°C".
precision	Number of digits that will be displayed on the Keypad after the decimal point.
allowManualOverride	If the point is a Hardware point, then setting this property to "1" or "on" will allow the Keypad user to enter a value for the point, overriding the actual point value.
increment	If allowManualOverride is set, the increment property will be the amount by which the point value will change when the Keypad user presses the "up" or "down" buttons.
upper	If allowManualOverride is set, the upper property will be the maximum value to which the point can be set.
lower	If allowManualOverride is set, the lower property will be the minimum value to which the point can be set.

DIGITAL POINT

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the point is defined. [Not editable]
FieldController	Address within the Fieldbus of the Controller in whose strategy the point is defined. [Not editable]
pointObject	Address of the point within the Field Controller strategy. [Not editable]
displayValues	If this property is set ("1" or "on") then the value of the point will be displayed beside the point item in the Keypad menu. If it is not set ("0" or "off") then the user will have to open the point item in the keypad menu in order to view the value.
onString	A text string that will be displayed if the value of the digital point is "On" or "1"
offString	A text string that will be displayed if the value of the digital point is "Off" or "0"
allowManualOverride	If the point is a Hardware point, then setting this property to "1" or "on" will allow the Keypad user to enter a value for the point, overriding the actual point value.

SETPOINT ITEMS

ANALOG SETPOINT

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the setpoint is defined. [Not editable]
FieldController	Address within the Fieldbus of the Controller in whose strategy the setpoint is defined. [Not editable]
setpointObject	Address of the setpoint within the Field Controller strategy. [Not editable]
displayValues	If this property is set ("1" or "on") then the value of the setpoint will be displayed beside the setpoint item in the Keypad menu. If it is not set ("0" or "off") then the user will have to open the setpoint item in the keypad menu in order to view the value.
unitString	A text string that will be displayed beside the setpoint value to indicate the units of that value, for example "°C".
precision	Number of digits that will be displayed on the Keypad after the decimal point.
allowEdits	If this property is set ("1" or "on"), the Keypad user will be allowed to change the value of the setpoint.
increment	The amount by which the setpoint value will change when the Keypad user presses the "up" or "down" buttons.
upper	The maximum value to which the setpoint can be set.
lower	The minimum value to which the setpoint can be set.

DIGITAL SETPOINT

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the setpoint is defined. [Not editable]
FieldController	Address within the Fieldbus of the Controller in whose strategy the setpoint is defined. [Not editable]
setpointObject	Address of the setpoint within the Field Controller strategy. [Not editable]
displayValues	If this property is set ("1" or "on") then the value of the setpoint will be displayed beside the setpoint item in the Keypad menu. If it is not set ("0" or "off") then the user will have to open the setpoint item in the keypad menu in order to view the value.
onString	A text string that will be displayed if the value of the digital setpoint is "On" or "1".
offString	A text string that will be displayed if the value of the digital setpoint is "Off" or "0".
allowEdits	If this property is set ("1" or "on"), the Keypad user will be allowed to change the value of the setpoint.

DATALOG ITEM

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the datalog is defined. [Not editable]
FieldController	Address within the Fieldbus of the Controller in whose strategy the datalog is defined. [Not editable]
datalogObject	Address of the datalog within the Field Controller strategy. [Not editable]
datalogType	If this property is 0, the datalog is "normal" (interval based). If this property is 1, the datalog is "Time Stamped". [Not editable]
dateDisplay	Defines how time and date should be displayed for Datalog values: 0 = display both date and time 1 = display time only 2 = no date or time displayed
unitString	A text string that will be displayed beside the datalog values to indicate the units of those values, for example "°C".

TIME SCHEDULE ITEMS

COMMS CONTROLLER SCHEDULE

Property	Description
CommsController	Address of the Fieldbus in which the schedule is defined. [Not editable]
commsScheduleObject	Address of the schedule within the Comms Controller. [Not editable]

COMMS CONTROLLER SCHEDULE BLOCKS

Each of the blocks defined in a particular Comms Controller Schedule are listed below the Comms Controller Schedule in the tree. Right-clicking on a block allows the following properties to be accessed for that block:

Property	Description
CommsController	Address of the Fieldbus in which the schedule is defined. [Not editable]
commsScheduleObject	Address of the schedule within the Comms Controller. [Not editable]
blockNumber	The address of the block within the Comms Controller. [Not editable]
blockName	A piece of descriptive text to identify the block.

FIELD CONTROLLER SCHEDULE

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the schedule is defined. [Not editable]
FieldController	Address within the Fieldbus of the Controller in whose strategy the schedule is defined. [Not editable]
fieldScheduleObject	Address of the schedule within the Field Controller. [Not editable]

HOLIDAY SCHEDULE

Property	Description
CommsController	Address of the Fieldbus containing the Controller in whose strategy the setpoint is defined. [Not editable]
commsScheduleObject	Address of the schedule within the Comms Controller. [Not editable]

CONTROLLER DATE AND TIME

Property	Description
editable	If this is set, the Keypad user will be able to change the Controller Date and Time from the Keypad.

ALARMS LIST

Property	Description
Priority Levels	A number of priority ranges can be specified. For each range, the highest and lowest alarm priorities can be specified, and the buzzer can be set to sound if alarms in the range occur.
Delete Button	Clicking on this button will delete the currently selected Priority range.
Delete All Button	Clicking on this button will clear all of the Priority ranges.
Alarm Source	The alarms included in the Alarms List (when it is displayed on the Keypad) will include all of those from the sources selected here. The options are alarms from the Local Fieldbus only, or alarms from the whole site.
System Alarms	If this checkbox is ticked, the Alarms List will include System alarms. Also, the buzzer can be set to sound if System Alarms occur.

4   Keypad Program settings

KEYPAD PROGRAM SETTINGS

The following parameters affect the menu tree as whole rather than individual items. They are set from dialog boxes, which can be accessed by clicking on the `Properties` button on the toolbar, or selecting `Properties...` from the Menu Tree Root's context menu.

ENABLEBUZZER

If this parameter is set to `1`, the buzzer will sound when called on by the keypad program.

If it is set to `0`, the buzzer will remain silent at all times.

DEFAULTS

FORMATS

The formats defined here for dates and analog values will apply to every date or analog value in the keypad program unless a format is specified for an individual date item or analog point item. These formats can be overridden if required at any point within the Keypad program menu tree.

Analog Values

`notation`

The value of an analog point can be displayed as either decimal notation (notation = `0`) or scientific notation (notation = `1`)

`precision`

The value of this parameter will be used as the number of decimal places to be in analog value displays if no format is specifically stated.

Date

If this parameter is...	dates will be displayed in
0	"European" format, i.e. dd/mm/yy
1	"American" format, i.e. mm/dd/yy
2	"Swedish" format, i.e. yymmdd

Separators

Time	This is the character used to separate elements in a time display (e.g. ":")
Date	This is the character used to separate elements in a date display (e.g. "/")

ALARMSLISTSETTINGS

DISPLAYTIME

If this parameter is set to 1, the time at which an alarm arose will be displayed with that alarm message. If it is set to 0, alarm times will not be displayed.

STANDALONEFIELDCONTROLLERKEYPAD

controlAlarm

A number of control alarms can be specified using the Block Numbers assigned to those alarms in **CXpro^{HD}**. Only these control alarms will be displayed in the alarms list.

For each Alarm the following parameters can be set:

alarmBlockNumber	The address of the alarm within the Field Controller's strategy.
notifyUser	If this parameter is set to 1, a message will appear on the keypad screen if this alarm is triggered. If this parameter is set to 0 this alarm will be "silent" - the alarm will be displayed in the alarms list, but the user will not be notified at the time that it is triggered.
description	Some descriptive text to be displayed along with the alarm in the alarm list.

systemAlarm

In addition to control alarms a number of system alarms can be specified for inclusion in the alarms list.

systemAlarmID	The system alarm ID number identifies each alarm within the Field Controller system.

pointMonitor

It is also possible to report in the alarm list changes in state of a number of digital points - even if they are not attached to alarm blocks in the Field Controller strategy. This is only possible in "local" keypad programs, where the keypad is directly connected to the Field Controller.

pointNumber	This is the address within the Field Controller of the digital point that is to be monitored.
Description	Some descriptive text to be displayed along with the monitored point in the alarm list.

COMMSCONTROLLERKEYPAD

alarmSource

If this parameter is set to 0, then only alarms from the Fieldbus of the Comms Controller to which the keypad is connected ('local alarms') will be included in the alarms list.

If this parameter is set to 1 alarms from all of the fieldbusses on the BMS site will be included in the alarms list.

priorityLevels

A number of ranges of alarm priorities can be specified. An alarm whose priority rating is greater than the value of a range's lowEnd parameter, and lower than the range's highEnd parameter is said to be in that range. An alarm can be in more than one range at a time.

Any alarms from the specified alarmSource (above) that are within any of the defined ranges will be included in the alarms list.

Also, for each range it can be specified whether or not the buzzer will sound when alarms in that range arise.

`lowEnd, highEnd`	An alarm whose priority rating is greater than the value of a range's lowEnd parameter, and lower than the range's highEnd parameter is said to be in that range.
`buzzerEnabled`	If this parameter is set to 0, then the keypad's buzzer will not sound when alarms within the range are detected. If this parameter is set to 1, then when any alarm within the range is triggered, the keypad's buzzer will sound. The default value for this parameter is 1 (the buzzer will sound).

enableSystemAlarms

If this parameter is set to 0, then system alarms will not be included in the alarms list.

If this parameter is set to 1, then system alarms will be included in the alarms list.

`buzzerEnabled`

If this parameter is set to 0, then the keypad's buzzer will not sound if System Alarms are detected. If this parameter is set to 1, then when if system alarms are detected the keypad's buzzer will sound.

LOCALISATIONSTRINGS

TIMESCHEDULE

This parameter sets the text that will be displayed on screen for the following headings in the time schedule display:

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday
- ExceptionPeriod
- StandardWeek

It is intended to provide a localised display in languages other than English.

5   Using the completed tree

DOWNLOADING TO THE TARGET CONTROLLER

When the Keypad Program Tree is ready for use in a keypad, it must be downloaded to the Target controller. The Target controller - either a Communications Controller or a Field Controller - is defined in the keypad program automatically depending on the controller that was selected when the Keypad Builder was launched.

To download the program to the Target Controller, simply press the Download button in the centre of the Keypad Builder Interface.

Note: The first time you download to a specific controller, you may be prompted for a username and password. The default for **CBXi** controllers is `cxpro` / `siteguide` and for **UC32.net** is is `UC32Net` / `CylonCtl`

Note: When you download a keypad program to a Field Controller, under certain circumstances the buzzer will sound. This happens when there is a point configured as '`pointMonitor`', and its value currently matches the alarm condition. Pressing the X button on the keypad will silence the buzzer. This situation does not arise on Communications Controllers.

Note: When downloading to the controller, if the Network connection is set to '`Public`' the Firewall on the Engineering PC may identify the ftp transfer as suspicious, and block it causing the **Keypad Builder** to stall without a warning. If this happens, change the Network zone to '`Private`', or edit your Firewall's list of exclusions to allow "`Keypad Interface Builder`" to transfer files.

SAVING

To save the current state of the keypad program tree, simply press the Save button in the centre of the Keypad Builder Interface. The program will be saved in the strategy folder of the Target Controller.

OPENING A SAVED KEYPAD PROGRAM

To open a keypad program tree for editing, press the Open button in the centre of the Keypad Builder Interface. A file-browsing dialog will open, showing the contents of the strategy folder of the Target Controller. You can open any saved keypad programs there, or navigate to any other location where saved keypad programs may be stored.

PRINT PREVIEW- DISPLAY IN BROWSER

It is possible to view the current keypad program tree in a web browser. This can be useful for reviewing the content of the tree, and for printing handover documents etc.

To open the tree in a browser, click on the Open in browser button on the toolbar.

Note: In order to view print-preview files, you ensure your browser is allowed to view 'active content'. If you are using Microsoft's **Internet Explorer**, open Tools > internet options, and click on the 'Advanced' tab. Scroll down to the Security heading, and tick the box beside "Allow active content to run in files on My Computer".

6   Appendix :: Allowable Character S et

The following table shows all of the characters available in the UC32 Keypad:

ABB

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ABB CYLON CONTROLS

Clonshaugh Business &
Technology Park
Clonshaugh
Dublin 17
Ireland

Tel.:   +353 1 245 0500
Fax: +353 1 245 0501
Email: info@cylon.com

—

ABB CYLON CONTROLS

ONE TECHNOLOGY LANE
EXPORT,
PA 15632

Tel.:   +1 724 733-2000
Fax: +1 724 327-6124

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