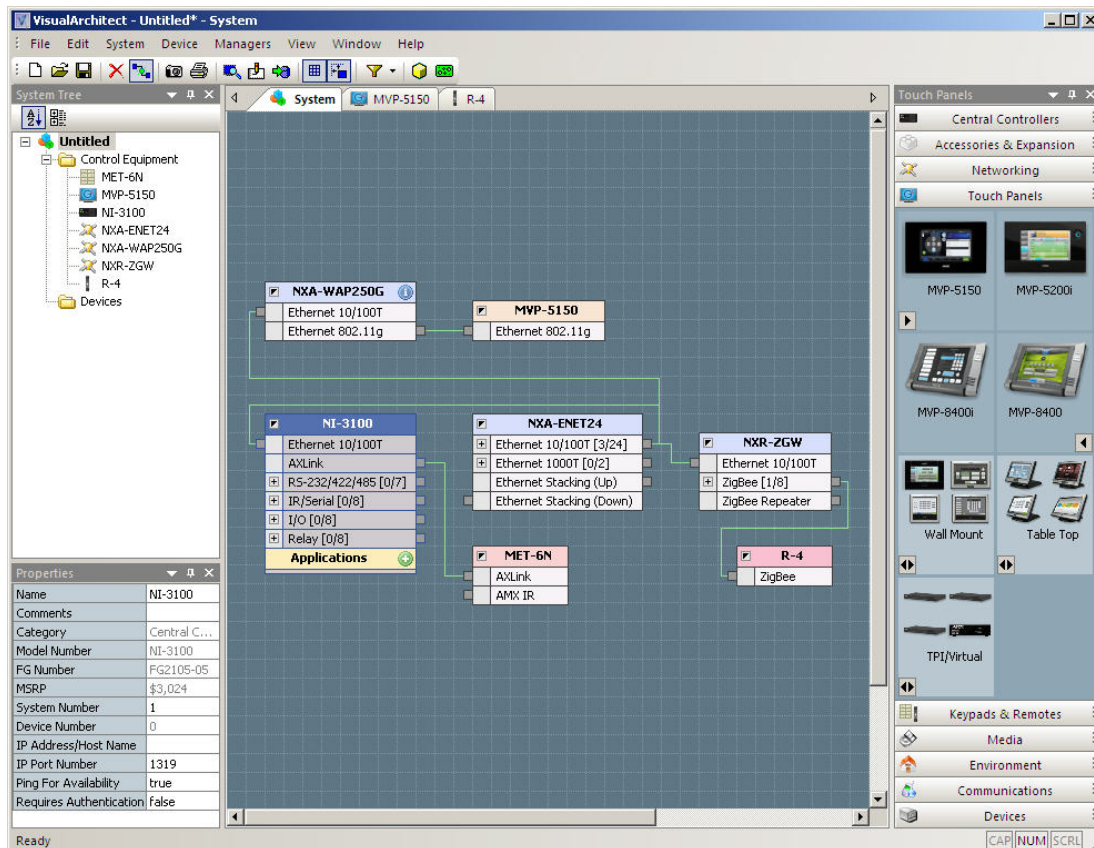




Operation/Reference Guide

VisualArchitect

NSS-VA (v1.4.3 or higher)



AMX Software License and Warranty Agreement

- **LICENSE GRANT.** AMX grants to Licensee the non-exclusive right to use the AMX Software in the manner described in this License. The AMX Software is licensed, not sold. This license does not grant Licensee the right to create derivative works of the AMX Software. The AMX Software consists of generally available programming and development software, product documentation, sample applications, tools and utilities, and miscellaneous technical information. Please refer to the README.TXT file on the compact disc or download for further information regarding the components of the AMX Software. The AMX Software is subject to restrictions on distribution described in this License Agreement. AMX Dealer, Distributor, VIP or other AMX authorized entity shall not, and shall not permit any other person to, disclose, display, loan, publish, transfer (whether by sale, assignment, exchange, gift, operation of law or otherwise), license, sublicense, copy, or otherwise disseminate the AMX Software. Licensee may not reverse engineer, decompile, or disassemble the AMX Software.
- **ACKNOWLEDGEMENT.** You hereby acknowledge that you are an authorized AMX dealer, distributor, VIP or other AMX authorized entity in good standing and have the right to enter into and be bound by the terms of this Agreement.
- **INTELLECTUAL PROPERTY.** The AMX Software is owned by AMX and is protected by United States copyright laws, patent laws, international treaty provisions, and/or state of Texas trade secret laws. Licensee may make copies of the AMX Software solely for backup or archival purposes. Licensee may not copy the written materials accompanying the AMX Software.
- **TERMINATION.** AMX RESERVES THE RIGHT, IN ITS SOLE DISCRETION, TO TERMINATE THIS LICENSE FOR ANY REASON UPON WRITTEN NOTICE TO LICENSEE. In the event that AMX terminates this License, the Licensee shall return or destroy all originals and copies of the AMX Software to AMX and certify in writing that all originals and copies have been returned or destroyed.
- **PRE-RELEASE CODE.** Portions of the AMX Software may, from time to time, as identified in the AMX Software, include PRE-RELEASE CODE and such code may not be at the level of performance, compatibility and functionality of the GA code. The PRE-RELEASE CODE may not operate correctly and may be substantially modified prior to final release or certain features may not be generally released. AMX is not obligated to make or support any PRE-RELEASE CODE. ALL PRE-RELEASE CODE IS PROVIDED "AS IS" WITH NO WARRANTIES.
- **LIMITED WARRANTY.** AMX warrants that the AMX Software (other than pre-release code) will perform substantially in accordance with the accompanying written materials for a period of ninety (90) days from the date of receipt. AMX DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH REGARD TO THE AMX SOFTWARE. THIS LIMITED WARRANTY GIVES LICENSEE SPECIFIC LEGAL RIGHTS. Any supplements or updates to the AMX SOFTWARE, including without limitation, any (if any) service packs or hot fixes provided to Licensee after the expiration of the ninety (90) day Limited Warranty period are not covered by any warranty or condition, express, implied or statutory.
- **LICENSEE REMEDIES.** AMX's entire liability and Licensee's exclusive remedy shall be repair or replacement of the AMX Software that does not meet AMX's Limited Warranty and which is returned to AMX in accordance with AMX's current return policy. This Limited Warranty is void if failure of the AMX Software has resulted from accident, abuse, or misapplication. Any replacement AMX Software will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. Outside the United States, these remedies may not be available. NO LIABILITY FOR CONSEQUENTIAL DAMAGES. IN NO EVENT SHALL AMX BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR INABILITY TO USE THIS AMX SOFTWARE, EVEN IF AMX HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME STATES/COUNTRIES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION MAY NOT APPLY TO LICENSEE.
- **U.S. GOVERNMENT RESTRICTED RIGHTS.** The AMX Software is provided with RESTRICTED RIGHTS. Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph ©(1)(ii) of The Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or subparagraphs ©(1) and (2) of the Commercial Computer Software Restricted Rights at 48 CFR 52.227-19, as applicable.
- **SOFTWARE AND OTHER MATERIALS FROM AMX.COM MAY BE SUBJECT TO EXPORT CONTROL.** The United States Export Control laws prohibit the export of certain technical data and software to certain territories. No software from this Site may be downloaded or exported (i) into (or to a national or resident of) Cuba, Iraq, Libya, North Korea, Iran, Syria, or any other country to which the United States has embargoed goods; or (ii) anyone on the United States Treasury Department's list of Specially Designated Nationals or the U.S. Commerce Department's Table of Deny Orders. AMX does not authorize the downloading or exporting of any software or technical data from this site to any jurisdiction prohibited by the United States Export Laws.

This Agreement replaces and supersedes all previous AMX Software License Agreements and is governed by the laws of the State of Texas, and all disputes will be resolved in the courts in Collin County, Texas, USA. For any questions concerning this Agreement, or to contact AMX for any reason, please write: AMX License and Warranty Department, 3000 Research Drive, Richardson, TX 75082.

Table of Contents

VisualArchitect (NSS-VA)	1
Overview (v1.4 or higher)	1
Supported Windows Platforms and PC Requirements	2
Supported Operating Systems	2
Supported System Languages	2
PC Requirements/Recommendations	2
Getting Started	3
Overview	3
Welcome Screen	4
Welcome Screen - Start a New Project	4
Welcome Screen - Open a Recent Project	5
Welcome Screen - Browse for a Project	5
Welcome Screen - Managers	5
The VisualArchitect Workspace	7
Overview	7
Menu Bar	7
Toolbars	8
System Tree	8
Device Classes / Device Controllers	9
System Tree Context Menu	10
Properties Window	10
Diagram Area	11
System Tab (System Diagram)	12
Panel UI Diagrams	12
Keypad UI Diagram	13
Remote UI Diagrams - MIO R-1, R-2 and R-3 Remotes	13
Remote UI Diagrams - MIO R-4 Remotes	14
Show/Hide/Snap To Grid	14
Toolbox	15
Toolbox - System Devices	15
Device Groups	16
Availability Icons	16
Toolbox - UI Tabs	17
Toolbox - Devices Tab	18
Toolbox Context Menus	18
Toolbox Sub-Menu	19
Status Bar	19

Working With Projects21

- Creating a New VA Project..... 21
 - Using The Basic System Assistant Option..... 22
 - Using the System Design Library Option..... 24
 - Downloading System Design Library (SDL) Files 25
 - Using the New Empty System Option 26
- Opening VA Project Files..... 27
- Setting Project Properties 27
- Saving VA Project Files 28
- Compiling VA Project Files 28

Device Database29

- Overview 29
- Adding IR Devices To The Device Database 30
 - Adding InConcert IR Devices To The Device Database 31
 - Manually Adding IR Devices To The Device Database..... 31
 - Adding InConcert Serial and IP Devices To The Device Database 33
 - Manually Adding Serial and IP Devices To The Device Database 34
- Capturing IR Codes..... 34
 - IR Capture - 1) Entering Device Information..... 34
 - IR Capture - 2) Selecting Functions To Capture..... 35
 - IR Capture - 3) Setting IR Properties 35
 - IR Capture - 4) Capturing IR Codes From The Hand Controller 36
 - Troubleshooting - IR Capture 37
 - Creating XMD Files 37
 - VA IR Templates - Channel Layouts 38
- Control Strings Definitions..... 39
 - Creating a New CSD File..... 39
 - Control String Assignments window 41
 - Control Strings - Syntax Rules 42
 - Device Classes / Device Controllers 42
 - Opening Control Strings Definition (*.CSD) Files 42
 - Adding a New CSD File to the Device Database..... 43
- CSD Example 1: Case Requiring a Check Sum 43
 - Step 1: Specify the Device Type..... 44
 - Step 2: Enter the Manufacturer Name 44
 - Step 3: Enter the Model Name 45
 - Step 4: Specify the Packet Format 45
 - Step 5: Terminator Before Checksum Setting 46
 - Step 6: Enter the Command and Parameters 46

CSD Example 2: Case Not Requiring a Check Sum	48
Step 1: Specify the Device Type	48
Step 2: Enter the Manufacturer Name	49
Step 3: Enter the Model Name	49
Step 4: Specify the Packet Format	50
Step 5: Specify the Serial Baud Rate	50
Step 6: Enter the Command and Parameters	51
Device Database - Default Search Paths	52
Device Database - Adding a New Search Path	52
Removing a Search Path	53
Re-ordering the Search Paths	53
InConcert Resource Center	53
Searching For IR Library (.IRL) Files	53
Downloading IR Library (.IRL) Files	55
Searching For Duet Module (.JAR) Files	55
Downloading Duet Module (.JAR) Files	57
Module ZIP Files	58
Importing a Café Duet Module into VisualArchitect	59
Re-Scanning the Device Database	60
Rebuilding the Device Database	60
Adding MSRP Values for Controlled Devices	61
Working With Devices	63
Supported Devices	63
Device Notes	63
Copying Device Notes to Clipboard Memory	63
NetLinx Central Controller	64
Setting The Card Frame Number	64
Replacing the Central Controller	64
Working With Applications	66
User Interface Devices	67
Selecting AMX User-Interface Devices	67
Intercom-Enabled Touch Panels	68
Device Properties	68
Using Quick Input	68
Device Properties - Central Controllers	68
Device Properties - Accessories & Expansion Devices	69
Device Properties - Networking Devices	70
Device Properties - Touch Panels	70
Device Properties - Keypads & Remotes	71
Device Properties - Media Devices	72

Device Properties - Environment Devices.....	73
Device Properties - Communications Devices.....	74
Device Properties - Third-Party Devices	74
Device Number Defaults	75
Device Number Ranges - By Device Type.....	76
Device Properties	76
Card Frame Number	76
Category	76
Color	76
Color Scheme.....	76
Comments.....	76
Connection Type	77
Device Number	77
Duet Module.....	77
FG Number	77
Frequency	77
IP Address/Host Name.....	77
IP Port Number	77
Manufacturer	77
Model Number.....	77
Module Initialization Properties	77
MSRP	77
Name	77
Option	77
Ping For Availability.....	77
Communication Parameters	78
Preset/Media Library File Path.....	78
Requires Authentication.....	78
System Number	78
Template.....	78
Unicode Font	78
Voltage	78
Communication Parameters - Ethernet Connections	79
Ethernet Connection Types	79
Communication Parameters - IR Connections.....	80
Communication Parameters - Modem Connections.....	80
Communication Parameters - Serial (RS-232/422/485) Connections	81
Communication Parameters - TCP/IP Connections	81
Device Addressing	82
Device:Port:System (D:P:S).....	82
Modero® Touch Panels Device Addressing.....	82
Mio Modero Keypad Device Addressing.....	82
Central Controller Addressing Via Telnet.....	83
NetLinx Device Addressing via the Central Controller UI.....	85
Device Accessories.....	86
Adding Accessories to an AMX Device	86
Prerequisite Devices.....	87
Multi-Port Devices	88
Port Activation	88

Port Naming.....	88
Component Port Usage.....	89
Multi-Port Code Generation.....	91
Device Discovery (DD)	91
Device Discovery (DD) Concepts.....	92
Enabling Internet Access On The Central Controller.....	93
Managing Device Bindings.....	94
Configuring Application-Defined Devices	95
Troubleshooting - Device Discovery (DD) Devices	96
External Device Configuration Files.....	97
Importing a Device Configuration (*.HPX) File	97
Exporting a Device Configuration File	97
System Design	99
Overview	99
System Diagram.....	99
Device Elements	99
Adding Devices To The System Diagram	100
Prerequisite Devices.....	100
Removing Devices From The System Diagram	101
Connection Nodes - Device Elements.....	102
Expand / Collapse Multi-Connection Nodes.....	103
Connection Lines	104
Connecting Devices	104
Manually Connecting Devices in the System Diagram:.....	105
Devices/Modules With Multiple Connection Types	106
Defining Physical Connectors For System Devices.....	107
Filtering Device Connections	107
Removing Device Connections	109
Changing the Connection Line Style	109
Connection Node Types.....	109
Replacing Devices.....	109
Replacing the Central Controller.....	109
Replacing Touch Panels.....	111
Touch Panel Replacement - Incompatibilities	111
Replacing Keypads.....	112
Keypad Replacement Table.....	112
Replacing Remotes.....	120
Replacing Controlled Devices	121
Duplicating Devices	122
Duplicating Touch Panels	122

Duplicating DMS Keypads.....	122
Duplicating R-4 Remotes.....	124
System Diagram context menu	124
UI Design	125
Overview	125
Adding UI Elements To The UI Diagram	126
Connection Nodes - UI Elements	127
Connecting Elements In The UI Diagram	127
Connection Lines - UI Diagram	128
Removing UI Element Connections	128
Changing the Connection Line Style	128
UI Element Types.....	128
UI Element Type - Start Device	128
UI Element Type - Mode Selection	129
UI Element Type - Navigation.....	129
UI Element Type - Sub-Navigation.....	130
UI Element Type - Features	130
UI Element Type - Sub-Feature.....	130
UI Element Type - Placeholder	131
UI Element Type - Device Elements.....	131
UI Element Properties.....	131
Using Quick Input.....	131
UI Element Properties - Start Device Element.....	131
UI Element Properties - Mode Selection	132
UI Element Properties - Navigation	133
UI Element Properties - Sub-Navigation	134
UI Element Properties - Features	134
UI Element Properties - Sub-Features	135
UI Element Properties - Placeholder.....	135
UI Element Properties - Device Elements	136
UI Element Properties	137
Button Name	137
Category	137
Color	137
Color Scheme.....	137
Comments.....	137
Device Mode.....	137
Device Number	137
Device Port Number	137
Engraving Font	138
Engraving Scale	138
Engraving Text.....	138
FG Number	138
Items	139
IP Address/Host Name.....	139

Manufacturer.....	139
Model Number.....	139
MSRP.....	139
Name.....	140
On-Screen Name.....	140
Skin.....	140
Template.....	140
Template Element.....	140
Unicode Font.....	140
Feature Property - ComputerControl.....	141
Feature Property - TakeNote.....	142
Feature Property - Video Window.....	142
Removing UI Elements.....	142
Replacing UI Elements.....	143
Defining the UI - Touch Panels.....	144
Defining the UI - Touch Panels.....	144
Mode/Navigation/Sub-Navigation Button Feedback.....	144
External Button Programming.....	146
UI Templates.....	147
Selecting a UI Template - Via Device Properties.....	147
Templates for Intercom-Enabled Touch Panels.....	148
Installing UI Templates.....	149
Uninstalling UI Templates.....	150
Previewing Touch Panel UI Elements.....	151
Color Schemes.....	152
Changing the Color Scheme on a UI Template.....	152
Skins.....	153
Changing the Skin on a UI Template.....	154
Customizing Panel UI Pages.....	155
Adding UI Elements to the Touch Panel Page.....	155
Editing UI Element Properties.....	155
Deleting UI Elements from the Touch Panel Page.....	156
Editing Panel Buttons.....	156
Editing Panel Button Text.....	157
Character Map dialog.....	158
Working With Features and Sub-Features.....	159
Defining the UI - Keypads.....	159
Keypad UI Diagram.....	159
UI Diagram - Keypads With Labelled Buttons.....	159
UI Diagram - Keypads With Custom Engraved Buttons.....	160
UI Diagram - Keypads With Custom Engraved Buttons and LCD Display.....	160
UI Diagram - MIO-DMS Keypads.....	161
Defining the UI - Keypads.....	162

Keypad Buttons.....	163
Keypad UI Diagram - Button Layout.....	163
Setting Keypad Button Properties	164
Combining Buttons.....	164
Uncombining Buttons.....	165
Engraving - Show Bounding Box	165
Exporting Keypad Button Engraving Templates as DXF Files.....	165
Keypad LCD Display Menus	166
Adding Devices to the Main Menu	166
Adding Separator Lines to the Main Menu.....	168
Adding Events to a Device Sub Menu	168
Generating KeypadBuilder Project Files.....	169
Defining the UI - Remote Controllers.....	169
UI Diagram - MIO R-1, R-2 and R-3 Remotes	170
UI Diagram - MIO R-4 Remotes	170
Defining the UI - MIO R-1, R-2 and R-3 Remotes.....	171
Remote Button Properties.....	172
Exporting the Remote Button Engraving Template as a DXF File.....	172
Defining the UI - MIO R-4 Remotes	173
Creating Device Macros (Using CodeBuilder)	175
Overview	175
Defining Device Macros	175
Adding General-Purpose Macros.....	177
If_else-Endif	177
Adding Device Functions.....	178
Adding Status Functions	180
Defining Custom Macro UI Buttons	181
UI Buttons - Code Blocks.....	182
CodeBuilder - Adding Comments To Button Events	182
CodeBuilder: UI-Centric Programming	183
UI-Centric Programming - Generated BUTTON_EVENT code	184
External Button Programming.....	185
MIO R-4 External Button Programming.....	185
External Button Programming - NetLinX Source Code Generation	186
Online/Offline Event Programming	187
I/O Event Programming	187
Working With Variables	188
Defining Variables	189
Variable Data Types	190
Variable Validation	190

CodeBuilder - Adding a New Variable	190
CodeBuilder - Editing A Variable	191
CodeBuilder - Deleting A Variable	191
Variables - NetLinX Code Generation.....	191
Variable Assignment Step	192
Assigning Variables	193
Replacing Literals In Existing Steps With Variables.....	194
Variable Replacement In Function Blocks.....	195
Variable Replacement in IF-ELSE Statements.....	195
Creating an IF Conditional with a Variable.....	196
Compound IF-ELSE With Variables.....	197
Variable Replacement In Delay Macros	198
Finishing the Project	199
Overview	199
Generating And Transferring System Files	199
Generating the System Report.....	200
Generating The TPDesign4 Project (.TP4) File	201
Transfer Previously Generated System Files	202
System Report	202
System Report - Cover Page	202
System Report - System Diagram.....	203
System Report - Equipment List.....	203
System Report - Accessory List	203
System Report - Installation Checklist	204
System Report - Wiring Connections.....	204
System Report - Default Cable FG Information.....	204
System Report - Installation Instructions	204
System Report - General Information.....	205
System Report - Troubleshooting and Support.....	205
System Report - Contact Information.....	205
Exporting Diagram Images	206
Printing The Diagrams	207
VA Generated System Files	208
VA-Generated Folders	208
VA-Generated Files	208
Custom Include Files	209
Making Your Project Portable.....	209
Working with Presets (.MXD and .PXD) Files	213
Preset and Media Content Database Files.....	213
Media Preset Files (CDs and DVDs).....	213

Channel Preset Files (TV Channels and Radio Stations)	213
Attaching a Preset File to a VA Project.....	214
Troubleshooting	215
Overview	215
If VA Freezes During File Transfers.....	215
If VA Fails to Connect To the NetLinx Master.....	215
If VA Won't Compile Your Project	215
Ethernet Cable Troubleshooting Tips	216
Troubleshooting - Device Discovery (DD) Devices	216
RS-232 Control Troubleshooting.....	217
RS-232 Control Troubleshooting - Cabling	217
RS-232 Control Troubleshooting - Settings	217
RS-232 Control Troubleshooting - The Controlled Device.....	218
RS-232 Control Troubleshooting - Technique.....	218
RS-232 Control Troubleshooting - Terminal PASS Mode.....	218
RS-232 Control Troubleshooting - Flow Control.....	218
NetLinx Diagnostics	219
NetLinx Diagnostics Control Device / Emulate Device	219
Manage System - Diagnostics.....	220
Setting Up and Removing a Diagnostic Filter.....	220
Modifying a Diagnostic Filter	222
Web Update	223
Overview	223
Installing WebUpdate	223
WebUpdate User Interface Templates.....	225
WebUpdate Duet Modules	226
WebUpdate System Design Libraries (SDL)	227
Appendices	229
AMX Icon 2 Character Map.....	229
Extended ASCII Characters/Hex Table	230
AMX Power Calculator.....	231

VisualArchitect (NSS-VA)

Overview (v1.4 or higher)

VisualArchitect (VA) is a comprehensive system design platform that increases the productivity and efficiency of your organization. VisualArchitect simplifies generation of all the programming, touch panel files, IR codes and system documentation for an integrated control system.

This software is free to Authorized AMX Dealers and Independent Programmers and is available through your AMX sales representative (**FG3002-21**).

For experienced NetLinx® programmers and system designers, VA can serve as a powerful tool, greatly reducing the amount of time required to design and complete single-master NetLinx systems. The UI Template support in VA makes it easy to create attractive Touch Panel page designs, and the CodeBuilder feature helps to define macros with ease and speed.

More information on VisualArchitect can be found at www.amx.com/va. Here you will find the Quick Start Demo, Frequently Asked Questions including instructional video clips, training course list and the VisualArchitect Forum.

Also, take a few moments to familiarize yourself with the elements of the VA Workspace, and the elements of the help file. When you're ready to begin, select an option under **Start a New Project**, on the *Welcome To VisualArchitect* window:



FIG. 1 New Project options (Welcome To VisualArchitect window)

- Basic System Assistant
- System Design Library
- New Empty System

Refer to the *Creating a New VA Project* section on page 21 for details.

Supported Windows Platforms and PC Requirements

Supported Operating Systems

- Windows XP® Professional (service pack 2 or greater)
- Windows Vista® Home Basic



NOTE

You must have Power User (or Administrator) rights to install and run all required System files.

Supported System Languages

- English (US)
- French
- Spanish
- German
- Russian

PC Requirements/Recommendations

- 1.00 GHz Processor (minimum requirement); 1.5GHz or faster recommended.
- 20 GB of free disk space (minimum requirement)
- 1 GB of RAM (minimum - SQL Server 2005 Express Edition requires 512MB)
- Minimum (VGA) screen resolution of 800x600.
- Windows-compatible mouse (or other pointing device).



NOTE

If the mouse wheel on your Microsoft® IntelliMouse® doesn't work with VA, try downloading the latest IntelliMouse drivers from Microsoft.

Getting Started

Overview

The basic steps involved in creating a new system in VA are:

1. Creating a New VA Project/System.
 - Use the **Basic System Assistant** option to use a wizard-type approach to defining the Central Controller, Touch Panel, Keypads and Remotes as a starting point to creating a new project/system. Refer to the *Using The Basic System Assistant Option* section on page 22 for details.
 - Use a **System Design Library** file as a starting point to creating a new project/system. System Design Library (.VAP) files provide several templates for pre-configured systems of various types (e.g. Auditoriums, Conference Rooms, Boardrooms etc.), to use as is or as a short-cut to designing several common types of control systems. Refer to the *Using the System Design Library Option* section on page 24 for details.
 - Use the **New Empty System** option to start with a blank slate. Refer to the *Using the New Empty System Option* section on page 26 for details.



NOTE

You can also start a new system design with a Central Controller selection. With no project open, right-click on the Central Controller that you want to use in the Central Controllers tab of the Toolbox, and select New System Using: from the context menu. This action starts a new empty system, with the selected Controller in place.

2. Adding Devices to the System, and establishing device connections. Refer to the *Adding Devices To The System Diagram* section on page 100.
3. Setting Device Properties. Refer to the *Device Properties* section on page 68.
4. Defining Control Strings and Device Macros as necessary. Refer to the *Creating Device Macros (Using CodeBuilder)* section on page 175.
5. Define the User Interface for UI devices
 - Touch Panels (see the *Defining the UI - Touch Panels* section on page 144)
 - Keypads (see the *Defining the UI - Keypads* section on page 159)
 - Remote Controllers (see the *Defining the UI - Remote Controllers* section on page 169)
6. Saving the Project (see *Saving VA Project Files* on page 28).
7. Finishing the Project
 - Generating And Transferring System Files - see *Generating And Transferring System Files* on page 199.
 - Generating the System Report - see *System Report* on page 202.
 - Exporting Diagram Images - see *Exporting Diagram Images* on page 206.
 - Printing The Diagrams - see *Printing The Diagrams* on page 207.

Welcome Screen

When you launch VisualArchitect, the *Welcome* screen is displayed (FIG. 2):

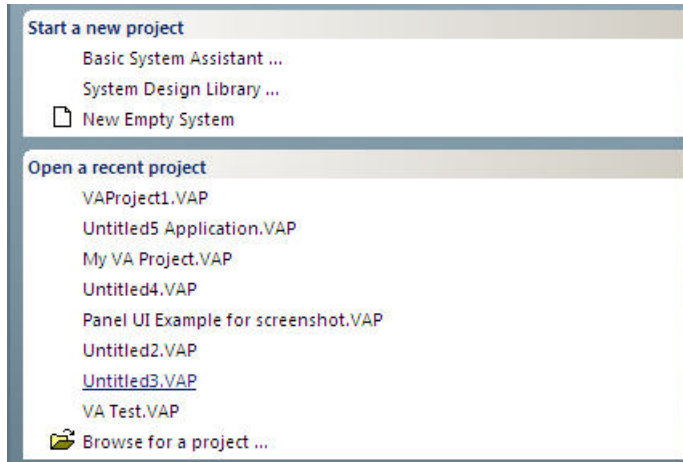


FIG. 2 Welcome Screen

The Welcome screen is divided into three main sections (**Start a New Project**, **Open a Recent Project**, and **Managers**), each containing a set of shortcuts:



NOTE

The Welcome screen is also displayed any time there is not a Project open.

Welcome Screen - Start a New Project

This section contains shortcuts relating to creating a new VA project (FIG. 3):

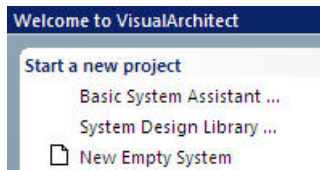


FIG. 3 Welcome Screen - Start a New Project Options

- **Basic System Assistant:** Click to access the *Basic System Assistant* dialog. Use the Basic System Assistant to quickly specify a Central Controller, Touch Panel, up to two Keypads, and / or a remote. This option is the same as selecting **File > New > Basic System Assistant**. Refer to the *Using The Basic System Assistant Option* section on page 22 for details.
- **System Design Library:** System Design Library files (SDLs) represent pre-configured VA Project/Systems designed to accommodate various installation types. SDLs are available for Dealers to download from www.amx.com (in the Markets section). Select a SDL that most closely meets the needs of your customer, keeping in mind that you will have the ability to customize the solution later by adding different devices and options. This option is the same as selecting **File > New > System Design Library**. Refer to the *Using the System Design Library Option* section on page 24 for details.
- **New Empty System:** Click to open a new System tab, with a NI-3100 Central Controller. This is the default Central Controller for new VA projects, and it can be switched to a different Central Controller at any time. This option is the same as selecting **File > New > New Empty System** (or the New Empty System button on the Standard Toolbar). Refer to the *Using the New Empty System Option* section on page 26 for details.



NOTE

You can also start with the Central Controller selection - right click on any Central Controller in the Toolbox, and select *New System Using:* from the context menu.

Welcome Screen - Open a Recent Project

This section contains a list of recently opened VA Projects, for quick access (FIG. 4).

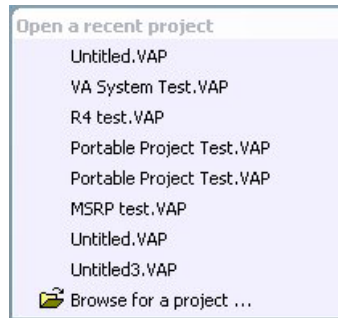


FIG. 4 Welcome Screen - Open a Recent Project

Click on any project in the list to open it.

Welcome Screen - Browse for a Project

Click to launch the *Open VisualArchitect Project* dialog, where you can locate and select projects that are not listed in the recent projects list (FIG. 5).

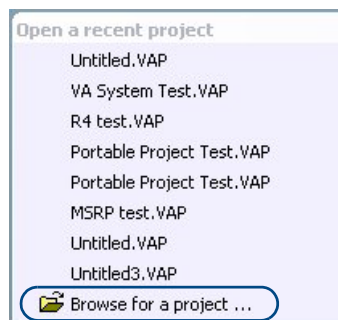


FIG. 5 Welcome Screen - Open a Recent Project > Browse for a project

Welcome Screen - Managers

This section of the Welcome Screen contains shortcuts to the two managers used by VA (FIG. 6):

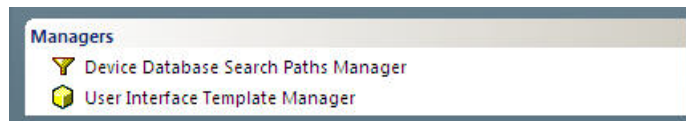


FIG. 6 Welcome Screen - Managers

- Device Database Search Paths Manager:** Click to access the *Device Database Search Paths Manager* dialog, where you can specify the location of folders containing new/additional devices. The Device Database is a collection of Cafe Duet module files (.JAR), and IR files with their metadata (.IRL/.XMD). Each JAR and IRL/XMD file represents one or more controlled devices that can be added to the project as third-party devices, via the Devices tab of the Toolbox. The Device Database is located in the **VASupportFiles** folder (Program Files / Common Files / AMXShare / VASupportFiles), the folders added to the Device Database Search Paths Manager tell VA which folders to include when building or updating the database. These paths will contain JARs, CSDs, and/or IRL/XMDs. If you add new JAR or IRL/XMD files to the Device Database, you'll have to update the database via the **Re-Scan Device Database Search Paths** option in the Managers menu.

Refer to the *Device Database* section on page 29 for details.

- **User Interface Template Manager:** Click to access the *User Interface Template Manager* dialog, where you can preview, load and install ready-made UI templates that can be applied to Panels in your project.

Refer to the *UI Templates* section on page 147 for details.



Refer to the VisualArchitect online help system for detailed descriptions of all Menus, Toolbars and dialogs.

Toolbars

There are several Toolbars available in the VA Workspace, each one providing shortcuts to a different set of functions (FIG. 9):



FIG. 9 Toolbars

- Standard Toolbar - Displayed by default
- Touch Panel Toolbar - Displayed when a Panel UI tab is selected,
- Keypad Toolbar - Displayed when you select a UI tab for a Keypad.
- Remote Toolbar - Displayed when you select a UI tab for a R-1, R-2 or R-3 Remote.



Refer to the VisualArchitect online help system for detailed descriptions of all Menus, Toolbars and dialogs.

System Tree

FIG. 10 shows the System Tree window, as it appears with the System Diagram active:

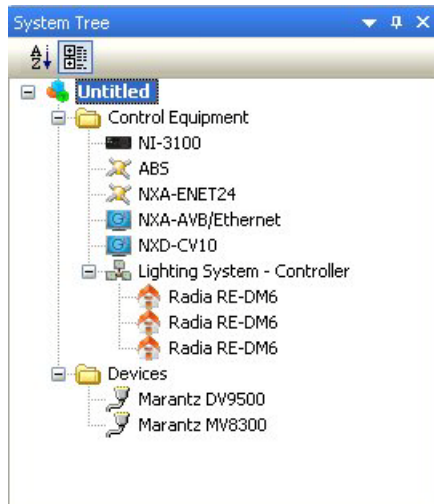


FIG. 10 System Tree - System Diagram active

The System Tree indicates the devices that are currently in your system, separated into two categories:

- **Control Equipment** - This represents AMX equipment, including Central Controllers, Expansion, Networking, Touch Panels, Keypads, Remotes, Media devices, and Environment devices.
- **Devices** - This represents third-party (non-AMX controlled) equipment.

Beyond providing a visual summary of the devices in your system, the System Tree also provides shortcuts to many of the device-oriented functions of VA, via the System Tree shortcut menu. Right-click on any device in the System Tree to access this menu.

FIG. 11 shows the System Tree window, as it appears with a UI Diagram active:

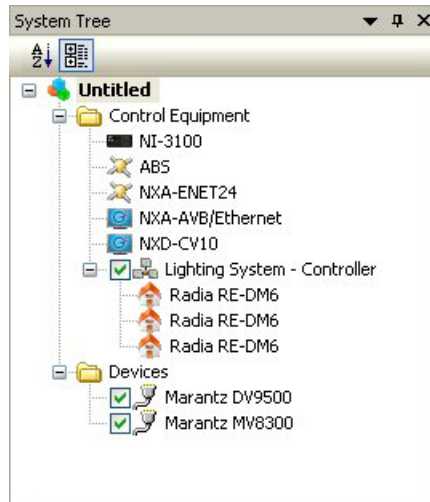


FIG. 11 System Tree - UI Diagram active

If you are in a UI diagram (UI tabs), the Controlled third-party device list has an additional feature:

Clear the check box next to any controlled device in the list to remove its element from the UI diagram. This does not remove the device from the system, it only removes it from the diagram. Reapply the check mark to return the device to the UI diagram.

Device Classes / Device Controllers

VA represents its Device Database in the System Tree on a class-by-class basis, based on the Duet module they share.



NOTE

Device Controllers include the Lighting System device class.

As devices that are controlled by a single Duet controller module (or device controller), and not individual modules per device, are added to a system, VA collects them under a common logical device controller (FIG. 12).

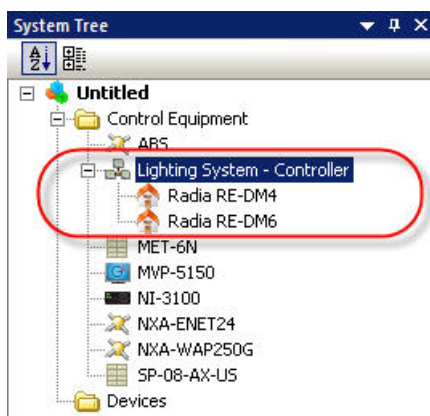


FIG. 12 System Tree - Lighting System Device Controller

For CodeBuilder, the device controller is the only device visible for programming purposes. The events available for programming in CodeBuilder are the events for the device controller, and the functions and status

items available for use in programming are only those from the controller. Individual controlled devices are not listed on the right-side of Code Builder.

In the generated NetLinX code, only the controller device is assigned a virtual address and given a DEFINE_MODULE statement (the second parameter to the module definition-physical address-will be ignored by the module).

The physical addresses of the controlled devices are passed to the controller module via PROPERTY commands in the module's ONLINE handler.

System Tree Context Menu

The System Tree context menu provides shortcuts to many of the device-oriented functions of VA.



NOTE

Refer to the VisualArchitect online help system for detailed descriptions of all Menus, Toolbars and dialogs.

Properties Window

Beneath the System Tree is the Properties window (FIG. 13):

Properties	
Name	NI-3100
Comments	
Category	Central Controller
Model Number	NI-3100
FG Number	FG2105-05
MSRP	\$3,024
System Number	1
Device Number	0
IP Address/Host Name	
IP Port Number	1319
Ping For Availability	true
Requires Authentication	false

Device Element (NI-3100) selected

Properties	
Name	Nav 2
On-Screen Name	
Comments	
Category	Navigation
Template Element	Nav 2
Device Port Number	11
Items	
Item 1	iWeather
Item 2	Start

Navigation Element (Nav 2) selected

Properties	
Keypad Properties	
Name	Mio Modero Prestige D
Comments	
Category	Keypad
Model Number	Mio Modero Prestige D
Device Number	132
Color	White
FG Number	FG5798-01WH
MSRP	\$425
Button Properties	
Button Name	
Channel Code	1

Keypad Button selected

Properties	
Remote Properties	
Name	R-3
Comments	
Category	Remote
Model Number	R-3
Device Number	10003
Option	MIO-R3
FG Number	FG148-03
MSRP	\$1,200
Button Properties	
Button Name	
Engraving Text	
Engraving Font	Arial Unicode MS
Engraving Scale	1.0

Remote Button selected

FIG. 13 Properties Window

The Properties Window provides detailed information for any selected device or navigation element.

The Properties Window is context sensitive:

- When a *Device Element* is selected in the System Diagram, it provides detailed information for that device.
- When a *Navigation Element* is selected in a Panel UI diagram, it provides information relative to the selected UI element.

- When a *Keypad button* is selected in a Keypad UI diagram, it provides information relative to the selected button.
- When a *Remote button* is selected in a Remote UI diagram, it provides information relative to the selected button.



If a Keypad or Remote is selected in the System Diagram, the Properties window represents the device-level properties for that keypad or remote only, but if the Keypad's or Remote's UI tab is opened, the Properties window indicates button-level properties (in addition to device-level properties).

Diagram Area

The Diagram Area is the main area in the middle of the application window, where you will view representations of every device in your system, as well as all device connections and Navigation layouts for User-Interface devices (Touch Panels, Keypads and Remotes).

Note that the example in FIG. 14 indicates several tabs across the top of the Diagram Area window (showing the System tab):

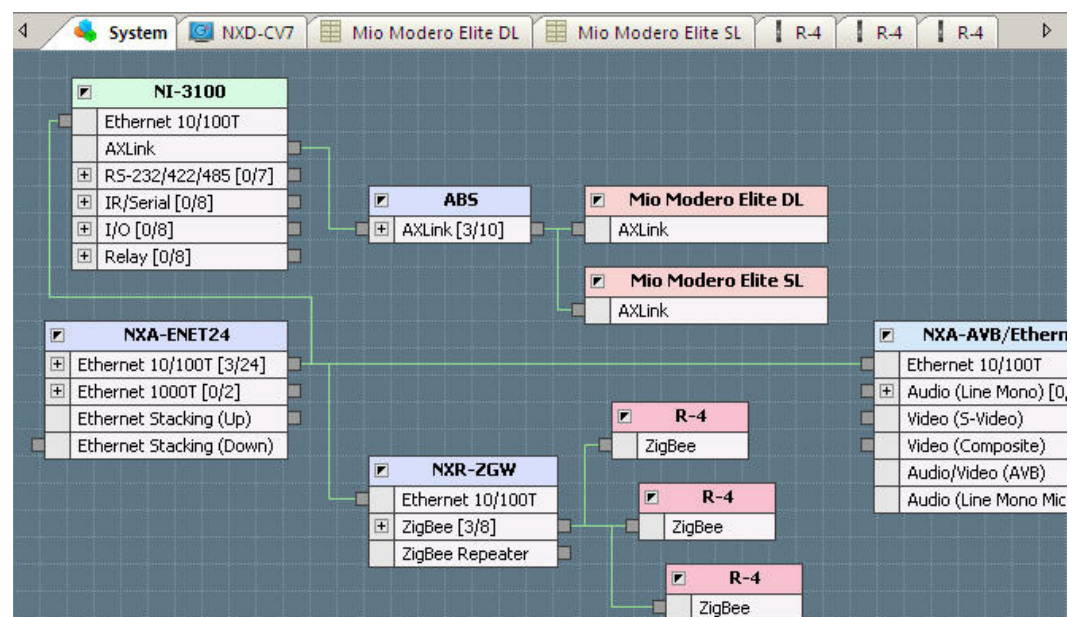


FIG. 14 Diagram Area (System tab shown)

- **System Tab** - The System tab displays the System Diagram which gives a visual representation of the devices in the system and their connections to each other and to the Central Controller. When you start a new system, the program automatically selects a NI-3100 NetLinX Central Controller. At this point, only the System tab is represented. Since every system must have a single NetLinX Central Controller, there will always be a single System tab.

Use the System tab to add and remove devices from the system, and establish connections between the devices.

- **UI Tab(s)** - A separate UI tab is added for each User-Interface device added to the system. Use these tabs to design the navigation layout for each of the UI devices.
 - For each Touch Panel in the system, there is a **Touch Panel UI** tab, which displays the UI diagram for each panel.
 - For each Keypad in the system, there is a **Keypad UI** tab, which displays the Keypad Diagram for each keypad.
 - For each Remote in the System, there is a **Remote UI** tab, which displays the Remote Diagram for each remote.

The navigation that is established here will be reflected in the resulting Touch Panel, Keypad, and Remote templates generated by VA.

System Tab (System Diagram)

Click on the System tab in the Diagram Area to view the System Diagram - a layout of the entire system, including the NetLinx Central Controller, AMX devices and third-party (controlled) devices, as well as all device connections (FIG. 15):

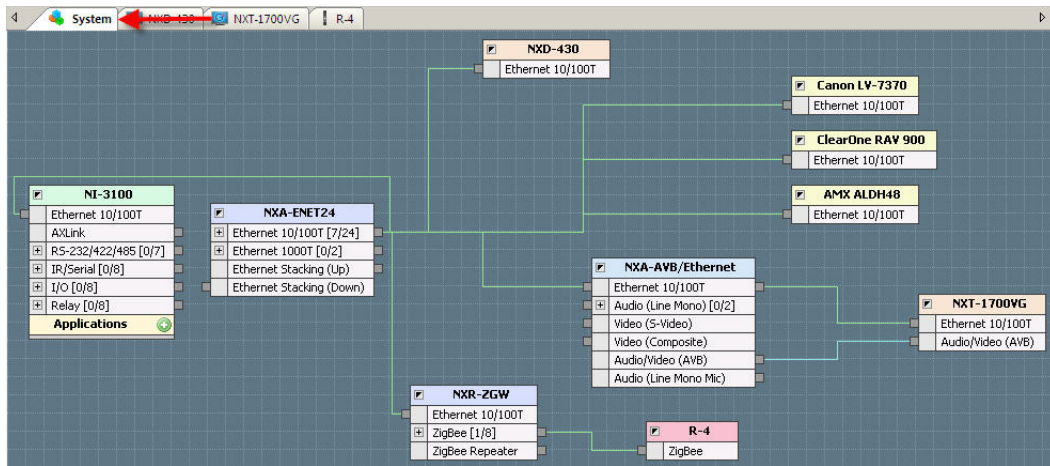


FIG. 15 Example System Diagram

See the *System Design* section on page 99 for details.

Panel UI Diagrams

For every Touch Panel added to the system, a separate Panel UI tab is added to the Diagram Area. Each Panel UI tab consists of a Panel UI Diagram - the graphic representation of the elements in the GUI, and their navigation layout. This is where you can add and connect UI Elements to establish a flow from one area of the UI to another.

The selected UI Element's properties are displayed in the Properties window.

An example of a simple Panel UI diagram is shown below (FIG. 16):

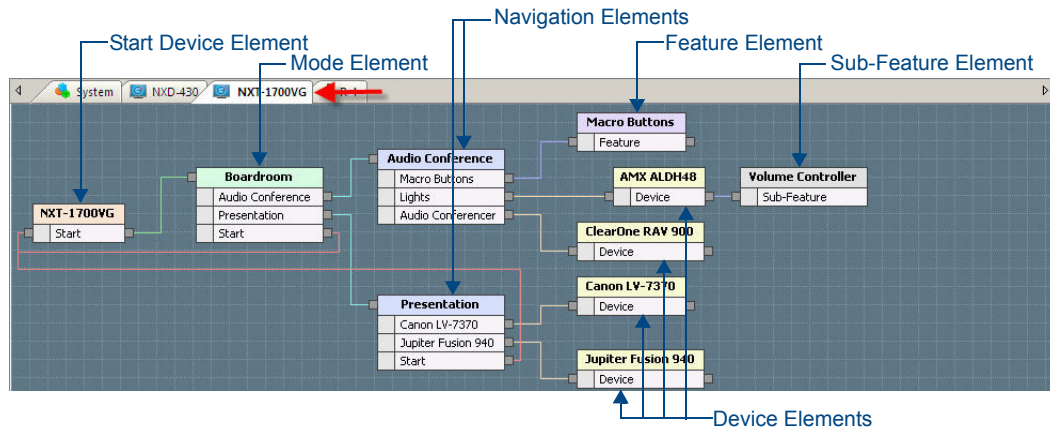


FIG. 16 Panel UI Diagram

Keypad UI Diagram

For every Keypad added to the system, a separate UI tab is added to the Diagram Area. Each UI tab consists of a Keypad UI Diagram - the graphic representation of the buttons on the keypad (FIG. 17):

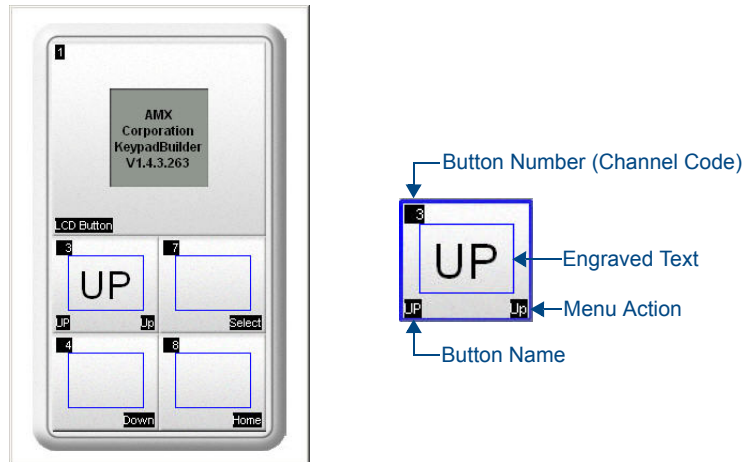


FIG. 17 Keypad UI Diagram (Show Button Numbers, Show Menu Actions, Show Button Names options enabled)

The button layout for each keypad is based on the type of keypad selected:

- For Keypads that do not feature an LCD display, the UI consists of channel codes assigned to each button on the keypad that allow the end-user to select devices to control, and trigger various control functions on each device.
- For Keypads that feature an LCD display, the UI also includes items displayed on the LCD display. These include the Mio Modero Elite SL, Elite DL and Attache.

Click on any button on the UI diagram to select it for editing, via the button properties in the Properties window.

Remote UI Diagrams - MIO R-1, R-2 and R-3 Remotes

For every MIO R-1, R-2 and R-3 remote added to the system, a separate UI tab is added to the Diagram Area. Each UI tab consists of a UI Diagram - the graphic representation of the buttons on the remote. The UI Diagram for these remotes is similar to Keypad UI diagrams - click on any button on the Remote UI diagram to select it for editing. The selected button's properties are displayed in the Properties window.

An example MIO R-1/R-2/R-3 UI diagram is shown below (FIG. 18):



FIG. 18 MIO R-1, R-2 and R-3 UI Diagram

Note that when you select a UI tab for MIO R-1, R-2 and R-3 remotes, the Remote Toolbar is displayed. Select **Remote > Engraving Template Preview** to open the *Engraving Template Preview* dialog. Use this dialog to preview the button engraving text as it has been specified in the properties for each button.

Remote UI Diagrams - MIO R-4 Remotes

For every MIO R-4 Remote added to the system, a separate UI tab is added to the Diagram Area. Each UI tab consists of a UI Diagram - the graphic representation of the elements in the remote's Panel GUI, and their navigation layout. This is where you can add and connect UI Elements to establish a flow from one area of the UI to another. The UI Diagram for MIO R-4 remotes is similar to Touch Panel UI diagrams - click on any UI Element on the R-4 UI diagram to select it for editing. The selected UI Element's properties are displayed in the Properties window.

An example MIO R-4 UI diagram is shown below (FIG. 19):

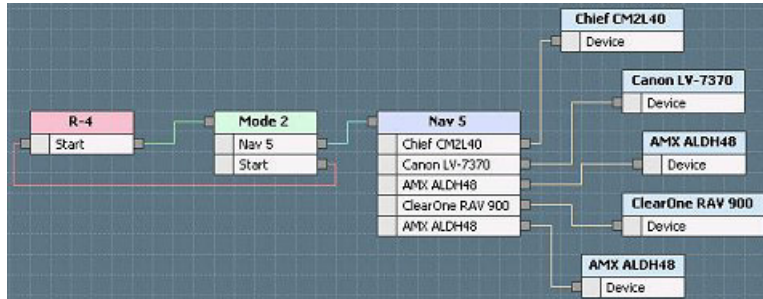


FIG. 19 MIO R-4 UI Diagram

- Right-click on any UI element to access the UI Diagram context menu.
- Use the **Preview UI** option to preview a selected element in a UI Diagram.
- Note that each UI element in the UI Diagram represents a separate page on the panel. The figure below shows an example Device UI element for a DVD player (FIG. 20):



FIG. 20 Example Device UI element for a DVD player (MIO R-4)

- Use the options in the *Customize UI Pages* dialog to add/remove buttons and edit button text on the panel pages.

Show/Hide/Snap To Grid

- **Show Grid** (Ctrl +G) - By default, the Grid display on the on the System Diagram, and UI Diagrams is enabled. Select Show Grid from the System Diagram context menu, the UI Diagram context menu, the View Menu (or click the Toolbar button) to toggle the grid display.
- **Snap To Grid** (Ctrl +Shift + G) - When this option is enabled, device elements and connection lines automatically "snap" to the nearest line on the grid, for quick and easy visual alignment of elements. Use this feature to ensure a clean layout for your system and touch panel navigation layouts.

By default, the Grid display is enabled.

Select Show Grid from the System Diagram context menu, the UI Diagram context menu, the View Menu (or click the Toolbar button) to toggle the snap to feature.

Toolbox

The Toolbox in VA is dual-purpose:

- If you are in the System tab of the Diagram Area, the Toolbox provides thumbnail images of the devices that you can add to your system. In this scenario, use the Toolbox to select AMX hardware and third-party (controlled) devices to add to the system. Controlled devices are represented in the Devices tab.
- If you are in a UI tab of the Diagram Area, the toolbox provides access to all elements available within the template selected for this Touch Panel. In this scenario, use the Toolbox to select UI elements to incorporate in your panel navigation layout.

Toolbox - System Devices

When you are in the System tab of the Diagram Area, the Toolbox provides thumbnail images of the devices that you can add to your system (FIG. 21):

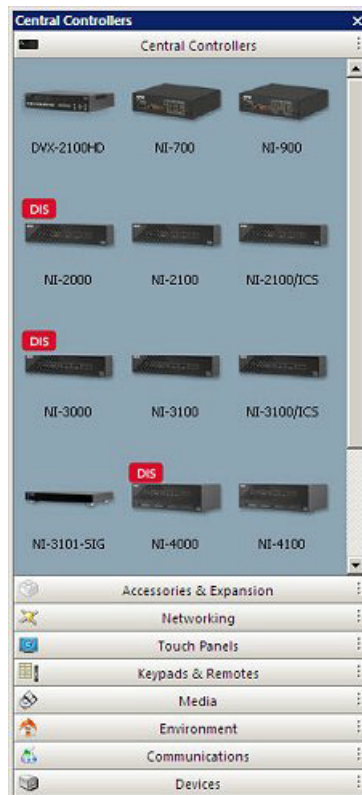


FIG. 21 Toolbox - System Devices

In this scenario, use the Toolbox to select AMX hardware and third-party devices to add to the system.

Click on the tabs to view the different categories of devices. AMX Device categories include: Central Controllers, Expansion devices, Networking devices, Touch Panels, Keypads / Remotes, Media, Environment and Communications devices.



The "Devices" category represents third-party (non-AMX) controlled devices in the system. To view a listing of third-party devices that can be added to the system, click on the Devices tab.

- To add a device to the system, simply click and drag it into the System tab of the Diagram Area.
- Select **View > Toolbox** to access the Toolbox sub-menu, where you can select to hide and show the AMX hardware and third-party device types that can be added to the system.
- Right-click on any device thumbnail to access the Toolbox System Devices context menu. By default, all available device types are shown. De-select any item in the Toolbox sub-menu to prevent that device type from being displayed in the Toolbox.



VA uses a device database to populate the list of module-supported devices (displayed in the Devices tab of the Toolbox). The device database is installed as part of the VA installation routine. However, the device database can be updated via the Re-Scan Device Database Search Paths option in the Managers menu. In order for a device to be available for inclusion in your projects, it must be represented in the device database.

There are many devices indicated in the database when VA is installed, and there are many more that can be downloaded from the InConcert Resource Center (on www.amx.com) and added to the database.

Device Groups

To manage large numbers of devices in certain categories, the Toolbox presents similar devices in groups that can be expanded and collapsed to reveal or hide their individual devices. A device group is represented by reduced thumbnails of devices in that group with a different background color, and a button to expand the group.

The group may be expanded by either clicking on the expand button (<>), or by double clicking on the group thumbnail itself (FIG. 22).

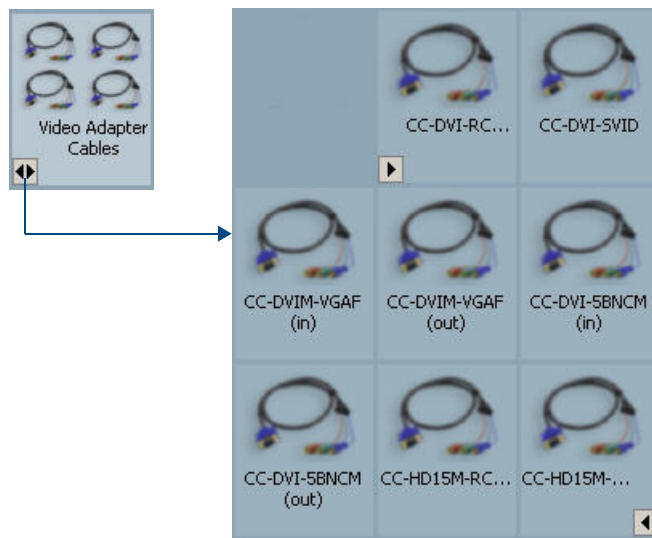


FIG. 22 Device Group - Collapsed and Expanded Views

Once a group has been expanded, it will show the devices it contains as full-sized thumbnails (as they are currently represented). To collapse a group, click either the collapse button on the first member of the group (>) or the collapse button on the last member of the group (<).

Availability Icons

The Toolbox uses icons to indicate the availability status of AMX products (FIG. 23):

LTD Indicates that the product has limited availability

DIS indicates that the product is discontinued.

FIG. 23 Toolbox - Availability Icons

Toolbox - UI Tabs

If you are in a UI tab of the Diagram Area, the toolbox provides access to all UI elements available within the Template selected for this device (FIG. 24):

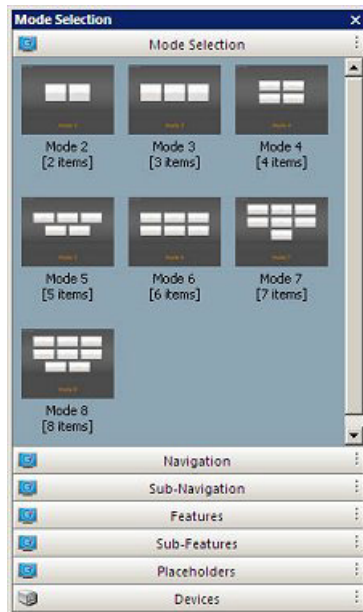


FIG. 24 Toolbox - UI Tabs

In this scenario, use the Toolbox to select UI elements to incorporate in your panel navigation layout.

- You must select a template for the panel (via the **Template** option in the Device Properties window) to populate the tabs in the Toolbox with UI elements.
- You must install at least one template (via the User Interface Template Manager dialog) to have a template available to apply to your panel(s).
- To add a UI element from the Toolbox to a Navigation diagram, simply click and drag it into a Touch Panel UI tab of the Diagram Area.
- Select **View > Toolbox** to access the Toolbox sub-menu, where you can select to hide and show the various types of UI elements that can be used in the UI diagram.
- Right-click on any UI element to access the Toolbox User Interface context menu.

By default, all available elements are shown. De-select any item in the Toolbox sub-menu to prevent that element type from being displayed in the Toolbox.

Toolbox - Devices Tab

The **Devices** tab of the Toolbox displays a listing of all third-party devices natively supported by VA (via a Duet Module (.JAR) file), categorized by type (FIG. 25):

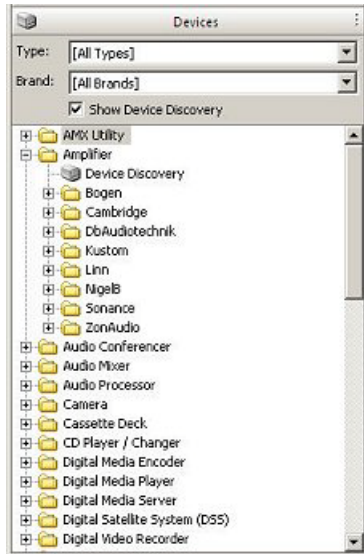


FIG. 25 Toolbox - Devices Tab

- Click the plus sign next to any Device Type folder to display a listing of supported Manufacturers for that device type.
- Click the plus sign next to any Brand folder to further expand the view to show the supported Devices for the selected Manufacturer and device type.

The options at the top of this tab allow you to filter the Devices list by Type and/or Brand:

- **Type:** Select a Device Type from the drop-down menu to exclude all other device types from the list (default = All Types).
- **Brand:** Select a brand (manufacturer) from the drop-down menu to exclude all other brands from the list (default = All Brands).
- **Show Device Discovery:** Click to include Device Discovery-capable devices in the list.

Once you have located the desired device, you can click and drag it onto the System Diagram.



NOTE

*If the device you want to add is not included in the Devices tab, you can use the **Device Discovery** (assuming the device supports Device Discovery) and/or the **User-Defined Device** (assuming that the "User-Defined Device" is a CSD or IRL/XMD device) options to add it to your system.*

Toolbox Context Menus

- Right-click on any device thumbnail in the Toolbox to access the Toolbox System Devices context menu.
- Right-click on any third-party device thumbnail in the Toolbox (Devices tab) to access the Toolbox Third-Party System Devices context menu.
- Right-click on any UI template element thumbnail in the Toolbox to access the Toolbox User Interface context menu.



NOTE

Refer to the VisualArchitect online help system for detailed descriptions of all Menus, Toolbars and dialogs.

Toolbox Sub-Menu

Click **View > Toolbox** to open the Toolbox sub-menu. Use this sub-menu to toggle display of the various elements displayed in the Toolbox (FIG. 26):

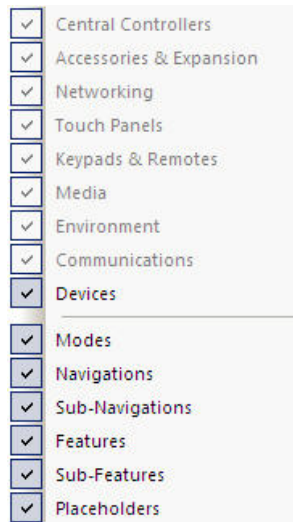


FIG. 26 Toolbox Sub-Menu

Note that some of the options in the sub-menu are disabled, depending on what type of tab is currently active in the Diagram Area. For example, if this sub-menu is accessed while the System Diagram is active, then the Device elements are enabled, but the UI elements are disabled.

Conversely, if a UI tab is selected when the sub-menu was accessed, then only the UI elements are enabled, as shown above.

- In either case, the Devices element is enabled.
- By default, all Toolbox elements are displayed.

Status Bar

The Status Bar displays application status and Tooltips when the mouse moves over Toolbar buttons.

- The icons on the right side indicate standard keyboard settings: Caps Lock (CAP), Num Lock (NUM) and Scroll Lock (SCRL).
- The Status Bar display can be toggled via the **Status Bar** option in the *View* menu.

Working With Projects

Creating a New VA Project

When you launch VA, you are presented with the *Welcome Screen*. At the top of the Welcome Screen are options for creating a new NetLinX control system (FIG. 27):

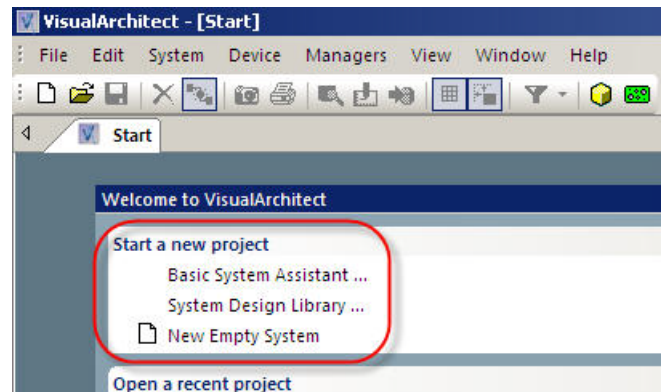


FIG. 27 Start a New Project Options

- **Basic System Assistant** - If you select this option, the program allows you to select a NetLinX Central Controller (default = NI-3100), an AMX Touch Panel, and up to two AMX Keypads (via the Basic System Assistant dialog). All other devices are added to the system by dragging them from the Toolbox into the System Diagram.
- **System Design Library** - If you select this option, the program uses a System Design Library (SDL) template as a starting point to creating a new project/system. System Design Library (.VAP) files provide several templates for pre-configured systems of various types (e.g. Auditoriums, Conference Rooms, Boardrooms etc.), to use as is, or as a short-cut to designing several common types of control systems (see Using System Design Library Files).
- **New Empty System** - If you select this option, the program automatically adds a NI-3100 NetLinX Central Controller. All other devices are added to the system by dragging them from the Toolbox into the System Diagram. You can change the Central Controller type later via the Edit > Replace option (see Replacing The Central Controller).



NOTE

*These options are also available via the **File > New** sub-menu.*

Using The Basic System Assistant Option

One of the main options presented on the Welcome Screen for starting a new project is the **Basic System Assistant** option (FIG. 28):

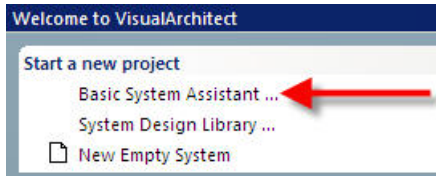


FIG. 28 Basic System Assistant option

The Basic System Assistant helps you get started designing a new system by allowing you to define several key pieces of equipment as a first step. You can always add, remove or replace devices later, but the Basic System Assistant can help you get started.

1. Select **File > New > Basic System Assistant** (or select *Basic System Assistant* in the Welcome Screen) to access the *Basic System Assistant* dialog (FIG. 29).

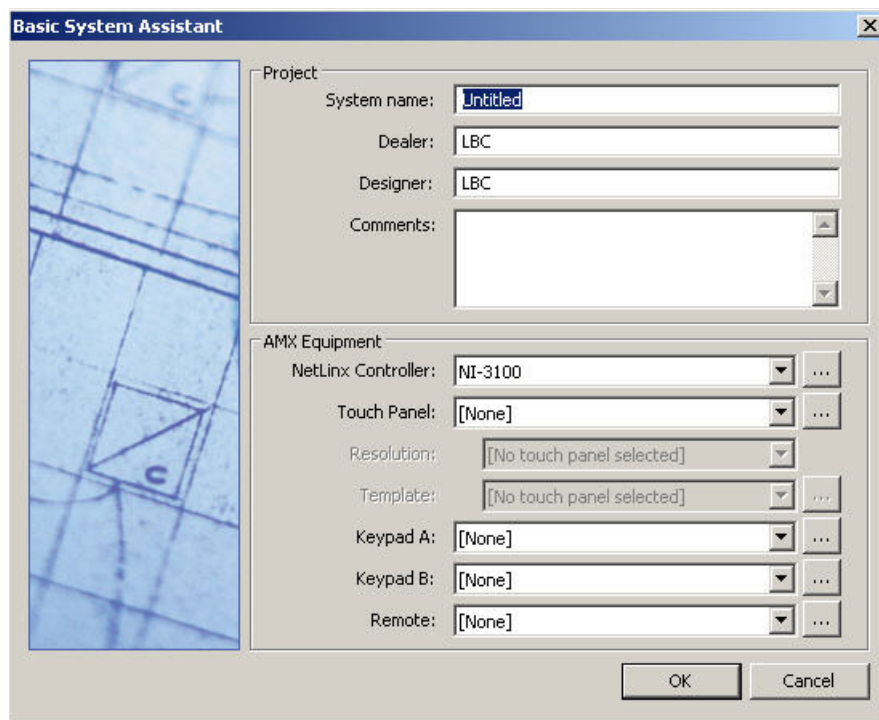


FIG. 29 Basic System Assistant dialog

Use the options in this dialog to enter general project information and specify a NetLinx Central Controller and User-Interface devices.

2. Fill in the Project Information (*System name*, *Dealer*, *Designer* and *Comments*). The only required input here is the System name.
3. Use the fields in the lower half of the dialog to select the system devices:
 - NetLinx Controller
 - Touch Panel
 - Resolution
 - Template
 - Keypads A, B
 - Remote



Every system must have one Central Controller and at least one User-Interface device (Touch Panel, Keypad or Remote).

4. Click **OK** to close the Basic System Assistant dialog.
5. If VA detects that there are any support devices required for the devices selected so far (like a WAP or Ethernet Switch for example), you will be prompted to pick a device from the appropriate device category. Select a device from each Choose (Device Type) dialog that is presented, and click OK to proceed.
6. Once all required support devices have been selected, the System Diagram is displayed, indicating all of the devices you selected.
7. Assuming that you haven't disabled the Auto-Connect feature (via the **Edit > Auto-Connect** option), VA will automatically establish device connections for the devices in the system.

The new system (one NetLinx Central Controller and any selected user interface devices) will be represented in the diagram on the System tab.

Note that there is a separate User-Interface (UI) tab for each User-Interface device (Touch Panels, Keypads and Remotes) currently in the system. Use these tabs to define UI Navigation for each of these devices.

At this point, you can add more devices and accessories, set device properties, define macros and UIs to complete the project.

Using the System Design Library Option

One of the main options presented on the Welcome Screen for starting a new project is the System Design Library option (FIG. 30):

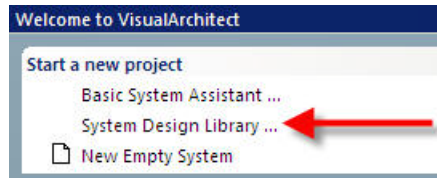


FIG. 30 System Design Library Option

System Design Library files (SDLs) represent pre-configured VA Project/Systems designed to accommodate various installation types. SDLs are available for Dealers to download from www.amx.com (in the Markets section).

Select an SDL that most closely meets the needs of your customer, keeping in mind that you will have the ability to customize the solution later by adding different devices and options.

When you download System Design Library (.VAP) files, they must be placed in the following directory to be utilized by VA (if you don't already have this directory, you'll need to create it):

C:\Program Files\AMX Control Disc\System Design Library

Once you have loaded at least one SDL in the System Design Library directory, you can select it via the System Design Library dialog.

1. Select **System Design Library** from the **File > New** sub-menu (or on the Welcome Screen) to open the *System Design Library* dialog (FIG. 31).

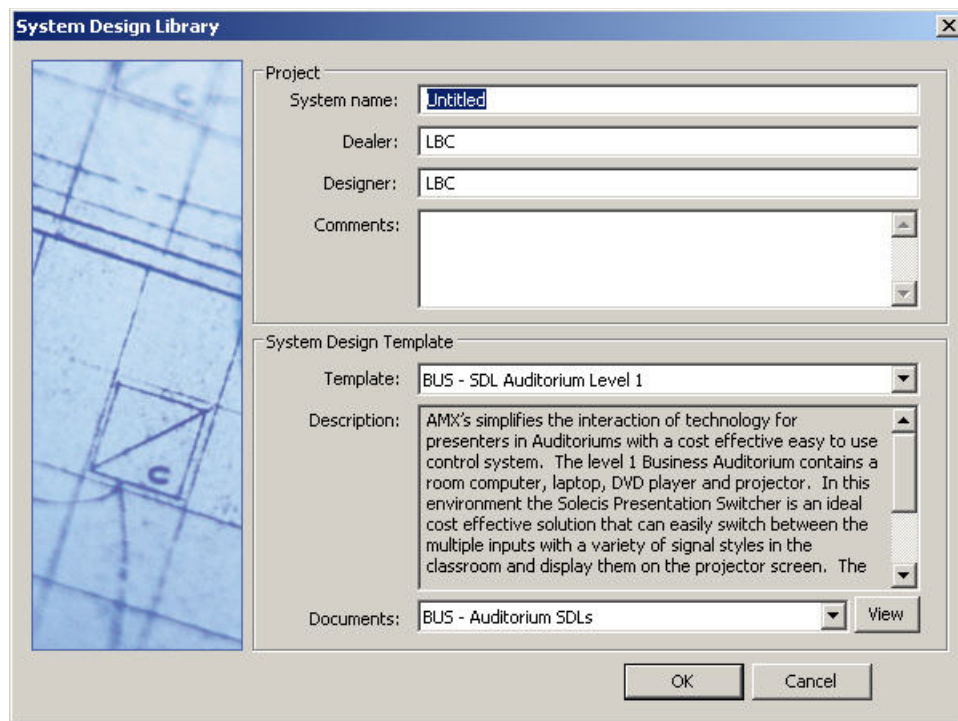


FIG. 31 System Design Library dialog

2. Fill in the Project Information (*System name*, *Dealer*, *Designer* and *Comments*). The only required input here is the System name.
3. Select an SDL from the *Template* drop-down menu.
4. Click **OK** to close the *System Design Library* dialog.

At this point, you can add more devices and accessories, set device properties, define macros, and UIs to complete the project.

Downloading System Design Library (SDL) Files

System Design Library (SDL) files represent pre-configured VA Project/Systems designed to accommodate various installation types. SDLs are available for Dealers to download and install from www.amx.com (in the Markets section):

1. From the Help menu, select **WebUpdate System Design Libraries (SDL)**. If VA finds any SDL files, the WebUpdate System Design Libraries dialog opens.
2. Select the files you want to download by clicking the corresponding check box for each item.
3. Click **Download**.
4. Read the License Agreement, select **I Agree** and click **Next** to proceed.
5. The program alerts you once the SDL installation is complete (FIG. 32):

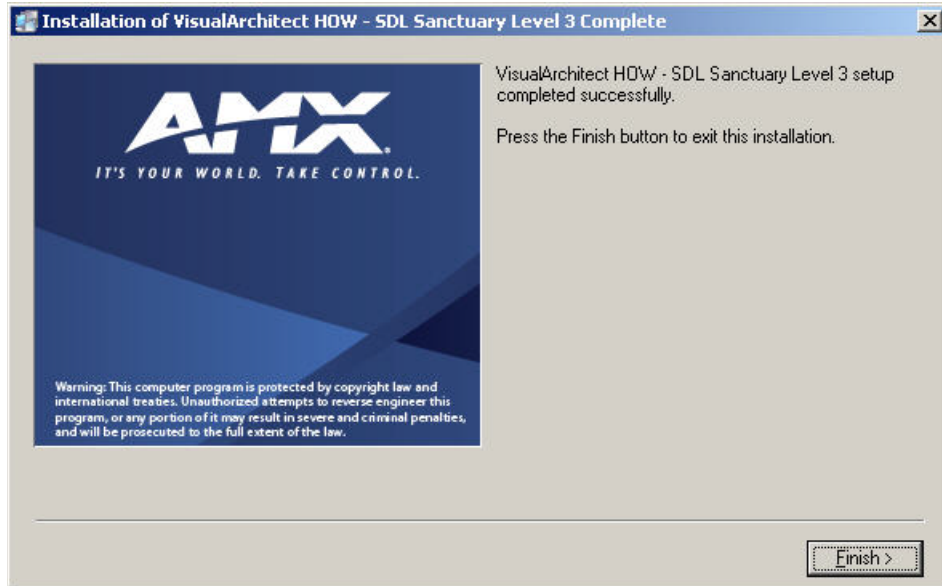


FIG. 32 System Design Library - Installation Complete

6. Click **Finish** to proceed. This action invokes the *WebUpdate System Design Libraries Report* dialog (FIG. 33):

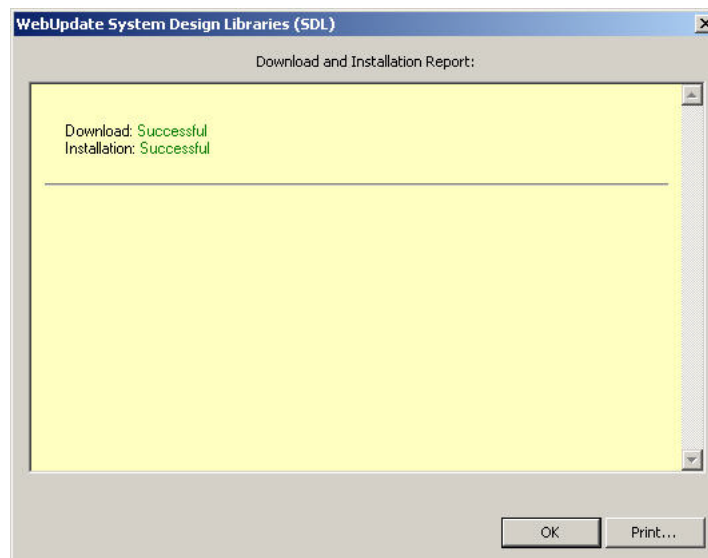


FIG. 33 WebUpdate System Design Libraries Report dialog

- Click **Print** to print the Download and Installation Report.
- Click **OK** to close this dialog.

Once installed, the SDL is available for selection via the *System Design Library* dialog (FIG. 34):

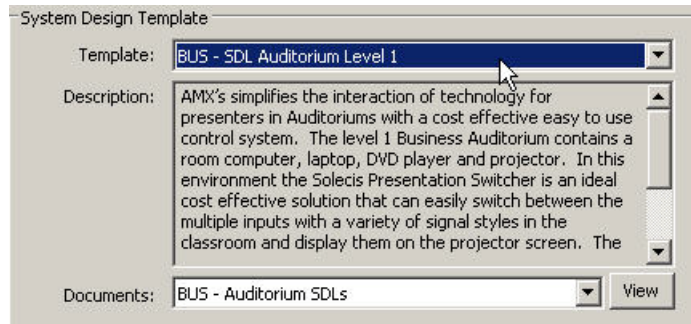


FIG. 34 System Design Library dialog

Using the New Empty System Option

One of the main options presented on the Welcome Screen for starting a new project is the New Empty System option (FIG. 35):

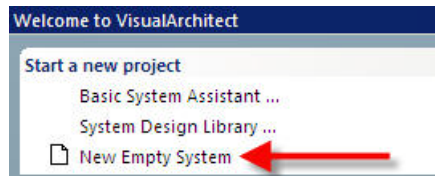


FIG. 35 New Empty System Option

Select **New Empty System** on the Welcome Screen to start a new system, with no devices other than the (default) NI-3100 NetLinx Central Controller. This option invokes the *Choose Central Controller for new system* dialog (FIG. 36).

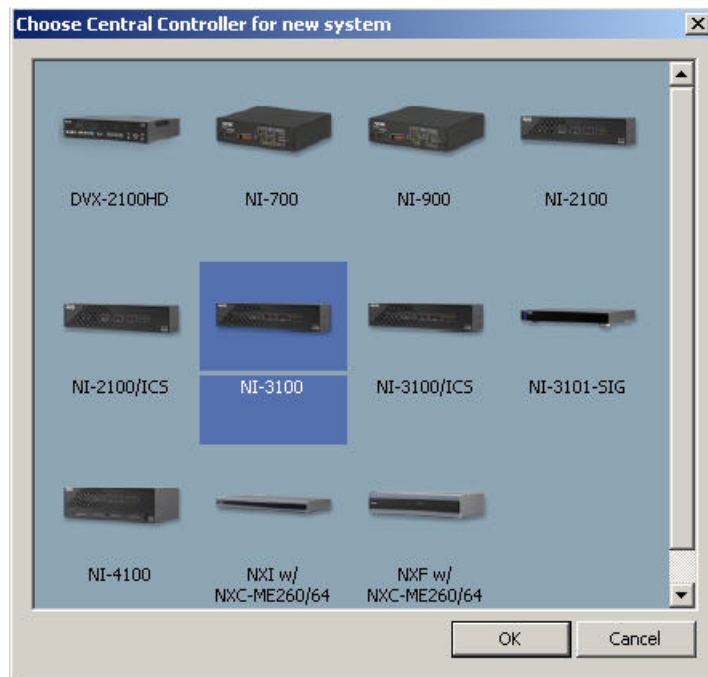


FIG. 36 Choose Central Controller for new system dialog

Alternatively, you can select **Empty System** from the **File > New** sub-menu, or click the Toolbar button.

- If you start with the New Empty System option, you should visit the Project Properties dialog (System > Project Properties) to enter basic project information for this system. Note that the Project Properties dialog is only available once the project has been created (indicated by the display of the System Diagram).
- Every system must have one Central Controller and at least one User-Interface device (Touch Panel, Keypad or Remote).

Opening VA Project Files

Select **File > Open** (or click the Toolbar button) to open an existing VA Project file (.VAP), via the *Open VisualArchitect Project* dialog (FIG. 37).

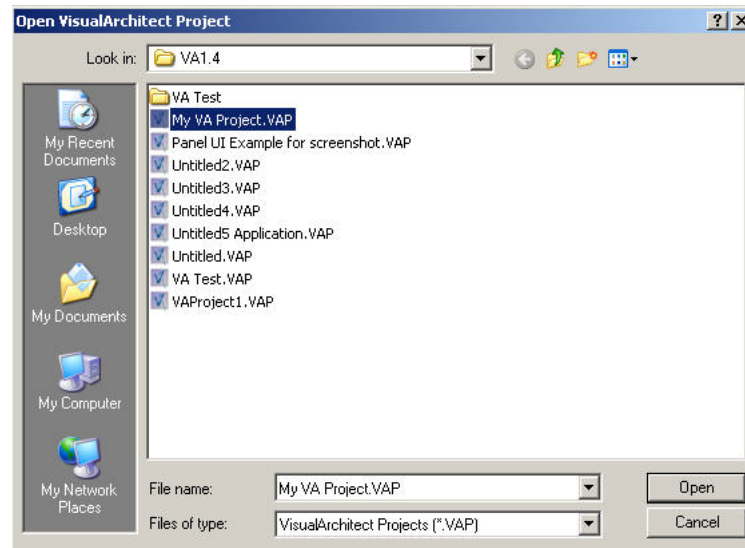


FIG. 37 Open VisualArchitect Project dialog

Recent Projects can also be accessed via the Recent Projects section of the Welcome Screen (see FIG. 4 on page 5).

Setting Project Properties

Select **System > Project Properties** to open the *Project Properties* dialog, where you can view and edit basic project information for the active project (FIG. 38).



FIG. 38 Project Properties dialog

The fields in this dialog include:

- **System Name** - Enter the name that you want to associate with this system. This name will be reflected in the resulting project (.VAP) file, and any system reports and diagrams generated from this project (default = Untitled).

This System Name is used as part of the filename for export diagram images, and as part of the Header/Footer text in printouts of diagram images.

- **Dealer** - Enter the name of the dealer associated with this project.
- **Sales Order** - Enter the sales number associated with this project
- **File Revision** - Enter a file revision number.
- **Designer ID** - Enter the name of the designer associated with this project.
- **Purchase Order** - Enter the sales number associated with this project.
- **Comments** - Enter any comments that might prove useful regarding this project.

If you started your project via the *Basic System Assistant* dialog, some of the fields in this dialog are pre-populated with the project data you entered there.

If you started your project via the *(New) Empty System* option, all fields are empty.



NOTE

The only required field in this dialog is System Name.

Saving VA Project Files

VA Project files are saved as *.VAP files.

- Select **File > Save** (or click the Toolbar button) to save the project under its current name. The first time you save the project, the *Save VisualArchitect Project* dialog prompts you to define a File Name and specify a target directory for the Project (.VAP) file.
- Select **File > Save As** to save the Project under a different name.

Compiling VA Project Files

In VA, project files are "Generated" (or compiled) via options in the *Generate and Transfer System Files* dialog. See the *Generating And Transferring System Files* section on page 199 for details.

Device Database

Overview

The *Device Database* is a collection of Duet device module (.JAR) files that provide support for controlled devices in VA. The Device Database is included as part of the VA installation, and provides VA support for many popular devices. For module-supported devices, the control information is already captured in the Duet module associated with each device. Therefore, you only need to define macros to apply to the functions supported by each device/module (via CodeBuilder).



VA requires v1.8 or higher Duet Module files to support controlled devices.

VA uses the Device Database to populate the list of controlled devices displayed in the Devices tab of the Toolbox. While the Device Database provides module support for many popular devices, at some point you may need to include devices not inherently included.

Devices can be added to the Device Database either by downloading the Module (JAR) file from the InConcert Resource Center at www.amx.com, or by using tools included with VA to create the device files required by the Device Database:

- **IR Devices** - In order for IR-controlled devices to be available for inclusion in your projects, each device must be represented in the Device Database with both an IR Library (.IRL) and an IR Metadata (.XMD) file. The options in the *IR Capture and Management* dialog allow you to capture and manage IR control codes (FIG. 39).

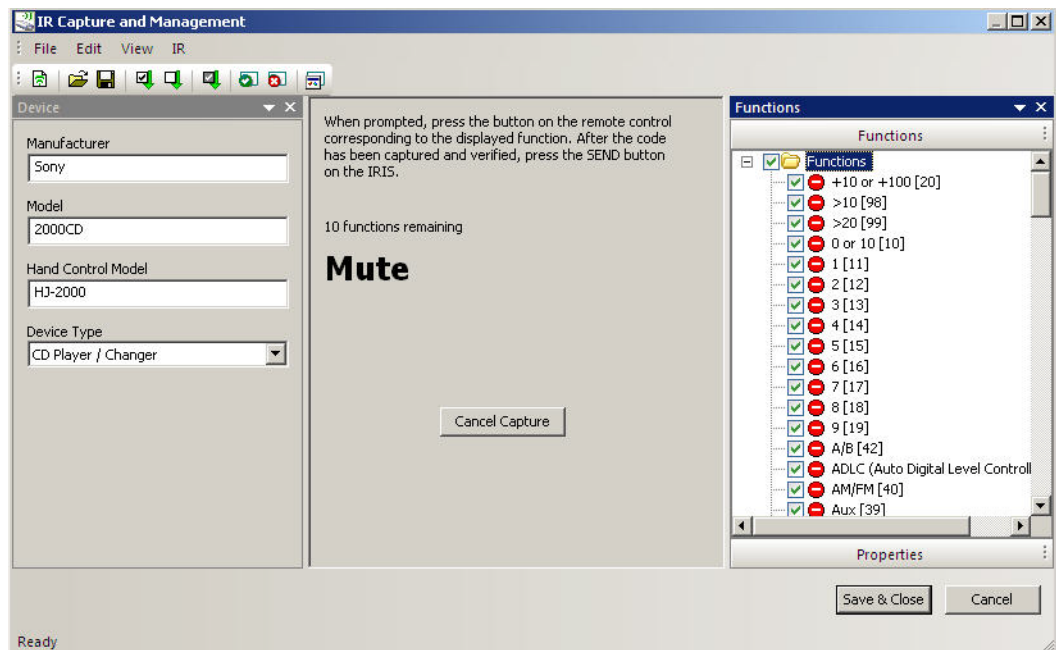


FIG. 39 IR Capture and Management dialog

By default, these .IRL and .XMD files are stored in the following location:
C:\Documents and Settings\All Users\Application Data\AMX\IR Files

- **Serial and IP Devices** - In order for Serial and IP Devices to be available for inclusion in your projects, each device must be represented in the Device Database with a Control Strings Definition (.CSD) file. The options in the *Control Strings Definition* dialog allow you to define control strings and create a new .CSD file, and add the .CSD file to the Device Database (FIG. 40):

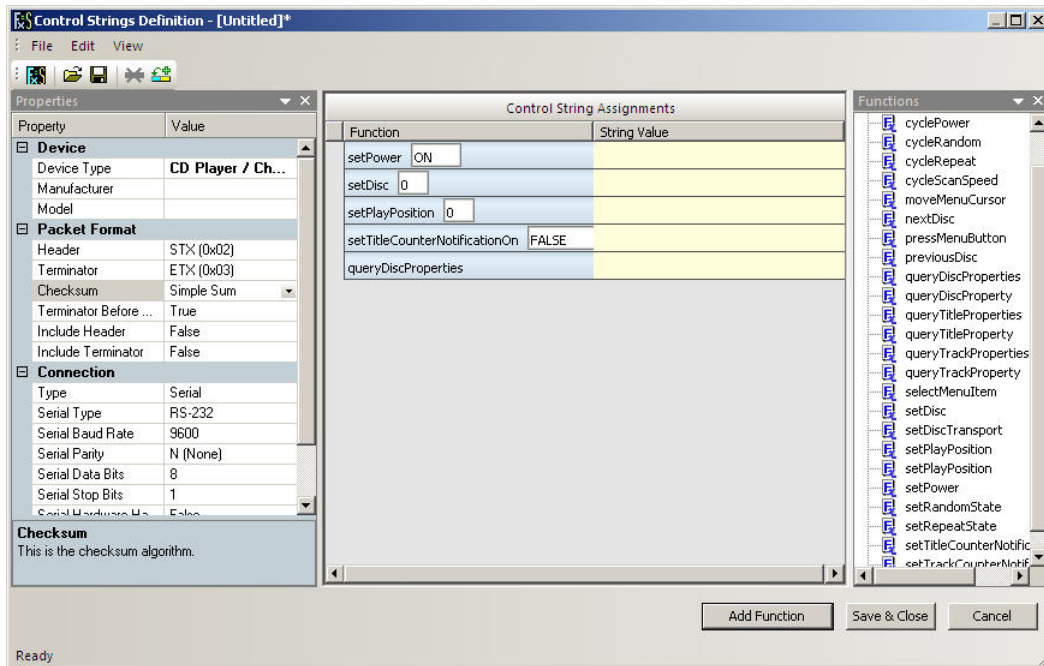


FIG. 40 Control Strings Definition dialog

The Device Database can be updated via options in the *Managers* menu, via the *Device Database Search Paths Manager* dialog. Refer to the *Re-Scanning the Device Database* section on page 60 for details.

Adding IR Devices To The Device Database

There are two ways to approach adding an IR-controlled device to the Device Database:

- Download a VA-compatible IRL file for the device from the *InConcert Resource Center* at www.amx.com, and save the IRL file to a directory included in the Search Paths for the Device Database (see the *InConcert Resource Center* section on page 53 for details). By default, these .IRL and .XMD files are stored in the following location:

C:\Documents and Settings\All Users\Application Data\AMX\IR Files



NOTE

*Some InConcert IR Devices may not have an .XMD file associated with the .IRL file. In these cases, you will need to generate an .XMD file (see *Creating XMD Files* on page 37).*

- Use the *IR Capture and Management* dialog to capture IR functions from a device's remote controller (using an AMX IRIS IR Capture Unit), and save the resulting IR Library (.IRL) and metadata (.XMD) files to a directory included in the Search Paths for the Device Database (see the *Capturing IR Codes* section on page 34 for details).

Either way, in order for any new devices to be represented in the Devices tab of the Toolbox (so that they can be added to your System), the Device Database must be updated to include the new file(s), via the *Device Database Search Paths Manager* dialog (see *Re-Scanning the Device Database* on page 60).

Adding InConcert IR Devices To The Device Database

IRL files for many popular IR-controlled devices are available for download on the InConcert Resource Center at www.amx.com (see the *InConcert Resource Center* section on page 53 for details):

- Go the InConcert Resource Center at www.amx.com to search and download IRL files.

Some of the devices represented in the InConcert Resource Center provide a ZIP file for download that contains all of the system files required to control that device, including IRL and XMD files. XMD Files provide metadata for captured IR-functions and are designed to provide device information for the designer. While .XMD files are not required to control IR devices, they are required by VA.

Duet and IRL files on the InConcert web site have a checkmark in the VA column (in the Download section) to indicate that they are VA compatible.

 - See *Searching For IR Library (.IRL) Files* on page 53
 - See *Downloading IR Library (.IRL) Files* on page 55
- Save the downloaded IRL file(s) to a local directory.
 - In order for a device to be available for inclusion in your projects, it must be represented in the device database with an IR Library (.IRL) and an IR Metadata (.XMD) file. Both files must be present in the Device Database in order for the device to be listed in the Devices tab of the Toolbox.
 - Some InConcert IR Devices may not have an XMD file associated with the IRL. In these cases, you will need to generate an XMD file (see *Creating XMD Files* on page 37).
- Re-scan the Device Database to include the new IRL and XMD files (see the *Re-Scanning the Device Database* section on page 60).

At this point, the device associated with the new IRL file should be represented in the *Devices* tab of the Toolbox, in the appropriate device type folder:

- The new IRL file is added to the Device Type folder that matches the **Device Type** selection made in the *IR Capture and Management* dialog.
- Within the appropriate Device Type folder, the new file is added to a folder matching the **Manufacturer** name entered in the *IR Capture and Management* dialog.

Manually Adding IR Devices To The Device Database

To manually add an IR-controlled device to the Device Database:

- Select **File > IR Capture and Management** to open the *IR Capture and Management* dialog.
- Enter the information for the Device that you are adding in the **Device** window (FIG. 41). The Device window contains a set of text fields that allow you enter information specific to the device for which you are capturing IR codes (all fields are required):

FIG. 41 IR Capture and Management dialog - Device window

- Manufacturer:** Enter the device manufacturer's name.
 - Model:** Enter the device's model name and/or number.
 - Hand Control Model:** Enter the model name and/or number of the remote controller associated with this device.
 - Device Type:** Select the Device Type that best describes this device from the drop-down menu.
- Select the IR Functions that you want to capture, in the *Functions/Properties* windows.

Click the *Function* tab to view the functions defined in the selected IR Template and select which ones to include in the capture operation (FIG. 42):

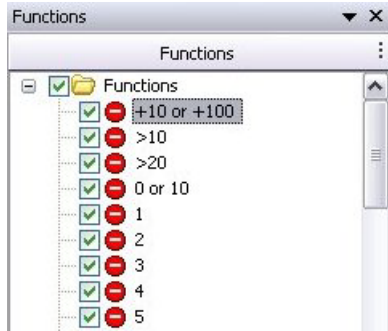


FIG. 42 IR Capture and Management dialog - Function tab

- Review and edit the IR properties as required for this device, in the *Properties* tab.

Click the *Properties* tab to view and edit device-level IR Properties for the selected device type. The IR properties listed here will vary depending on the device type selection, and represent the default settings for that device type (FIG. 43):

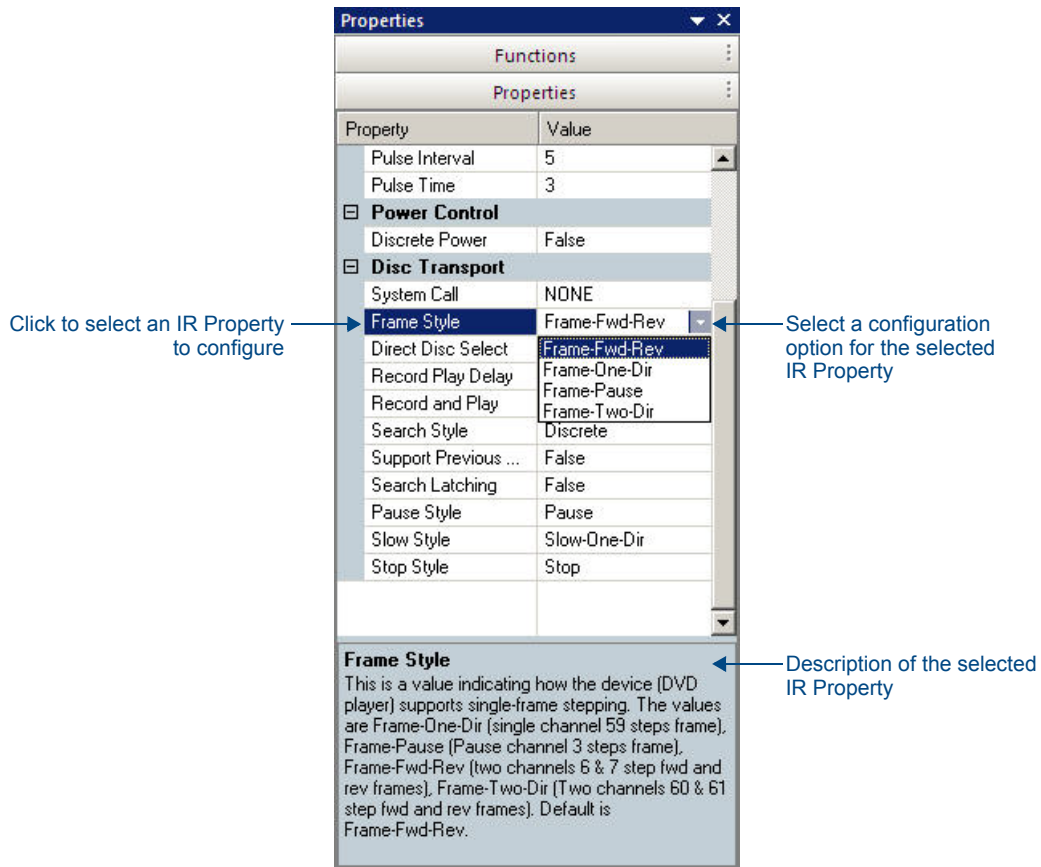


FIG. 43 IR Capture and Management dialog - Properties tab

- Use the AMX IRIS IR Capture Unit to capture the selected IR Functions for the IR remote controller.

The *IR Capture window* guides you through the process of capturing IR Codes, using an AMX IRIS IR Capture Unit (FIG. 44):

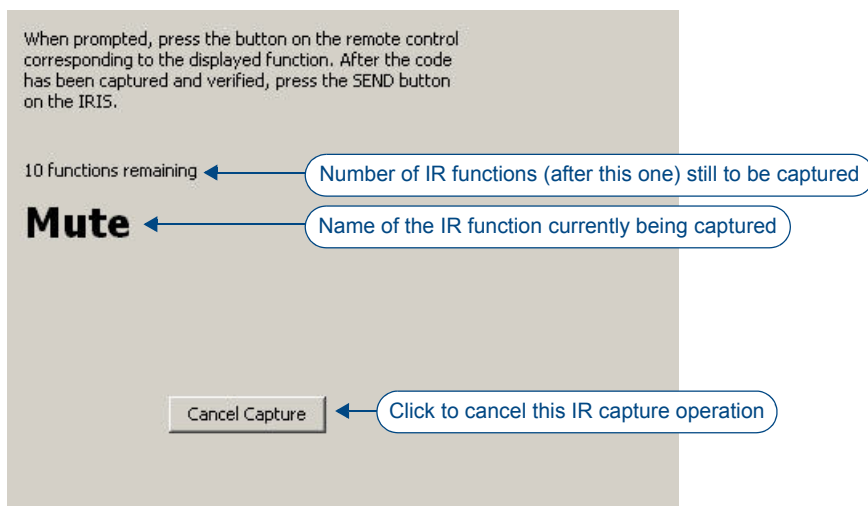


FIG. 44 IR Capture and Management dialog - IR Capture window

See the *Capturing IR Codes* section on page 34 for details.

6. Select **File > Save** (or click the Toolbar button) to save the new .IRL file to a local directory.
 - In order for a device to be available for inclusion in your projects, it must be represented in the device database with an IR Library (.IRL) and an IR Metadata (.XMD) file. Both files must be present in the Device Database in order for the device to be listed in the Devices tab of the Toolbox.
 - Some InConcert IR Devices may not have an XMD file associated with the IRL. In these cases, you will need to generate an XMD file (see *Creating XMD Files*).
7. Click **OK** to close the *IR Capture and Management* dialog.
8. Re-scan the Device Database to include the new IRL and XMD files (see *Re-Scanning the Device Database* on page 60).

At this point, the device associated with the new IRL file should be represented in the Devices tab of the Toolbox, in the appropriate device type folder:

- The new IRL file is added to the Device Type folder that matches the *Device Type* selection made in the *IR Capture and Management* dialog.
- Within the appropriate Device Type folder, the new file is added to a folder matching the *Manufacturer* name entered in the *IR Capture and Management* dialog.

Adding InConcert Serial and IP Devices To The Device Database

JAR files for many popular Serial and IP-controlled devices are available for download on the InConcert Resource Center (at www.amx.com):

1. Go the InConcert Resource Center at www.amx.com to search and download JAR files. See *Searching For Duet Module (.JAR) Files* on page 55 and *Downloading Duet Module (.JAR) Files* on page 57.
 - Some of the devices represented in the InConcert Resource Center provide a ZIP file for download that contains all of the system files required to control that device, including JAR, APW, TP4 and Protocol reference files.
 - Duet and IRL files on the InConcert web site have a checkmark in the VA column (in the Download section) to indicate that they are VA compatible.
2. Save the downloaded .JAR file(s) to a local directory.
3. Re-scan the Device Database to include the new .JAR files (see *Re-Scanning the Device Database* on page 60).

At this point, the device associated with the new .JAR file should be represented in the Devices tab of the Toolbox, in the appropriate device type folder.

Manually Adding Serial and IP Devices To The Device Database

Serial and IP Devices rely on Control String Definition (*.CSD) files for support in VA. CSD files are created in the *Control Strings Definition* dialog. See the *Control Strings Definitions* section on page 39 for details.

Capturing IR Codes

VA helps you to capture IR codes for any devices that you want to include in your system that are not already module-supported. All devices listed by name in the Devices tab of the Toolbox are module-supported. Module-supported devices have their basic IR codes captured within the module, so there is no need to capture their IR codes.



NOTE

Once you have captured a device's IR codes, they are added to the VA database as an IR Capture (.IRL) file, which will be available for other future projects.

To capture IR Codes, you'll need:

- The hand control (remote controller) that is associated with the device.
- An AMX IRIS IR Capture Unit, connected to your PC. Refer to the IRIS Infrared Capture Unit Instruction Manual (available at www.amx.com) for details.

Use the options in the IR Capture and Management dialog to capture IR codes.

The basic steps in capturing IR Code include:

1. Enter device information (including the device type).
2. Select the IR functions you wish to capture, from a listing of all function supported by the device.
3. Set IR properties for this device.
4. Capture the IR codes from the device's hand controller.
5. Save the IRL file (**File > Save**) to a local directory.



NOTE

When VA generates the IRL file, it also creates an XMD file to handle metadata for this device. The XMD file is copied to the same location as the IRL file, and both files must be present in the Device Database in order for this device to be represented in the Devices tab of the Toolbox.

6. Re-Scan the Device Database to include the new IRL and XMD files.

IR Capture - 1) Entering Device Information

The first step in capturing IR codes for an IR-controlled device is to enter the device information, and select an IR template to use, via the Device window of the IR Capture and Management dialog:

1. In the Device window, enter the **Manufacturer**, **Model** and **Hand Control Model** fields manually.
2. Select the **Device Type** that best describes the device that you want to control from the drop-down menu of supported device types. The *Functions* tab is populated with the functions supported by the IR Template associated with the selected Device Type.

The next step is to select the functions that you want to capture, from the list of all supported function for this template type (in the *Functions* tab).

IR Capture - 2) Selecting Functions To Capture

Once you have entered the device information for the device/hand controller that you want to capture, you can select the specific functions to capture (from the full set of functions included in the selected IR Template) in the Functions window of the *IR Capture and Management* dialog (FIG. 45).

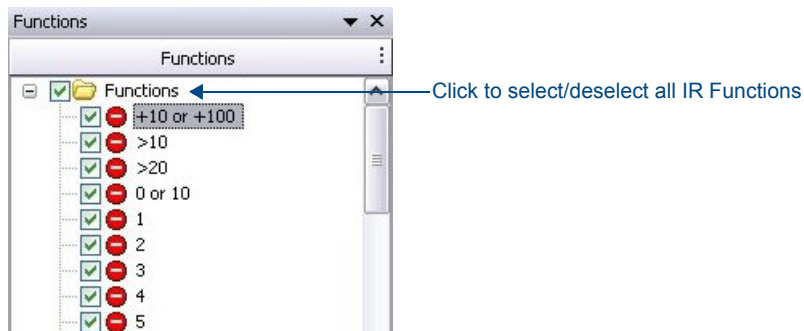


FIG. 45 IR Capture and Management dialog - Functions window

1. Look at the remote controller that you will capture the IR codes from, and note the functions that are indicated on the remote, based on the buttons and labels that you see. In most cases, you will want to capture all of the functions that are represented on the hand controller.

While many hand controllers support most or all of the functions listed in the Main Functions directory in the Functions window, many hand controllers do not support the full set of Main Functions. Keep in mind that the Main Functions listed represent those included in the selected IR Template, and are intended to account for the Main Functions on a majority of hand controllers, but are not expected to apply fully to all hand controllers. In most cases, you will select some but not all functions in the template.

Click the check boxes to select the functions that you want to capture.

Use the top-level checkbox to toggle Select All/Select None.

2. Select **File > Save** (or click the Save IR File Toolbar button) to save your changes.

The next step is to specify IR Properties for this device.

IR Capture - 3) Setting IR Properties

Once you have selected a Device Type, you should review the IR Properties for this device type.

IR Properties are viewed and edited in the Properties tab of the Properties window (in the IR Capture and Management dialog):

The IR properties listed here will vary depending on the device type selection, and represent the default settings for that device type. In most cases, these default settings should suffice, but in some cases you may need to edit some IR properties. You should consult the hand controller's documentation for device specifications that may indicate changing some of the default IR properties. Although the IR properties vary for each device type, there are some that are common to all devices:



NOTE

Select any IR property to display a description of that property in the text field at the bottom of the Properties window.

- **Module** - The Device Class is a read-only field that indicates the Duet SDK class that this device type implements.
- **IR Settings** - These basic IR properties are common to all IR devices:
 - IR Mode:** Click the drop-down menu to select either SET MODE IR (the default setting) or SET MODE SERIAL.
 - IR Carrier String:** This option indicates whether or not to use IR Carrier signals. The default setting is True (do use IR Carriers). Carrier signals are sometimes used in IR-transmissions to bookend signals, to add accuracy.
 - Pulse Interval:** This option defines the length of time between IR signals, measured in .10-second increments.
 - Pulse Time:** This option defines the length of time that the IR signal is emitted, also measured in .10-second increments.

IR Capture - 4) Capturing IR Codes From The Hand Controller

Once you have entered the device information for the device/hand controller, selected the functions that you want to capture, and entered IR properties for this device, you are ready to start capturing the selected functions, using an AMX IRIS IR Capture Unit:



NOTE

Before you begin, make sure that the IRIS is connected to the PC running VA and powered up.

1. Select **IR > Capture Selected** from the menu bar (or click the Toolbar button). The dialog steps you through the process:
 - The dialog displays the first function that will be captured, and indicates how many functions remain after the current one.
 - Locate the button on the remote control that matches the indicated function.
2. Press the button on the remote control corresponding to the function indicated in the IR Capture and Management dialog (FIG. 46):

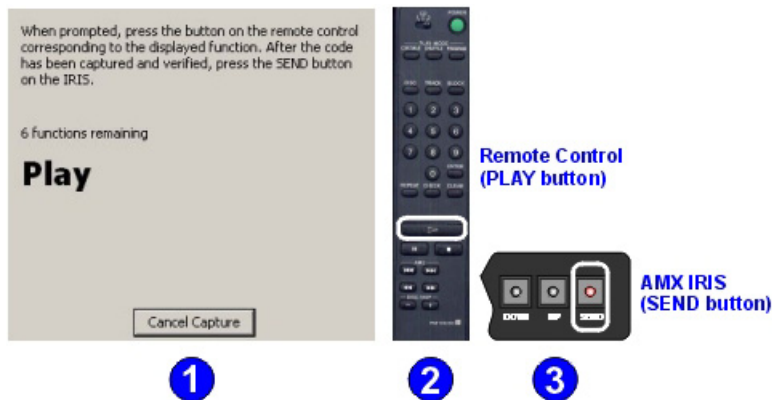


FIG. 46 Capturing IR



NOTE

Before you begin, verify that the IRIS is ready to use (the READY (green) LED on the IRIS is illuminated and the numeric LED indicates "01").

- a. Point the emitter on the remote directly at the IR window on the IRIS (between the SIGNAL and READY LEDs on the front panel).



NOTE

For best results, place the remote control's IR emitter as close as possible to the IR window on the IRIS.

- b. Press and hold the button on the remote - the SIGNAL (red) LED on the IRIS should flicker to indicate that it is receiving a signal.
- c. Don't release the button on the remote until the READY (green) turns off (approximately 3 seconds). When the READY LED turns off, the IRIS is ready to verify the signal (by repeating the button press).
- d. When the VERIFY (red) and READY (green) LEDs are lit, press and hold the button again. Again, hold the button until the READY LED turns off.
- e. Once the function has been captured and verified by the IRIS, the LED on the SEND button (also on the front panel of the IRIS) illuminates to indicate that the captured function is ready to send (to the PC).
- f. Press the SEND button to send the captured function to the PC (so it can be added to the IRL file for this device). The display on the IRIS reads "So", indicating that the function is being sent to the PC.

The IR Capture and Management dialog should now indicate that it is waiting for you to capture the next selected function (and that one less function remains to be captured).

- Repeat steps a-f for the remaining functions, until all of the selected functions have been captured.
- A green check icon in the Functions list indicates which functions have been captured successfully.



NOTE

You can cancel the capture process at any time by clicking on the *Cancel Capture* button.

3. Once you have captured all of the selected functions, save your work: In the *IR Capture and Management* dialog, select **File > Save**. This creates an IR Capture File (.IRL) in the specified directory.
4. Re-scan the Device Database (see the *Re-Scanning the Device Database* section on page 60).

Troubleshooting - IR Capture

Problem:

The ER/E1 message appears in the LED display on the IRIS, and it doesn't seem to capture codes.

Possible Solutions:

- Verify that the IRIS is connected to the COM port selected in the IR Capture Options dialog (default = COM1).
- Verify that the communications settings on the IRIS are correct. VA requires the IRIS to use the following settings:
 - *Bits Per Second = 9600*
 - *Data Bits = 8*
 - *Parity = None*
 - *Stop Bits = 1*
 - *Flow Control = None*
- Verify that the batteries in the remote control are fresh. If the remote has inadequate power, it may appear to capture some functions, but could result in various anomalies or the inability to capture some functions.
- Try to minimize direct exposure of the IR window to strong light sources (especially fluorescent).
- Minimize or eliminate other sources of IR emission in the area that could cause interference.

Creating XMD Files

In order for an IR-Controlled device to be listed in the Devices tab of the Toolbox (to be available for inclusion in your projects), it must be represented in the Device Database with both an IR Library (.IRL) and an IR Metadata (.XMD) file. Both files must be present in the Device Database in order for the device to be listed in the Devices tab of the Toolbox.

- If you captured your own IR functions via the IR Capture and Management dialog, VA automatically generates the associated .XMD file.
- If you are adding an existing IR device, you must first open and save the .IRL file (in the IR Capture and Management dialog) to generate the required .XMD file.

Some InConcert IR Devices may not have an .XMD file associated with the .IRL file. In these cases, you will need to generate an .XMD file by opening the .IRL file in the *IR Capture and Management* dialog and re-saving the file:

1. Select **File > IR Capture and Management** to open the IR Capture and Management dialog.
2. Select **File > Open** to locate and select the .IRL file that you want to generate an .XMD file for.
3. Review the Device information and edit if necessary. This is the information that is represented in the .XMD metadata file.
4. Select **File > Save** to save the file. This action generates the required .XMD file.
5. Click **Close** to close the dialog.
6. Make sure that the .XMD file resides in the same directory as the .IRL file for this device, and that the directory that contains both files is represented in the Search Paths for the Device Database.

- Re-Scan the Device Database to include the .IRL and .XMD files (see *Re-Scanning the Device Database* on page 60).

VA IR Templates - Channel Layouts

Select **Device Type** in the *IR Capture and Management* dialog to view a listing of IR Templates provided by VA. Select a Device Type to view the IR Functions available in the IR Template for the selected Device Type in the *Functions* window (FIG. 47).

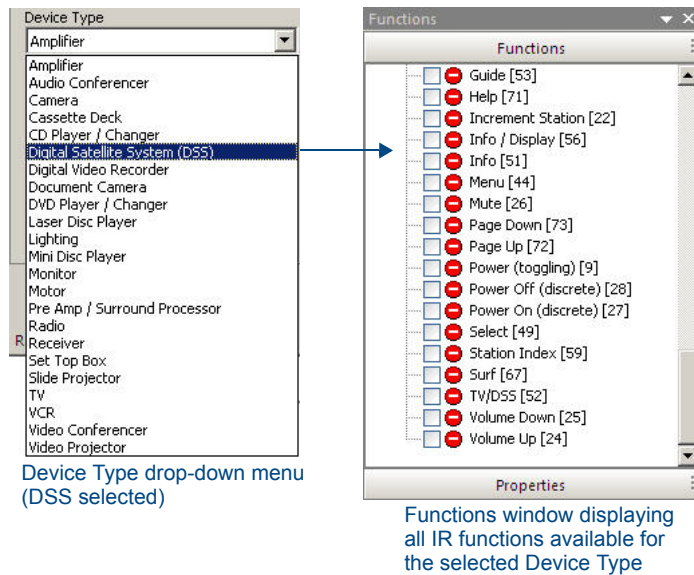


FIG. 47 IR Capture and Management dialog - Device Type drop-down menu and Associated IR Functions list

- IR slots 240-255 are reserved for Custom use in VA, to allow you to capture remote-specific functions into Custom 1 - Custom 16. You can then write custom code in Custom .AXI to use those IR functions.
- Refer to the VisualArchitect online help for a comprehensive listing of the channel layout of each of VA's IR Templates.

Control Strings Definitions

VA uses Control Strings Definition (.CSD) files to support Serial and IP controlled devices.

In order for a Serial or IP controlled device to be added to the Device Database for inclusion in your projects, it must be represented by a .CSD file.



NOTE

IR-controlled devices are supported by IR Library (.irl) files, which are outside of the scope of the Control Strings Definition dialog. See the Adding IR Devices To The Device Database section on page 30 for details.*

To add a new Serial or IP device to the Device Database, use the options in the Control Strings Definition dialog to define control strings and create a new .CSD file, and add the .CSD file to the device database.

Once you have created a .CSD file for a controlled device in your system, VA incorporates the control strings information into the source code when the system files are generated.

Creating a New CSD File

To manually add a Serial and IP-controlled device to the Device Database, so that it appears in the Devices tab of the Toolbox, you will define custom control strings for the device in the *Control Strings Definition* dialog (see FIG. 40 on page 30):

1. Select **File > Control Strings Definition > New** to open the *Control Strings Definition* dialog.
2. Enter device details in the *Properties* window (FIG. 48).

Property	Value
Device	
Device Type	
Manufacturer	
Model	
Packet Format	
Header	STX [0x02]
Terminator	ETX [0x03]
Checksum	Simple Sum
Terminator Before ...	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Ha...	False
Device Type	
This is the device classification.	

FIG. 48 Control Strings Definition dialog - Properties window

- a. Select the device type from the **Device Type** drop-down menu (for example, DVD Player / Changer). Note that this selection populates the *Functions* window with a list of functions supported for the selected Device Type.
 - b. Enter the name of the device's Manufacturer (in the **Manufacturer** field - required entry).
 - c. Enter the model name/number of the device (in the **Model** field - required entry).
 - d. Review the **Packet Format** and **Connection** properties, and edit as required: To change any of these properties to a setting other than the default, click inside the **String Value** column for any item to select from a drop-down menu of values supported for each property.
3. Double-click on any function in the *Functions* window to add it to the *Control String Assignments* window (FIG. 49).

Alternatively, you can select a function and click the **Add Function** command button or click the toolbar button.

The Control String Assignments window displays the Custom Control Definitions that have been created for this CSD file in a two-column table:

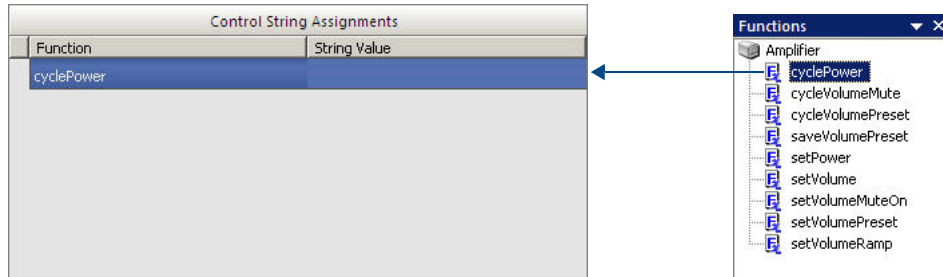


FIG. 49 Control Strings Definition dialog - Functions and Control String Assignments windows

- The *Function* column indicates the name of each function. Some functions support variable parameters, as indicated by an editable field within the Function column. In some cases this field accepts an integer (type directly into the text field. In other cases the field provides a drop-down menu of supported parameters to choose from.
- The *String Value* column contains text fields that allow you to enter the control string assignments for each Function. Type the control string assignment that you want to assign to each function in the Control Strings Assignments window, in the String Value column. The format and specific data bits that need to be entered here depend on the device's protocol specifications. Before you start, consult the device's protocol specifications to determine what aspects of the control string are required.

Each function should only appear in the string assignment list once. If a function has been duplicated in the Control String Assignments window, it is flagged with a red (!) icon (FIG. 50):

Function	String Value
setVolume 0	
! setVolume 0	

FIG. 50 Duplicate Function

To remove duplicate functions, select the function that you want to remove and select **Edit > Delete Function** (or click the toolbar button).

4. Click **Save & Close** to save your changes. The program will alert you if there is any required information missing.

In order to save a CSD file, the following information must be defined:

- Every Control String Assignment must have a Control String defined (in the **Value** column of the *Control String Assignments* window).
 - Every CSD file must have a manufacturer defined (in the **Manufacturer** field of the *Properties* window).
 - Every CSD file must have a device model defined (in the **Model** field of the *Properties* window).
5. Assuming all required information is present, the Save As dialog prompts you to specify a filename for this CSD file, and a target directory. Click **Save** to save the file, and close the *Save As* and *Control Strings Definition* dialogs.
 6. Re-scan the Device Database (see the *Re-Scanning the Device Database* section on page 60).

Once a new Control Strings Definition (*.CSD) file has been created and saved, it must be added to the Device Database, in order to be available as a selection in the Devices tab of the Toolbox. To add a new CSD File to the Device Database, you must re-scan the Device Database to include the new CSD file. See the *Adding a New CSD File to the Device Database* section on page 43 for details.



NOTE

The Device Database cannot be changed while a VA Project is open. Save and close your project before proceeding.

Control String Assignments window

The *Control String Assignments* window displays the custom control definitions that have been created for the active CSD file in a two-column table:

The **Function** column indicates the name of each function. Some functions support variable parameters, as indicated by a editable field within the *Function* column. In some cases this field accepts an integer (type directly into the text field. In other cases the field provides a drop-down menu of supported parameters to choose from.

As an example, to define a control string assignment for the Stop command (which happens to be one of several other options present in the *setDiscTransport* function):

1. Add the setDiscTransport function to the Control String Assignments window.
2. Click the down arrow next to the Function to select from a drop-down list of supported functions within this control string:

The **String Value** column contains text fields that allow you to enter the control string assignments for each Function. Type the control string assignment that you want to assign to each function in the Control Strings Assignments window, in the *String Value* column. The format and specific data bits that need to be entered here depend on the device's protocol specifications. Before you start, consult the device's protocol specifications to determine what aspects of the control string are required.

To continue the example of the Stop command for a DVD Player / Changer, let us assume that according to the device's protocol specifications, the DVD Player / Changer has the following requirements for control strings:

- *Header (STX (0x02) type) is required*
- *Terminator (ETX (0x03) type) is required*
- *No Checksum required*

According to the protocol specifications provided by the device manufacturer, the player requires two data bytes to be sent: **Device ID, xE7**.

- In our case, *Device ID* will be set to 0 (zero), but per the manufacturer's specifications, the Device ID range is x50 - x5F. Therefore, a device ID of zero is entered as **50** ("x5F" = device ID of 15).
- **xE7** represents the STOP command (again, according to the device manufacturer's protocol specifications).

So, to invoke the STOP command, we would expect to transmit the following control string:

`\x02\x50\xE7\x03`

where:

- **x02** = Header
- **x50** = Device ID (equal to zero)
- **xE7** = STOP
- **x03** = Terminator

Since the *Header*, *Terminator* and *Checksum* (if used) information is specified in the Properties window, it is only necessary to enter the actual data bits of the control string in the **String Value** field.

In this example, the data bits include the Device ID (**x50**) and the command itself (**xE7**), therefore, the following string assignment is entered into the String Value field.:

`\x50\xE7`

FIG. 51 shows the *Control String Assignments* window, indicating the data entered in this example:

Control String Assignments	
Function	String Value
setDiscTransport STOP	\x50\xE7

FIG. 51 Control String Assignments window

Control Strings - Syntax Rules

The syntax rules for control string assignments in VA are as follows:

- VA allows string assignments to contain non-printable ASCII characters in the form of escape sequences, to enter the equivalent decimal or hexadecimal ASCII code.
- VA treats all control string text as if it was enclosed in single quotes. Do not include the single quotes in your text.
- ASCII strings can have from 0 to 255 characters.
- All characters used in the context of Control String Definitions are case-sensitive.
- The backslash (\) character is used to denote the start of an escape sequence, which must adhere to one of the supported formats:

Escape Sequences - Supported Formats	
• \n	new line (ASCII 10/0x0A)
• \r	carriage return (ASCII 13/0x0D)
• \t	horizontal tab (ASCII 9/0x09)
• \v	vertical tab (ASCII 11/0x0B)
• \\	backslash character (ASCII 92/0x5C)
• \nnn	ASCII decimal character, where nnn is from 0 to 255 (\0 to \255)
• \xhh	ASCII hexadecimal character, where hh is from 00 to FF (\x00 to \xFF)

When generated into the appropriate SEND_STRING NetLinx construct, where these sequences represent an ASCII character outside of the range of 32/0x20 (‘ ‘ space) to 126/0x7E (‘~’ tilde), they are output as a NetLinx string expression. For example the string ‘PLAY\n’ with no header, terminator, or checksum would be generated as: **SEND_STRING “‘PLAY’,\$0A”**.

If the escape sequence represents a character in the allowable range mentioned above, it will simply be converted to its equivalent character in the output string. For example, the string ‘PLA\x59’ with no header, terminator, or checksum would be generated as: **SEND_STRING ‘PLAY’**.

Device Classes / Device Controllers

VA represents its Device Database in the System Tree on a class-by-class basis, based on the Duet module they share.



NOTE

Device Controllers include the Lighting System device class.

As devices that are controlled by a single Duet controller module (or device controller), and not individual modules per device, are added to a system, VA collect them under a common logical device controller. For CodeBuilder, the device controller is the only device visible for programming purposes. The events available for programming in CodeBuilder are the events for the device controller, and the functions and status items available for use in programming are only those from the controller. Individual controlled devices are not listed on the right-side of Code Builder.

In the generated NetLinx code, only the controller device is assigned a virtual address and given a DEFINE_MODULE statement (the second parameter to the module definition-physical address-will be ignored by the module). The physical addresses of the controlled devices are passed to the controller module via PROPERTY commands in the module's ONLINE handler.

Opening Control Strings Definition (*.CSD) Files

To open existing Control Strings Definition (.CSD) files for viewing/editing:

1. Select **File > Control String Definition** to open the Control Strings Definition dialog.
2. Select **File > Open** (or click the toolbar button) to invoke the Open dialog.
3. Locate and select a *.CSD file, and click **Open**.

Adding a New CSD File to the Device Database

Once a new Control Strings Definition (*.CSD) file has been created and saved (via the Control Strings Definition dialog), it must be added to the Device Database, in order to be available as a selection in the Devices tab of the Toolbox.

To add a new CSD File to the Device Database, you must re-scan the Device Database to include the new file:



NOTE

The Device Database cannot be changed while a VA Project is open. Save and close your project before proceeding.

1. Select **Managers > Re-Scan Device Database Search Paths** to open the Device Database Search Paths Manager dialog.
2. In the *Search Paths* area, click the **Add Search Path (Insert)** button. This adds a new (empty) search path to the device database.
3. Click the **Browse (...)** button next to the new search path to open the *Browse For Folder* dialog. Select the directory that the new CSD file was saved to, and click **OK**.
4. Click **Update** to update the Device Database to include the new file (as well as any other device files saved in the same directory).
5. Once the database update is complete, click the **Close** button to exit the Device Database Search Paths Manager dialog.



NOTE

Once the Re-Scan, or Rebuild operation has been started, it cannot be cancelled. Do not forcibly exit the program while a device database operation is in progress.

At this point, the device associated with the new CSD should be represented in the Devices tab of the Toolbox, in the appropriate device type folder:

- The new CSD file is added to the Device Type folder that matches the Device Type selection made in the Control Strings Definition dialog.
- Within the appropriate Device Type folder, the new file is added to a folder matching the Manufacturer name entered in the Control Strings Definition dialog.

CSD Example 1: Case Requiring a Check Sum

Below is a command to send to a DVD Player, that uses an ASCII protocol along with a checksum. The example that follows assumes that the device has the following RS-232 specifications:

- Transmission Speed: 9600 BPS
- Character Length: 8 bit
- Parity Bit: None
- Stop Bit: 1 bit

The following table shows the layout of the command, the only thing that needs to be obtained from the documentation is what method is being used to calculate the check sum. In this example, it is 2's complement (FIG. 52).

Start Byte	Command				Parameters						Check Sum	End Byte
●	P	L	Y	F	W	D	SP	SP	SP	SP		▼
x02	x50	x4C	x59	x46	x57	x44	x20	x20	x20	x20	xAA	x03
Check Sum Range												

FIG. 52 Example Command Layout

Step 1: Specify the Device Type

In the *Properties* window of the Control Strings Definition dialog, specify the *Device Type*: select **DVD Player/Changer** from the drop-down menu (FIG. 53):

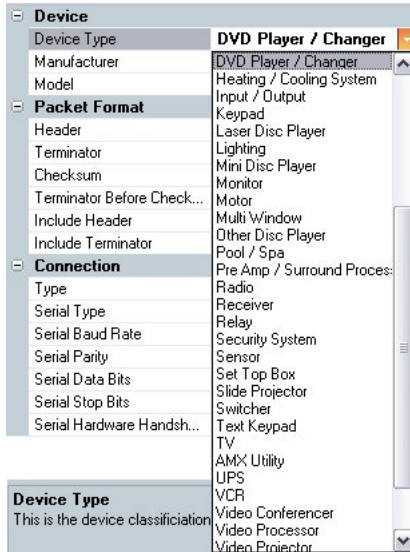


FIG. 53 Select Device Type

Step 2: Enter the Manufacturer Name

Enter the *Manufacturer* name (FIG. 54):

Property	Value
Device	
Device Type	DVD Player / Changer
Manufacturer	PV Test
Model	
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	Simple Sum
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Manufacturer This is the device manufacturer.	

FIG. 54 Enter Manufacturer Name

Step 3: Enter the Model Name

Enter the *Model* name (FIG. 55):

Property	Value
Device	
Device Type	DVD Player / Changer
Manufacturer	PV Test
Model	DVD1001
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	Simple Sum
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Model	
This is the device model.	

FIG. 55 Enter Model Name

Step 4: Specify the Packet Format

The *Header* (or "Start Byte") and *Terminator* (or "End Byte") are okay, so no changes are needed here. The *Checksum* should be changed to **None** since this protocol does not support it (FIG. 56):

Property	Value
Device	
Device Type	DVD Player / Changer
Manufacturer	PV Test
Model	DVD1001
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	2's Complement
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Checksum	
This is the checksum algorithm.	

FIG. 56 Specify the Packet Format

Step 5: Terminator Before Checksum Setting

The *Terminator Before Checksum* may need to be changed based on your protocol. By default it is set to *True*, which would mean that our bytes would come in the wrong order. We are going to set this to **False** so that it will match the order displayed above (FIG. 57):

Property	Value
Device	
Device Type	DVD Player / Changer
Manufacturer	PV Test
Model	DVD1001
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	2's Complement
Terminator Before Checksum	False
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Terminator Before Checksum	
This value flags whether the terminator comes before the checksum in the output string.	

FIG. 57 Terminator Before Checksum Setting

Step 6: Enter the Command and Parameters

Now we can enter the command and its parameters. In this case we need add four spaces as well. This can be done using the space bar, or using an escape sequence to define the decimal or hexadecimal value for the space.

The escape sequence is the preferred method since it helps you see that you entered the correct number of space.

The code generated for this scenario would look like the following:

```
CHANNEL_EVENT [vdvDISC2, 0]
{
ON:
{
    SWITCH (CHANNEL.CHANNEL)
    {
        // setDiscTransport (PLAY): Play
        CASE PLAY:
        {
            SEND_STRING dvdDISC2, "$02, ' PLYFWD ', $AA, $03"
        }
    }
}
}
```

FIG. 58 shows a screen capture of the Control Strings Definition dialog for this example:

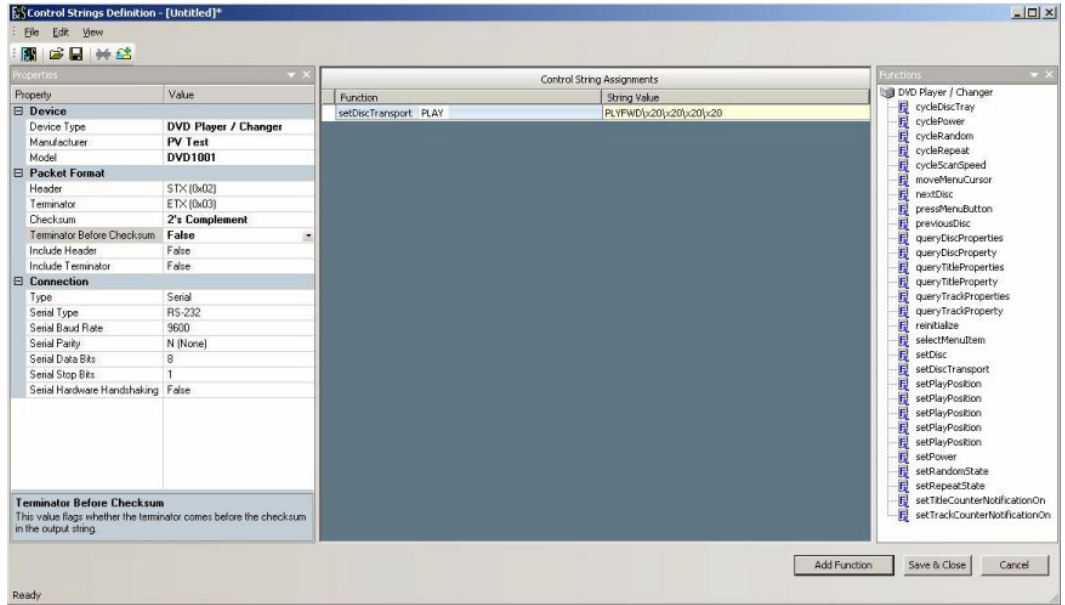


FIG. 58 Control Strings Definition dialog - CSD Example 1

CSD Example 2: Case Not Requiring a Check Sum

Below is a command to send to a Receiver, that uses an ASCII protocol. The example that follows assumes that the device has the following RS-232 specifications:

- Transmission Speed: 4800 BPS
- Start: 1 bit
- Data: 8 bit
- Parity: None
- Stop: 1 bit

The following table shows the layout of the command (FIG. 59):

Start Byte	ID		Command			Parameters			End Byte
x02	*	*	V	O	L	U	P	I	x03

FIG. 59 Example Command Layout

Step 1: Specify the Device Type

Enter the *Device Type* in the field: select **Receiver** from the drop-down menu (FIG. 60):

Property	Value
Device	
Device Type	Receiver
Manufacturer	
Model	
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	Simple Sum
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Device Type This is the device classification.	

FIG. 60 Select Device Type

Step 2: Enter the Manufacturer Name

Enter the *Manufacturer* name (FIG. 61):

Property	Value
Device	
Device Type	Receiver
Manufacturer	PV Test
Model	
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	Simple Sum
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Manufacturer This is the device manufacturer.	

FIG. 61 Enter Manufacturer Name

Step 3: Enter the Model Name

Enter the *Model* name (FIG. 62):

Property	Value
Device	
Device Type	Receiver
Manufacturer	PV Test
Model	RCV1001
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	Simple Sum
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Model This is the device model.	

FIG. 62 Enter Model Name

Step 4: Specify the Packet Format

The *Header* (a.k.a. "Start Byte") and *Terminator* (a.k.a. "End Byte") are okay, so no changes are needed here. The *Checksum* needs to be changed to **2's Complement** (FIG. 63):

Property	Value
Device	
Device Type	Receiver
Manufacturer	PV Test
Model	RCV1001
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	None
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	9600
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Checksum This is the checksum algorithm.	

FIG. 63 Specify the Packet Format

Step 5: Specify the Serial Baud Rate

The Serial Baud Rate needs to be set to the correct value - 4800 (FIG. 64):

Property	Value
Device	
Device Type	Receiver
Manufacturer	PV Test
Model	RCV1001
Packet Format	
Header	STX (0x02)
Terminator	ETX (0x03)
Checksum	None
Terminator Before Checksum	True
Include Header	False
Include Terminator	False
Connection	
Type	Serial
Serial Type	RS-232
Serial Baud Rate	4800
Serial Parity	N (None)
Serial Data Bits	8
Serial Stop Bits	1
Serial Hardware Handshaking	False
Serial Baud Rate This is the serial data baud rate.	

FIG. 64 Specify the Serial Baud Rate

Step 6: Enter the Command and Parameters

Now we can enter the command and its parameters. The code generated for this scenario would look like the following:

```
CHANNEL_EVENT [vdvRECV1, 0]
{
  ON:
  {
    SWITCH (CHANNEL.CHANNEL)
    {
      // setVolumeRamp (UP): Ramp volume up
      CASE VOL_UP:
      {
        SEND_STRING dvrECV1, "$02, 'VOLUP1', $03"
        OFF [CHANNEL.DEVICE, CHANNEL.CHANNEL]
      }
    }
  }
}
```

FIG. 65 shows a screen capture of the Control Strings Definition dialog for this example:

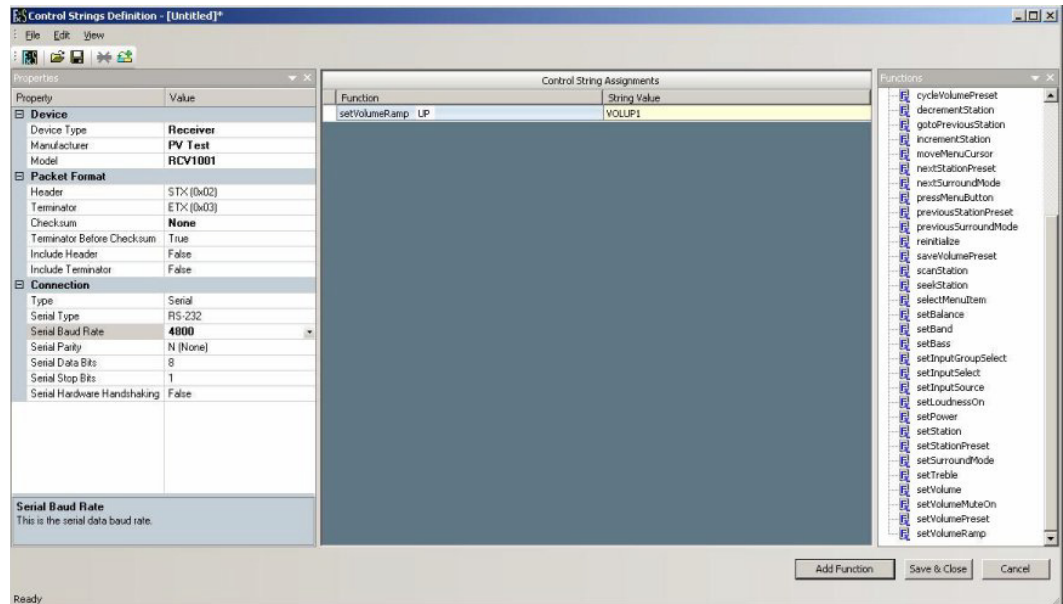


FIG. 65 Control Strings Definition dialog - CSD Example 2

Device Database - Default Search Paths

The default Search Paths (defined in the *Device Database Search Paths Manager* dialog) are as follows:

For Module (.JAR) Files:

C:\Documents and Settings\All Users\Application data\AMX\Duet\Module

For IR Library (.IRL) and IR Metadata (.XMD) Files:

C:\Documents and Settings\All Users\Application data\AMX\IR Files

Select **Managers > Device Database Search Paths Manager** to access this dialog (FIG. 66):

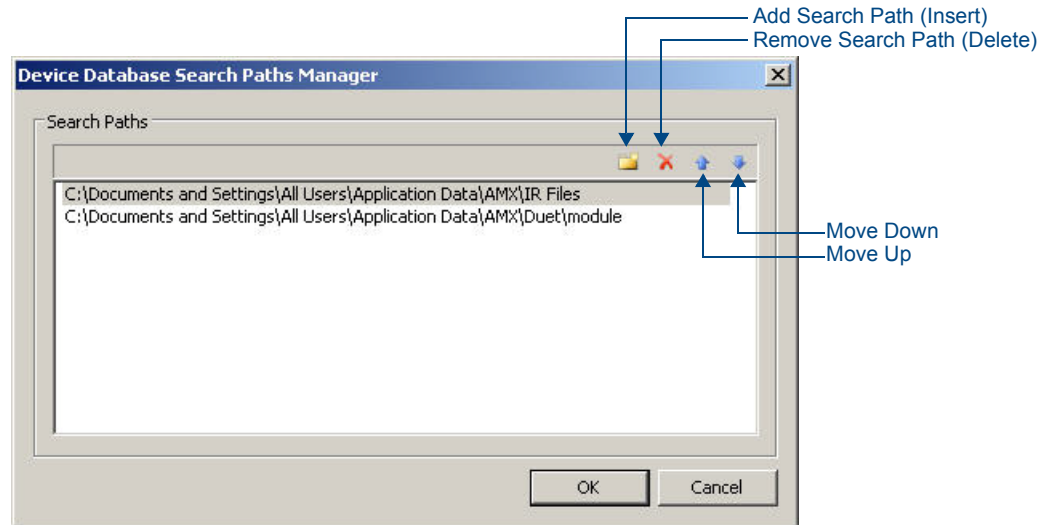


FIG. 66 Device Database Search Paths Manager dialog

Device Database - Adding a New Search Path

1. Click the **Add Search Path (Insert)** button. This adds a new (empty) line to the bottom of the *Search Paths* list.
2. Click the Browse button next to this line to open the *Browse For Folder* dialog (FIG. 67).

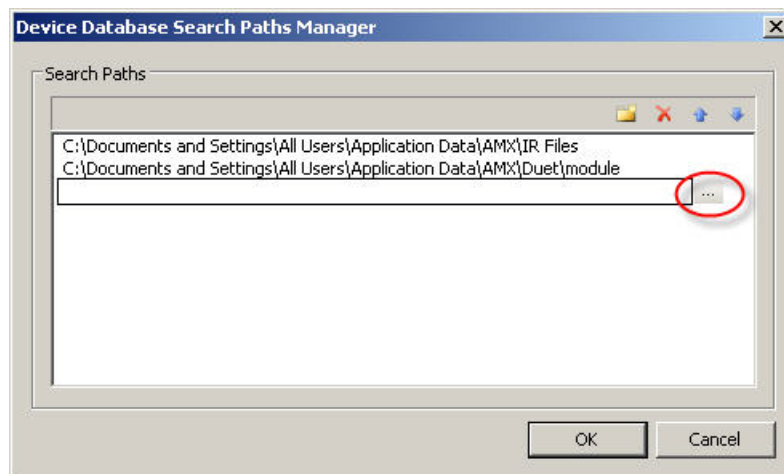


FIG. 67 Device Database Search Paths Manager dialog - Adding a New Path

3. Locate and select the directory that you want to include as a search path for the device database.
4. Click **OK** to close the *Browse For Folder* dialog and add the selected directory to the *Search Paths* list.

Removing a Search Path

1. Select the search path that you want to remove in the *Search Paths* list.
2. Click the **Remove Search Path** button.

Re-ordering the Search Paths

Select an item in the Search Paths list, and use the up/down arrow buttons to move it up and down in the list. If you have made any changes to the search paths, the paths must be re-scanned to update the Device Database.

InConcert Resource Center

The InConcert Resource Center is available at www.amx.com for registered AMX Dealers. Click the **Partners** link at the top of the **www.amx.com** website to access the AMX InConcert Partners page (FIG. 68):



FIG. 68 InConcert Resource Center

AMX InConcert Partners offer products that simplify integration with AMX control systems by streamlining system programming. Use the InConcert Resource Center to search for and download device modules.

Searching For IR Library (.IRL) Files

IR library (.IRL) files for many popular remote controls are available for download from the InConcert Resource Center at www.amx.com. All InConcert Resource Center search boxes use implied wildcards. For example, entering "son" in the R.C. Manufacturer search field will return "Sonance", "Sonic Blue", "Sonic Foundry" and "Sony".

1. Go to **www.amx.com**, and log in as a registered Dealer.
2. Click on the **Partners** Toolbar button, to access the *Partners* List, and the InConcert Resource Center.
3. Click on **Search Remote Controls** to access the *Search Remote Controls* page (FIG. 69):

FIG. 69 InConcert Resource Center - Search Remote Controls page

4. Enter as much information as you can into these fields and click **Search**.
5. The results of any search operation are displayed on the selected Search page (FIG. 70):

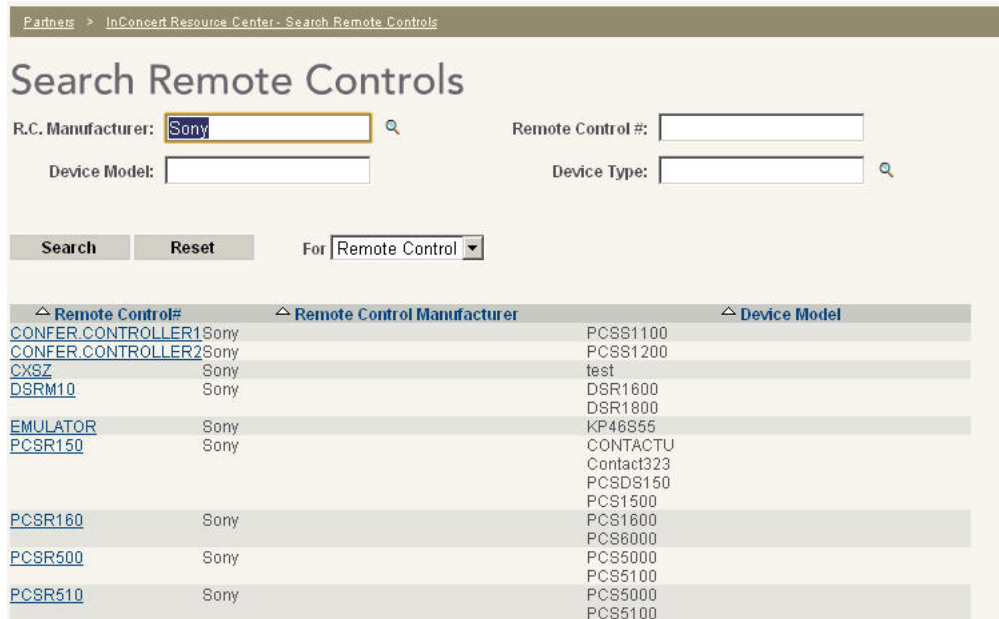


FIG. 70 InConcert Resource Center - Search Results page

- Click on the link for the desired device to open the **Remote Control Information** window (FIG. 71):



FIG. 71 InConcert Resource Center - Remote Control Information window

- Use this dialog to view device specifications and download associated files, including the IRL file.

Downloading IR Library (.IRL) Files

IR library (.IRL) files for many popular remote controls are available for download from the InConcert Resource Center at www.amx.com:

1. In the *Remote Control Information* window, select the **Assoc. IR Files** link (in the left sidebar) to access the *Associated IRL Files* window (FIG. 72):

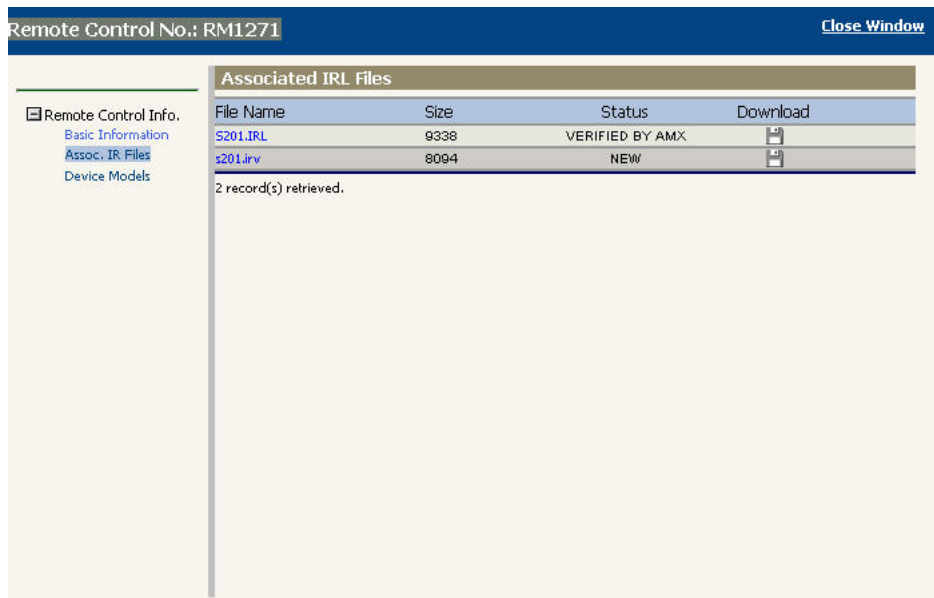


FIG. 72 InConcert Resource Center - Associated IRL Files window

2. Click the **Download** icon to download the .IRL file. The system will prompt you to specify a target directory for the file.
3. Finally, update the device database to include the new entries.

Searching For Duet Module (.JAR) Files

Duet Module (*JAR) files for many popular devices are available for download from the InConcert Resource Center at www.amx.com. All InConcert Resource Center search boxes use implied wildcards. For example, entering 'son' in the Manufacturer box will return *Sonance*, *Sonic Blue*, *Sonic Foundry* and *Sony*.



NOTE

VA requires Duet Module v1.8 or higher module files to support third-party (controlled) devices.

1. Go to www.amx.com, and log in as a registered Dealer.
2. Click on the **Partners** Toolbar button, to access the *Partners* List, and the InConcert Resource Center. There are several search options available:
 - **Search Devices:** Click to display the Search Devices options (this is the default view).
 - **Search New Releases:** Click to access the Search New Releases page, where you can view listings of new and updated module file, separated by file type.
 - **Search Remote Controls:** Click to show the Search Remote Controls options.
 - **Voting/Request:** Click to display the Voting/Request options, where you can vote for device modules that you would like to see developed and released by AMX, or request that a specific device module be developed.
3. Click on **Search Devices** to access the *Search Devices* page (FIG. 73):

Partners > InConcert Resource Center - Search Devices

Search Devices

(The AMX Certified Repository of Modules)

Note: All search boxes use implied wildcards. For example, entering 'son' in the Manufacturer box will return Sonance, Sonic Blue, Sonic Foundry and Sony.

[Go to MODPEDIA - The Public Repository of Modules for Everyone](#)
 (Please note that third party modules are untested and are not supported by AMX)

Device Model: Device Type:

Manufacturer: Control Method:

Manufacturer Series: AMX Systems:

Remote Control:

Standard Module AMXmeetingroom Compatible
 Duet Module AMXhome Compatible

A Access **L** Landmark **N** Netlinx
D Duet Module **S** Standard Netlinx Module

FIG. 73 InConcert Resource Center - Search Devices page

4. Click the **Duet Modules** check box to limit the search to Duet Modules.
5. Enter as much information as needed into the remaining fields, and click **Search**.
6. The results of any search operation are displayed on the selected *Search* page (FIG. 74):

Partners > InConcert Resource Center - Search Devices

Search Devices

(The AMX Certified Repository of Modules)

Note: All search boxes use implied wildcards. For example, entering 'son' in the Manufacturer box will return Sonance, Sonic Blue, Sonic Foundry and Sony.

[Go to MODPEDIA - The Public Repository of Modules for Everyone](#)
 (Please note that third party modules are untested and are not supported by AMX)

Device Model: Device Type:

Manufacturer: Control Method:

Manufacturer Series: AMX Systems:

Remote Control:

Standard Module AMXmeetingroom Compatible
 Duet Module AMXhome Compatible

A Access **L** Landmark **N** Netlinx
D Duet Module **S** Standard Netlinx Module

2 Model(s) found (Display 1 - 2) Page 1 of 1

Manufacturer	Device Type	Model	Series	ControlMethod	AMX System
Sony	Camera	BRC-H700		RS232	D
Sony	Camera	EVID100		RS232	A N S D

2 Model(s) found (Display 1 - 2) Page 1 of 1

FIG. 74 InConcert Resource Center - Search Results page

7. Click on the link for the desired device to open the *Device Model Details* dialog. Use this dialog to view device specifications and download associated files, including the Duet Module (*JAR) file (FIG. 75):

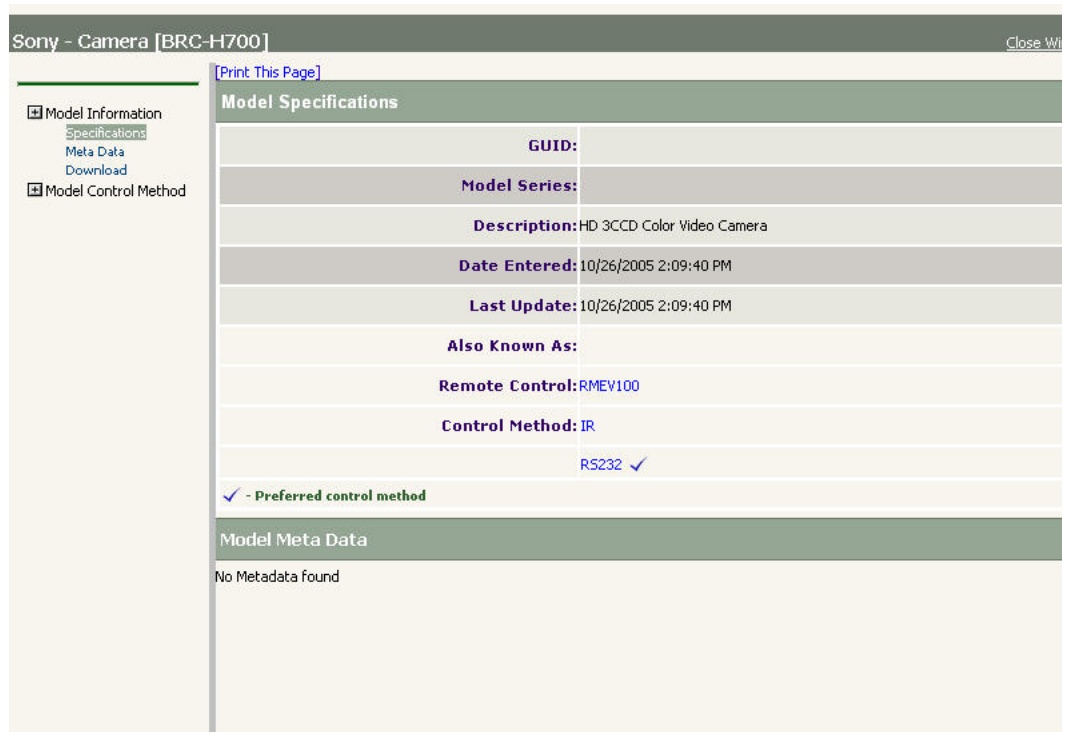


FIG. 75 InConcert Resource Center - Device Model Details dialog

Downloading Duet Module (.JAR) Files

Non-IR controlled (Ethernet, Modem, Serial and TCP/IP) devices can use Duet Module (.JAR) files for support in VA. Duet module files for many popular devices are available for download (as ZIP files) from the InConcert Resource Center at www.amx.com:

1. In the *Device Model Details* dialog, select **Download**, under *Model Information* on the left side of the dialog to access the Download page for the selected device (FIG. 76):

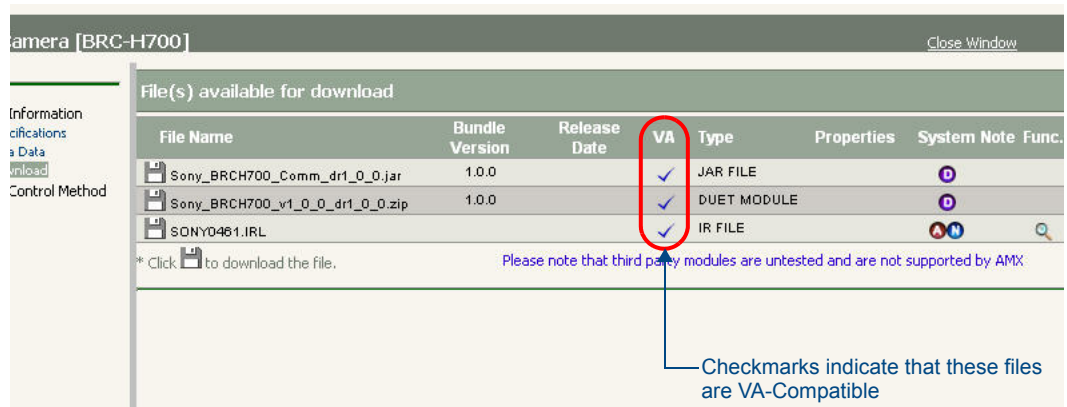


FIG. 76 InConcert Resource Center - Download page

2. Verify that there is a check-mark in the "VA" column, which indicates that the Duet module is VA compatible. If so then proceed to the next step.
3. Click on the file icon next to file name to save the ZIP file to your hard drive. The system will prompt you to specify a target directory for the file.
4. Click **Save** to save the selected (ZIP) file.
5. Once you have saved one or more modules to your local drive, unzip the files to access the set of device files that it contains. Typically the ZIP includes several files - see *Module ZIP Files* on page 58.

6. Finally, update the device database to include the new entries:
 - a. Select **Managers > Device Database Search Paths Manager**.
 - b. In the *Search Paths* window, verify that the folder(s) that you unzipped the new files to are represented in the list. If the new files are in a folder that is not listed, press the **Add Search Path** button, to add a new entry to the list, then click the Browse button (...) to select the folder that the files are in (in the *Browse For folder* dialog).
 - c. Click **OK** to close the *Browse For Folder* dialog.
 - d. Click **OK** in the *Device Database Search Paths Manager* dialog.

Module ZIP Files

Module ZIP Files	
• .JAR file:	This is the "Module" file required by VA to support this device. In order for devices to be represented in the Devices tab of the Toolbox (for inclusion in your VA projects), the Module (.JAR) file associated with the device must be present in the Device Database.
• .AXI file:	<p>" Include" files can be loaded and edited in NetLinx Studio like normal AXS program files. Like AXS program files, the name of the include file is stored on the first line of the file as a PROGRAM_NAME declaration.</p> <p>To include a file in a program, use the keyword INCLUDE, followed by the filename in single quotes.</p> <p>When the compiler reaches the INCLUDE statement, it jumps into the specified file and continues compiling. When it has reached the end of that file, it comes back to the line following the INCLUDE statement and continues compiling.</p> <pre> DEFINE_PROGRAM (* Program statements can go here *) INCLUDE 'TEST.AXI' (* More program statements can go here *) </pre> <p>This file must be transferred to the Central Controller.</p>
• .APW file:	<p>NetLinx Studio "Workspace" files contain of the files required for a control system (including Source Code (AXS) Files, Include (AXI) files, Module (AXS/TKO) Files, User Interface (TPD, TP4 or KPD) Files, IR Library (IRL) files, and Other (TXT, DOC, BMP etc.).</p> <p>This file allows you to open and edit the system files in NetLinx Studio, and is not transferred to any system devices.</p>
• .AXS file:	<p>This is the Master Source Code File (and possibly other source code files associated with the System).</p> <p>This file must be transferred to the Central Controller.</p>
• .TP4 file:	<p>The TPDesign4 project file defines the Touch Panel UI (panel pages, buttons and navigation).</p> <p>This file must be transferred to the Touch Panel.</p>
• .DOC file:	<p>This document file provides details about this module and describes its implementation.</p> <p>This file is for information purposes only.</p>

Importing a Café Duet Module into VisualArchitect

In some projects, you may find it necessary to import a previously created Café Duet module (JAR file) into VA instead of creating a new one. These may include third-party modules or modules designed for another project.

To import a previously created Café Duet module into VA:

1. Copy your module JAR files to the appropriate directory. VA searches particular directories when building or updating its device database, so copying the JAR files to one of those directories is highly recommended. If you are not sure what the paths are, select Managers > Device Database Search Paths Manager - the default directories as well as any others that may have been added are indicated in the *Device Database Search Paths Manager* dialog (FIG. 77):

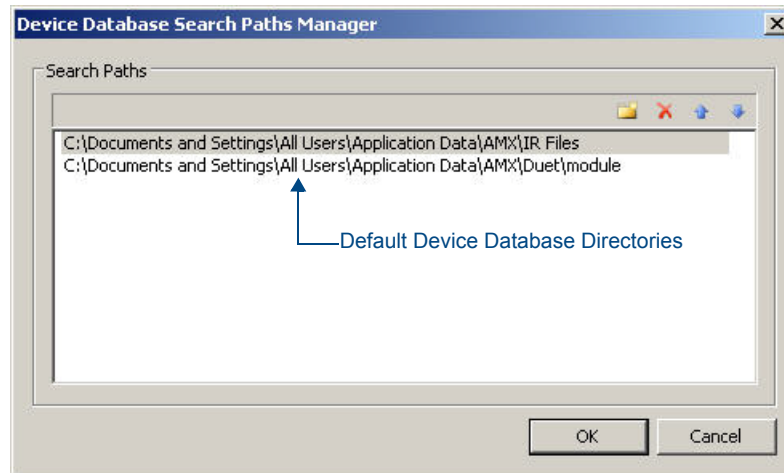


FIG. 77 Device Database Search Paths Manager dialog



NOTE

Because not all users install Café Duet to the same computer, or because the output JAR files may go to a different directory, having the correct directory path is essential. If you are unable to find the correct module directory using the Device Database Search Paths Manager, you may have to perform a manual search for the directory containing your module JAR file and then copy the file directly to the correct directory.

2. If you add a new path or change one of the existing paths, VA will automatically search all the paths and rebuild the device database for you. If your jar files were in one of those directories, you can skip this step.

When Café Duet and VA are first installed on the same PC, they will both point to the same path by default. Café Duet's Module Export Directory and VisualArchitect's Device Database Search Path would be:

C:\Documents and Settings\All Users\Application data\AMX\Duet\module

3. Once the search paths have been scanned, you will find your device listed under the appropriate device heading in VA. It is now available for use in your VA project.



NOTE

For details on using the Café Duet Integrated Development Environment for NetLinx application, refer to the Café Duet Operation/Reference Guide and on-line help.

Re-Scanning the Device Database

When you *re-scan* the Device Database, VA scans the search paths indicated in the Device Database Search Paths Manager dialog, looking for changes in the files including added (new) files, removed files and changed files.

Notes:

- The Device Database cannot be changed while a VA Project is open. Save and close your project before proceeding.
- Because of the large amount of data contained in the Device Database, Rescan and Rebuild operations typically take several minutes to complete.
- Modules and IRL files stored on removable media such as CDs cannot be added to the Device Database. These files must be copied to the local drive in order to add these devices to the database.

To re-scan the Device Database:

1. Select **Managers > Re-scan Device Database Search Paths**.
2. The progress bar indicates the status of the re-scan operation. When the operation is complete, the status bar closes.



NOTE

Once a Rescan or Rebuild operation has been started, it cannot be cancelled. Do not forcibly exit the program while a Device Database update operation is in progress.

Rebuilding the Device Database

When you *rebuild* the Device Database, VA clears the current database, then re-populates from the search paths indicated in the *Search Paths* window of the Device Database Search Paths Manager dialog.

Notes:

- **You should only have to use the Rebuild option if you are experiencing problems with devices in VA.**
- The Device Database cannot be changed while a VA Project is open. Save and close your project before proceeding.
- Because of the large amount of data contained in the Device Database, Rescan and Rebuild operations typically take several minutes to complete.
- Modules and IRL files stored on removable media such as CDs cannot be added to the Device Database. These files must be copied to the local drive in order to add these devices to the database.

To rebuild the device database:

1. Select **Managers > Rebuild Device Database**.
2. The progress bar indicates the status of the rebuild operation. When the operation is complete, the status bar closes.

Adding MSRP Values for Controlled Devices

VA allows you to add MSRP values for third-party devices, by manually editing the "MSRP.CSV" file that VA uses to provide MSRP values for AMX equipment (FIG. 78):

	A	B	C	D	E	F	G
1	FG012-03		\$100				
2	FG012-04		\$200				
3	FG012-05		\$70				
4	FG012-06		\$150				
5	FG012-07		\$250				
6	FG018-04		\$130				
7	FG025-10		\$150				
8	FG029-10		\$100				
9	FG031-10		\$175				

FIG. 78 MSRP.CSV

To add MSRP values for third-party devices:

1. Open the "MSRP.csv" file. This file resides in:

C:\Documents and Settings\All Users\Application Data\AMX\VisualArchitect\MSRP

Note that there are two CSV files in this directory: One named "MSRP.csv", and a second one named "AMX MSRP.CSV":

- "MSRP.csv" is the file used by VA. This is the file that you should edit.
- "AMX MSRP.csv" is a backup file. **Do not edit this file - it is intended for use in the case that the MSRP.csv file is lost or corrupted in some way.**

There are two ways to edit this file: via Microsoft Excel (or a similar spreadsheet editing program), or via Notepad (or a similar text editor).

MSRP.csv is simply a comma-delimited text file; follow the formatting that is apparent in the file when adding new devices/MSRP values.

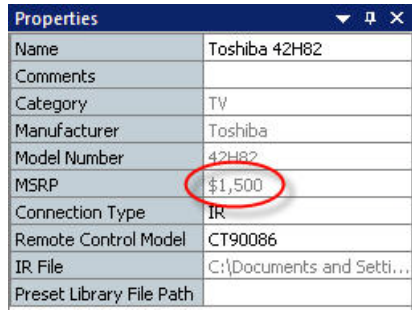
2. Scroll down to the last entry and press Enter to add a carriage return. You can start adding new devices to the bottom of the list (after all of the AMX devices).
3. Enter the new devices one at a time, following the required formatting (if you open the file in Excel, the comma delimiters are represented as three columns - A, B and C):

FG Number,Dealer Part Number,MSRP

- Be sure to type the device name exactly as it appears in the Properties window.
- AMX devices use the first field for FG Numbers which may not apply to third-party devices. When adding third-party devices, use this field for the "Model Number" of the device.
- The *Dealer Part Number* is optional. AMX Devices do not include a Dealer Part Number. Therefore, all AMX devices are represented in the MSRP.csv file with an empty middle field (for example: "FG012-03,,\$100"). However, you can use this field to add a custom part number to third-party devices.

Example: Toshiba 42H82,10-123,\$1500

4. When you're done editing the file, be sure to save it to the same name, file extension and location.
5. Restart VA to see the MSRP (and Dealer Part Number, if one was included) in the Properties window for that device. Note that you must select the device in the System Diagram in order to view its properties (FIG. 79):



Properties	
Name	Toshiba 42H82
Comments	
Category	TV
Manufacturer	Toshiba
Model Number	42H82
MSRP	\$1,500
Connection Type	IR
Remote Control Model	CT90086
IR File	C:\Documents and Setti...
Preset Library File Path	

FIG. 79 Properties window - MSRP Value indicated

Working With Devices

Supported Devices

VA provides native support for many devices, including AMX devices as well as third-party devices.

Supported devices are indicated in the Toolbox: with the System Diagram selected, the Toolbox provides several tabs for the various device categories (FIG. 80):



FIG. 80 Toolbox - Device Categories

- Click on any tab to view the devices contained therein.
- Click and drag any device from the Toolbox onto the System Diagram to add the device to the System.
- Refer to the VisualArchitect online help for a comprehensive listing of supported AMX devices.

Device Notes

Many devices have device notes associated with them, indicated by a blue Information Icon on the Device Element (in the System Diagram - see FIG. 81):

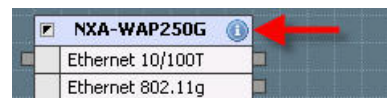


FIG. 81 Device Notes

Click on this icon to view the Device Notes, in the *Device Notes* dialog.

- Click **Print** to print the device notes.
- Click **OK** to close this dialog.

Copying Device Notes to Clipboard Memory

Right-click inside the text window to access a context menu (the options in this menu will vary depending on your PC configuration), and select **Copy** to copy the text to clipboard memory. Then, you can paste these notes into another file if desired.

NetLinx Central Controller

Every VA project/system requires a single NetLinx Central Controller.

When you start a new project (either via the Basic System Assistant or the Empty System option), VA automatically selects the NI-3100 as the Central Controller. In most cases, the NI-3100 is a good selection, since it is capable of handling most system designs that come from VA. However, VA also provides the flexibility to change this selection if necessary:

- If you started your project with the Basic System Assistant, you can select a different NetLinx Central Controller in the Basic System Assistant dialog.
- If you started your project with the New Empty System option, the NI-3100 is automatically added to the system when it is initially created. You can change the Central Controller type later via the Edit > Replace option.



You can also start a new system design with a Central Controller selection. With no project open, right-click on the Central Controller that you want to use in the Central Controllers tab of the Toolbox, and select New System Using: from the context menu. This action starts a new empty system, with the selected Controller in place.

Setting The Card Frame Number

The Card Frame Number dialog allows you to specify a Card Frame Number for NXF Card Frames and Central Controllers equipped with card slots (NI-4000 /4100).

The Card Frame Number determines the device numbers for the for the Control Cards installed in the Controller or Card Frame.

To access this dialog, click on the Browse (...) button in the Card Frame Number device property for NXF Card Frames and Controllers equipped with card slots (FIG. 82):



FIG. 82 Card Frame Number device property

By default, VA assigns the Card Frame Number as **25** (FIG. 83):

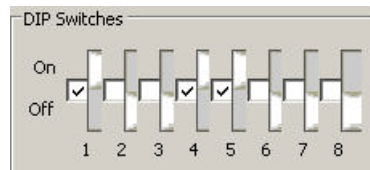


FIG. 83 Card Frame Number DIP Switch

The formula for assigning device numbers to the Controls Card Slots is:

$$(\text{Card Frame Number} \times 12) + \text{Card Slot Number (1-12)} = \text{Card address}$$

Therefore, if you use the default Card Frame Number setting of 25:

- Card slots 1-12 in an NXF Card Frame are assigned slot numbers 301-312.
- Card slots 1-4 in NI-4000/4100 Central Controllers are assigned slot numbers 301-304.

To change the Card Frame Number assignment, type the Card Frame Number in the Number field, and take note of the DIP Switch settings indicated in the dialog.

- The DIP Switch on the Controller or Card Frame (rear panel) will have to be set to match the settings shown here.
- Any time you change the DIP Switch settings on the Controller or Card Frame, cycle power for approximately 5 seconds to allow the system to read the new device number settings.

Replacing the Central Controller

VA requires that there is always one NetLinx Central Controller in each system.

Since you are not allowed to delete the Central Controller, you must use **Replace** to use a different type:

1. Select the device in the system diagram that you want to replace.
2. Select the device that you want to replace it with, in the Toolbox.
3. Select **Edit > Replace** (or select Replace Device from the Toolbox System Devices context menu).

Alternatively, you can drag-and-drop a replacement Central Controller from the Toolbox into the System Diagram:

1. Position the replacement Central Controller directly on top of the existing one to replace it.
2. When the replacement Controller is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor (FIG. 84):

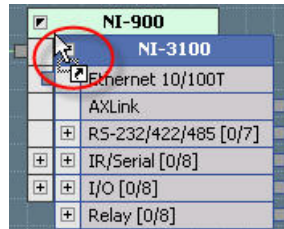


FIG. 84 Replace icon

3. When the Replace Icon appears, release the Controller that you are dragging, and it will replace the existing Central Controller.

It is important to note that depending on the differences between the original Central Controller and the one that is selected to replace it, some device connections may be lost.

For example, if you replace a NI-4000 - which features eight IR/Serial ports, with a NI-700 - which has one IR/Serial Port, you will lose IR/Serial Ports 2-8.

- If you have devices connected to any ports on the original Controller that do not exist on the replacement Controller, the device connections will be lost for the missing ports, but the devices will remain in the System. However, if the replacement Controller has the same number of port types as the original, no device connections will be lost.
- Also note that when you replace the Central Controller, device properties relative to connection type may be lost.

All Central Controllers are added to the system (including replacements) with the same default Connection Settings:

Central Controllers - Default Connection Settings	
• Connection Type:	TCP/IP
• IP Address/Host Name:	(none)
• IP Port Number:	1319
• Ping For Availability:	true
• Requires Authentication:	false

If any of the settings were changed before the Central Controller was replaced, they will have to be re-entered (since the replacement Controller will apply the default settings).

- This also holds true for the System Number assignment, which will return to the default setting of **1**.
- Any Comments entered will carry over after replacing the Controller.

Working With Applications

NetLinx Central Controllers feature the ability to add AMX Applications directly to the Central Controller's device node in the System Diagram.

To add an application to a NetLinx Central Controller:

1. Select the Central Controller in the System Diagram.
2. Click on the plus icon in the **Applications** node (FIG. 85):

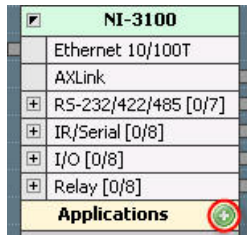


FIG. 85 Central Controller - Application Node

This action invokes the *Select a device to add to Applications* dialog (FIG. 86):

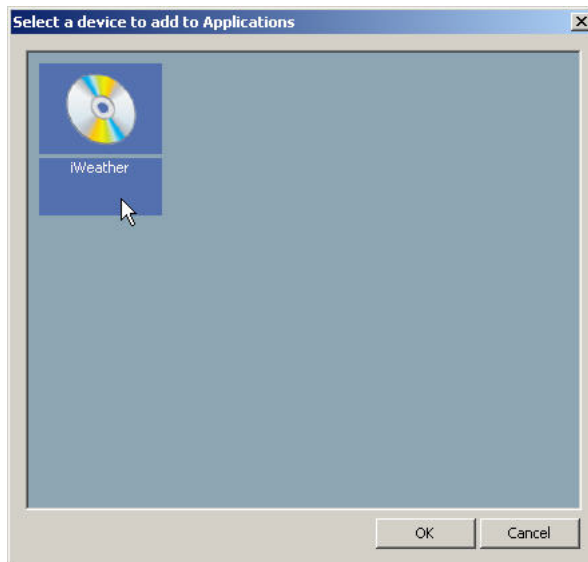


FIG. 86 Select a device to add to Applications dialog

3. Select an Application and click **OK** to close this dialog.
4. The selected Application is indicated in the device element in the System Diagram (FIG. 87):

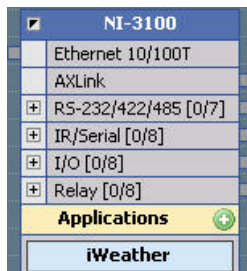


FIG. 87 Central Controller with i Weather Application

- Click on the Application node on the device element to populate the Properties window with the Application's properties (FIG. 88):

Properties	
Name	iWeather
Comments	
Category	Application
Model Number	iWeather
FG Number	FG070-518
MSRP	\$825
Duet Module	C:\Documents and Setti...

FIG. 88 Properties window - Application Properties

- Edit the Application *Name* and add *Comments* as desired.

To remove an Application from a Central Controller, click on the Application node and select Delete from the Toolbar, the Edit menu or the System Diagram Context menu (or press the Delete key).

User Interface Devices

There are three types of User-Interface (UI) devices supported by VisualArchitect:

- Touch Panels
- Keypads
- Remotes

Refer to the VisualArchitect online help for a comprehensive listing of supported AMX Touch Panels, Keypads and Remotes.

Selecting AMX User-Interface Devices

Once you have selected a NetLinx Central Controller, you can specify one or more AMX User-Interface devices.

Every VA project/system requires at least one AMX User-Interface device.

- If you started your project with the Basic System Assistant, you can select one Touch Panel and up to two Keypads in the Basic System Assistant dialog. The Basic System Assistant dialog also provides the opportunity to select a Template to apply to the Touch Panel.
Select **File > New > Basic System Assistant** to launch the Basic System Assistant dialog, which helps to streamline the initial setup of the control system, based on Project information and AMX Equipment (NetLinx Central Controller and Touch Panel/Keypad) selections.
- If you started your project with the New Empty System option, you will select and add User-Interface device(s) from the Toolbox:
Select **File > New > New Empty System** to create a new system, without any devices except the (default) NI-3100 NetLinx Central Controller. At this point you can define the rest of the system as desired.

- To add a Touch Panel, open the Touch Panels tab of the Toolbox, and double-click or drag-and-drop the desired Touch Panel into the System Diagram.



When adding video touch panels (including any of the wired Modero panels), VA (v1.3 or higher) automatically adds the appropriate NXA-AVB Breakout box to the System Diagram at the time that the panel is added. Also, note that included accessories cannot be removed from the system.

- To add a Keypad or Remote, open the Keypads & Remotes tab of the Toolbox, and click and double-click or drag-and-drop the desired keypad onto the System Diagram.

Intercom-Enabled Touch Panels

Intercom-enabled panels have additional template support in VA v1.3 or above. When an intercom-enabled panel is added to the system, and the Intercom feature/sub-feature from the selected template is added to the Touch Panel navigation, VA instantiates two NetLinx modules during code generation that handle the intercom communications and the intercom UI interaction.

- These modules are defined once, regardless of how many intercom-enabled panels have been added to the system (assuming that at least one has been added).
- These modules are given an array of the touch panels ports controlling intercom operation and an array of virtual devices to use for communication.
- These modules files will also be added to the resulting NetLinx Studio Workspace (.APW) file when the system code is generated.

Device Properties

When a device is selected in the System Diagram, detailed information for that device is displayed in the Properties window. Many of these properties are editable, and some require input, in order to successfully generate your control system files.

Using Quick Input

Select **Quick Input** from the Edit menu (or the System Diagram context menu or Panel UI Diagram context menu) to access the Quick Input sub-menu.

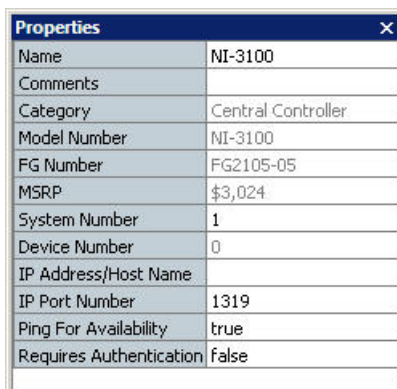
The Quick Input setting allows you to enter a particular device or UI element property, without having to select the property in the Properties Window.

Use the **Edit > Quick Input** submenu to specify which device property to assign Quick Input to. The options are:

- **Name** (default setting): With this option selected, you can select a device and type to change that device's name.
- **Current Property**: Highlight any device property (in the Properties window) and select Current Property to assign the selected property to Quick Input.
For example, select the Device Number property (in the Properties window), and select Current Property from the Quick Input sub-menu, then any time you select a device in the System Diagram, you can just type and press the Enter key to enter a device number for the selected device.
Note that VA will prompt you if the value entered is outside of the allowed range for the selected property.
- **Disabled**: This option disables the Quick Input feature.

Device Properties - Central Controllers

The following parameters are required for NetLinx Central Controllers, and are set via fields in the Properties window (FIG. 89):



Properties	
Name	NI-3100
Comments	
Category	Central Controller
Model Number	NI-3100
FG Number	FG2105-05
MSRP	\$3,024
System Number	1
Device Number	0
IP Address/Host Name	
IP Port Number	1319
Ping For Availability	true
Requires Authentication	false

FIG. 89 Device Properties - Central Controllers

The fields displayed depend on the Central Controller selected in the System Diagram, and include the following:

Device Properties - Central Controllers	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• Option	See page 77.
• FG Number	See page 77.
• MSRP	See page 77.
• System Number	See page 78.
• Device Number	See page 77.
• Card Frame Number	See page 76.
• IP Address/Host Name	See page 77.
• IP Port Number	See page 77.
• Ping For Availability	See page 77.
• Requires Authentication	See page 78.

Device Properties - Accessories & Expansion Devices

The device parameters for Accessories and Expansion devices are set via fields in the Properties window (FIG. 90):

Properties	
Name	AXB-VOL3
Comments	
Category	Expansion
Model Number	AXB-VOL3
Device Number	96
FG Number	FG5756
MSRP	\$700
Duet Module	C:\Documents and Se...

FIG. 90 Device Properties - Accessories & Expansion Devices

The fields displayed depend on the device selected in the System Diagram, and include the following:

Device Properties - Accessories & Expansion Devices	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• Device Number	See page 77.
• Color	See page 76.
• Frequency	See page 77.
• FG Number	See page 77.
• Duet Module	See page 77.
• IP Address/Host Name	See page 77.
• MSRP	See page 77.

Device Properties - Networking Devices

The device parameters for Networking devices are set via fields in the Properties window (FIG. 91):

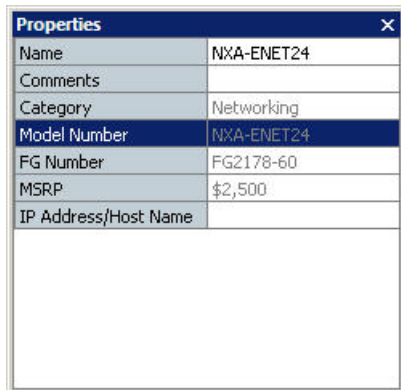


FIG. 91 Device Properties - Networking Devices

The fields displayed depend on the Networking device selected in the System Diagram, and include the following:

Device Properties - Networking Devices	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• FG Number	See page 77.
• MSRP	See page 77.
• IP Address/Host Name	See page 77.

Device Properties - Touch Panels

The device parameters for Touch Panel devices are set via fields in the Properties window (FIG. 92):

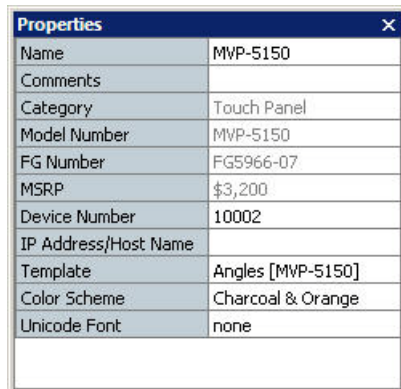


FIG. 92 Device Properties - Touch Panels

The fields displayed depend on the Touch Panel device selected in the System Diagram, and include the following:

Device Properties - Touch Panels	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.

Device Properties - Touch Panels (Cont.)	
• Color:	See page 76.
• Option	See page 77.
• FG Number	See page 77.
• MSRP	See page 77.
• Device Number	See page 77.
• IP Address/Host Name	See page 77.
• Template	See page 78.
• Color Scheme	See page 76.
• Unicode Font	See page 78.

Device Properties - Keypads & Remotes

The device parameters for Keypad & Remote Controller devices are set via fields in the Properties window (FIG. 93):

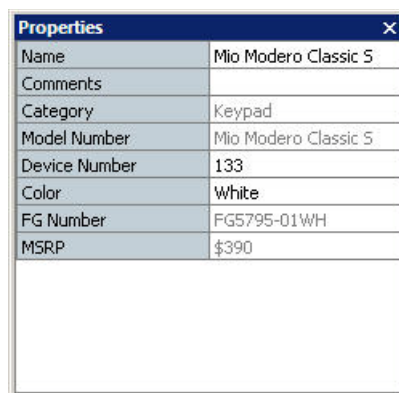


FIG. 93 Device Properties - Keypads & Remotes

The fields displayed depend on the Keypad or Remote selected in the System Diagram, and include the following:

Device Properties - Keypads & Remotes	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• Color:	See page 76.
• Frequency	R-2 remotes only See page 77.
• FG Number	See page 77.
• MSRP	See page 77.
• Device Number	See page 77.
• Option	R-3 and R-4 remotes only (see page 77).
• IP Address/Host Name	Mio Modero DMS/Pinnacle keypads and only (see page 77).
• Template	Mio Modero DMS/Pinnacle keypads only (see page 78).
• Color Scheme	Mio Modero DMS/Pinnacle keypads only (see page 76).
• Unicode Font	Mio Modero DMS/Pinnacle keypads only (see page 78).

Device Properties - Media Devices

The device parameters for Media devices are set via fields in the Properties window (FIG. 94):

Properties	
Name	UDM0404
Comments	
Category	Media
Model Number	UDM0404
FG Number	FG-UDM-0404
MSRP	\$4,900
Duet Module	C:\Documents and Se...
IP Address/Host Name	
Module Initialization Properties	
A_Config	VGA
B_Config	VGA
C_Config	VGA
D_Config	VGA
Password	admin
Port	2008
IP_Address	192.168.0.200
User_Name	endeleo
A_AudioConfig	ANALOG
B_AudioConfig	ANALOG
C_AudioConfig	ANALOG
D_AudioConfig	ANALOG

FIG. 94 Device Properties - Media Devices

The fields displayed depend on the Media device selected in the System Diagram, and include the following:

Device Properties - Media Devices	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• FG Number	See page 77.
• MSRP	See page 77.
• Duet Module	See page 77.
• IP Address/Host Name	See page 77.
Module Initialization Properties	
<i>These additional options are available for Tango Controllers:</i>	
• Baud_Rate	Click to manually enter a baud rate for the controllers serial port (default = 9600).
• DEVICEMODEL	Click to manually enter a Device Model type for the selected device (default = DELTA).
• Model	Click to manually enter a Model type for the selected device (default = DELTA).
<i>These additional options are available for Autopatch Switchers:</i>	
• config	Click to manually enter a configuration string for the selected switcher (default = AfV:0:36:36:ALL? Video:1:36:36:VIDEO? Audio:2:36:36:AUDIO?=3) -
• features	Click to manually enter XXXXX.
<i>These additional options are available for Endeleo Distribution Matrix devices:</i>	
• A/B/C/D_Config	Click to manually enter a video output type for the selected output (default = VGA).
• Password	Click to manually enter a password for the selected device (default = admin).
• Port	Click to manually enter a port for the selected device (default = 2008).

Device Properties - Media Devices (Cont.)	
• IP Address	Click to manually enter an IP Address for the selected device (default = 192.168.0.200).
• User_Name	Click to manually enter a User Name for the selected device (default = endeleo).
• A/B/C/D_AudioConfig	Click to manually enter an audio output type for the selected output (default = ANALOG).
These additional options are available for Solecis AVS-SL-0401-838 & AVS-SL-0601-848 Switchers:	
• DEVICE_ID	Click to manually enter a Device ID for the selected device (default = 0).

Device Properties - Environment Devices

The device parameters for Environment devices are set via fields in the Properties window (FIG. 95):

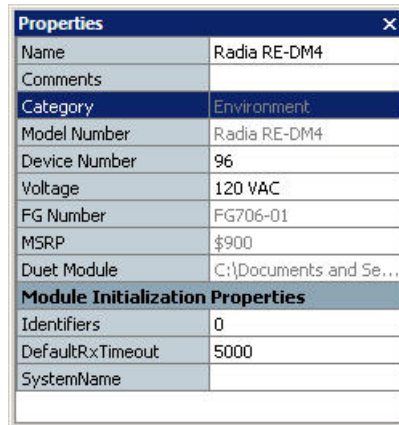


FIG. 95 Device Properties - Environment Devices

The fields displayed depend on the Media device selected in the System Diagram, and include the following:

Device Properties - Environment Devices	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• FG Number	See page 77.
• MSRP	See page 77.
• Duet Module	See page 77.
Module Initialization Properties	
<i>These additional options are available for Radia RE-DM4 & DM6 Controllers:</i>	
• Identifiers	Click to manually enter an identifier for the selected device (default = 0).
• DefaultRxTimeout	Click to manually enter default timeout for the selected device (default = 5000)
• SystemName	Click to manually enter a SystemName for the selected device (default = empty).

Device Properties - Communications Devices

The device parameters for Communications devices are set via fields in the Properties window (FIG. 96):

Properties	
Name	MET-ECOM
Comments	
Category	Communications
Model Number	MET-ECOM
Device Number	10001
Color	White
FG Number	FG2180-01-WH
MSRP	\$1,500
IP Address/Host Name	

FIG. 96 Device Properties - Communications Devices

The fields displayed depend on the Communications device selected in the System Diagram, and include the following:

Device Properties - Communications Devices	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.
• Model Number	See page 77.
• Device Number	See page 77.
• Color	MET-ECOM & MET-ECOM-D only - default = White See page 76.
• FG Number	See page 77.
• MSRP	See page 77.
• IP Address/Host Name	Mio Modero DMS/Pinnacle keypads only See page 77.

Device Properties - Third-Party Devices

Third-party (non-AMX controlled) devices, are selected via the Devices tab of the Toolbox. There are two types of Third-Party devices:

- **Module-Supported devices** - Devices that are listed by name in the Devices tab are module-supported. These devices are supported by Duet Modules that are packaged with VA that provide device and control information.



NOTE

Communication properties for a module-supported device should only be changed if it is known that the module supports that property.

- **Device Discovery (DD) devices** - Every device category in the Devices tab of the Toolbox contains a listing for "Device Discovery". Device Discovery (DD) devices are automatically detected by the Central Controller when they are connected and powered-up.

The following properties are displayed for DD devices:

Device Properties - Device Discovery (DD) Devices	
• Name	See page 77.
• Comments	See page 76.
• Category	See page 76.

Device Properties - Device Discovery (DD) Devices (Cont.)	
• Manufacturer	See page 77.
• Model Number	See page 77.
• Connection Type	See page 77.
• Duet Module	See page 77.
• IP Address/Host Name	See page 77.
• Preset/Media Library File Path	See page 78.
• Module Initialization Properties	See page 77.

Device Number Defaults

The default device numbers for devices that have this as a default are listed below:


Device Number Defaults	
Central Controller	default device number = 0
Accessories & Expansion Devices	
• NXS-NMS	The first NXS-NMS added to the system is assigned default device number 5002; each one added thereafter increments it's default device number by +1 (5003, 5004, 5005, etc).
• AXR-RF, MIO-IRRX, AXD-IR+, AXR-IRSM+	The first IR/RF Receiver added to the system is assigned default device number 128; each one added thereafter increments it's default device number by +1 (129, 130, 131, etc).
• AXB-VOL3	The first AXB-VOL3 added to the system is assigned default device number 96; each one added thereafter increments it's default device number by +1 (97, 98, 99, etc).
Touch Panels	The first touch panel added to the system is assigned device number 10001; each one added thereafter increments it's default device number by +1 (10002, 10003, 10004, etc).
Keypads & Remotes	
• Metreau & Mio Modero	The first Metreau or Mio Modero keypad added to the system is assigned device number 128; each one added thereafter increments it's default device number by +1 (129, 130, 131, etc). Note that the MET-6N uses two device numbers: one for the keypad portion of the device, and one for the AMX IR receiver portion (i.e. 129,130).
• DMS Keypads	The first DMS keypad added to the system is assigned device number 11001; each one added thereafter increments it's default device number by +1 (11002, 11003, 11004, etc).
• Mio Modero Remotes (R-3, R-4 only)	The first R-3 or R-4 remote added to the system is assigned device number 10001; each one added thereafter increments it's default device number by +1 (10002, 10003, 10004, etc).
Media Devices	MAX-CSE - The first MAX-CSE or MAX-CSD10 added to the system is assigned device number 10001; each one added thereafter increments it's default device number by +1 (10002, 10003, 10004, etc).
Environment Devices	Radia Controllers - The first Radia Controller added to the system is assigned device number 96; each one added thereafter increments it's default device number by +1 (97, 98, 99, etc).
Communications Devices	The first MET-ECOM or MET-ECOM-D added to the system is assigned device number 10001; each one added thereafter increments it's default device number by +1 (10002, 10003, 10004, etc).

Device Number Ranges - By Device Type

VA enforces the following device number ranges (entered in the Device Number field in the Device Properties window):

Device Number Ranges	
Device Type Allowed	Device # Range
AxLink General	1-255
AxLink UI	128-255
NetLinx Card Frames	301-3060 - see <i>Setting The Card Frame Number</i> on page 64
NetLinx ICSNet devices	5001-5999
Landmark ICSNet devices	6001-6999
P3 Devices	7001-7999
PCLink Devices	8001-8999
ICSNet Panels DMS, IMS, future panels	10001-31999
Dynamic devices (NetLinx Devices with no device number assigned)	32001-32385
Virtual devices	32768-36863 - start at 33001
Dynamic Virtual Devices (used by some older AMX-written modules)	36865-37863
Module Virtual devices (non-echoing devices)	37865-40999
Duet Virtual Devices	41000-42000

Device Properties

Device Properties	
Card Frame Number	The device number of the Card Frame. Available only for NXF Card Frames and NI-4000/4100 Controllers only (default = 25). Note: Click the browse button to open the Card Frame Number dialog to change this assignment (see <i>Setting The Card Frame Number</i> on page 64).
Category	The VA device category of this Controller (read-only). Note that the Category field is displayed as both a Device property and a UI Element property.
Color	Click to access the drop-down menu, and select from a listing of color options available for this device. Note that this selection is automatically reflected in the FG Number field. Note that the Color field is displayed as both a Device property and a UI Element property.
Color Scheme	Once a Template has been selected, this field is enabled. Click to access the drop-down menu and select a color theme to apply to the selected template. Note that the Color Scheme field is displayed as both a Device property and a UI Element property.
Comments	Click to add developer's comments regarding this device. Once comments have been added to a device, a yellow comment icon is added to the Device Element in the System Diagram (or the Start Element in a UI Diagram), and the comments are displayed when the cursor hovers over the element:  Note that the Comments property is displayed as both a Device property and a UI Element property.

Device Properties (Cont.)	
Connection Type	<p>Click to access the drop-down menu, and select from a listing of connection types supported by the selected device.</p> <p>The Connection Type selection determines which rows are displayed immediately beneath this one (based on that type's required parameters).</p> <ul style="list-style-type: none"> • By default, Serial devices are always added to the system with RS-232 set as the Connection Type. • By default, DD devices connect to the Central Controller via Ethernet 10/100T connection.
Device Number	<p>Central Controllers: The current Device Number setting for this Controller (default = 0).</p> <p>Other devices: The current Device Number setting for this device (see <i>Device Number Defaults</i> on page 75).</p> <p>Note that the Device Number field is displayed as both a Device property and a UI Element property.</p>
Duet Module	The file path and name of the Duet Module (*.JAR file) associated with this device (read-only).
FG Number	The AMX "Finished Goods" number associated with this device (read-only). Note that the FG Number field is displayed as both a Device property and a UI Element property.
Frequency	<p>Click to access the drop-down menu, and select from a listing of available RF frequencies.</p> <p>Note that this selection is automatically reflected in the FG Number field.</p>
IP Address/Host Name	<p>Enter an IP address (or Host Name if applicable) for this device.</p> <p>Note that the IP Address/Host Name field is displayed as both a Device property and a UI Element property.</p>
IP Port Number	<p>The IP Port Number to be used by this Controller (default = 1319).</p> <p>Note: <i>In most situations, the Port Number should not be changed.</i></p>
Manufacturer	This field indicates the name of the selected device's manufacturer (read-only).
Model Number	<p>The product model number of this device (read-only).</p> <p>Note that the Model Number field is displayed as both a Device property and a UI Element property.</p>
Module Initialization Properties	<p>Some third-party control modules have specific initialization properties (required or optional) which can be entered here. Examples include user name and password for a device, optional baud rates, etc.</p> <p>These properties are listed by name, with an entry space for each property, and will be transmitted to the module during system startup.</p>
MSRP	<p>The AMX Manufacturer's Suggested Retail Price for this device (read-only).</p> <p>Note that the MSRP field is displayed as both a Device property and a UI Element property.</p>
Name	The (default) system name for this device (click to edit).
Option	<ul style="list-style-type: none"> • Central Controllers: Specify an amplifier option for the DVX-2100HD Central Controller (DVX-2100HD only). • Remotes: Specify a kit option (R-3 and R-4 remotes only).
Ping For Availability	<p>Click to access the drop-down menu.</p> <p>Select <i>True</i> - ping the Controller before attempting a TCP/IP connection, or <i>False</i> - do not ping for availability (default = True).</p> <p>Pinging a device is relatively fast and will determine if the device is off-line, or if the TCP/IP address that was entered was incorrect. If you decide not to ping for availability and the controller is off-line, or you have an incorrect TCP/IP address, the program will try for 30-45 seconds to establish a connection.</p> <p>Note: <i>If you are trying to connect to a master controller that is behind a firewall, you may have to disable this option. Most firewalls will not allow ping requests to pass through for security reasons.</i></p>

Device Properties (Cont.)	
Preset/Media Library File Path	<p>Click the Browse button (...) to specify a file path for the Media Library (.MXD) file.</p> <p>The Media Library represents a listing of all media (including CDs and DVDs) identified in the Preset Editor program - accessible via the File menu. See Preset and Media Content Database Files.</p> <p>This field is only displayed for devices that can playback audio/video media.</p>
Requires Authentication	<p>Click to access the drop-down menu.</p> <p>Select True - this Controller has been configured to require authentication, or False - authentication is not required (default = False).</p> <p>If the Controller requires authentication, the correct User Name and Password combination will be required in order to establish a connection with the Controller.</p> <p>Refer to the Controller's WebConsole & Programming Guide for details on enabling this option on the Controller.</p> <p>Note: <i>User Names and Passwords are case-sensitive.</i></p>
System Number	The current System Number setting for this Central Controller (default = 1).
Template	<p>Click inside this field to access the drop-down menu and select a template to apply to this panel.</p> <p>Note: <i>VA only presents templates that include a resolution supported by the selected panel.</i></p> <p>Click Browse to access the Select User Interface Template dialog.</p> <p>Note that the Template field is displayed as both a Device property and a UI Element property.</p>
Unicode Font	<p>This field is enabled only after a Template has been selected. Click to access the drop-down menu and select a font to use with the selected template.</p> <p>Note that you can scroll through the font list by double-clicking in the text field.</p> <p>Note that the Unicode Font field is displayed as both a Device property and a UI Element property.</p>
Voltage	<p>Click to select a voltage setting (120VAC / 240VAC) for the selected device (default = 120 VAC).</p> <p>Device Properties are set via fields in the Properties window.</p>

Communication Parameters

Every time you add a device of any kind to the System Diagram, you should review the Device Properties for the device. Device properties include communication parameters, and the communication parameters displayed depend on the selected device's connection/control type. These include:

- Ethernet
- IR
- Modem (for Central Controllers)
- Serial (RS-232/422/485) Connections (for Central Controllers)
- TCP/IP Connections



There are several Ethernet connection types supported by VA (selectable only if Ethernet is selected as the Connection Type).

When you select a Device Element in the System Diagram, the device properties for the selected device are displayed in the Properties window.

These device properties include communication parameters, and the communication parameters displayed depend on the selected device's control type. Each device's control type is also indicated in the Device Element in the System Diagram (FIG. 97):

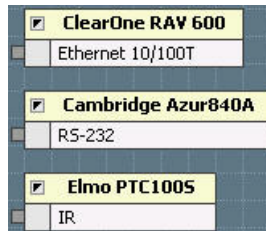


FIG. 97 Device Elements - Control Types

Communication Parameters - Ethernet Connections

The following parameters are required for Ethernet connections, and are set via fields in the Device Properties window. These fields are only displayed if an Ethernet connection type is selected for the device.

Communication Parameters - Ethernet Connections	
<p>• IP Address/Host Name:</p>	<p>Enter an IP Address or Host Name for this device in this field. This value is used for establishing connection during transfer:</p> <ul style="list-style-type: none"> • For third-party devices controlled by Duet modules, this value is used to initialize module communications with the device. • For all AMX Ethernet devices (e.g., touch panels), the field is strictly informational. • This value will be output into the System Report in the Device Addressing section under the IP Address/Host Name column. <p>IP Address/Host Name must either be a valid IP Address in the format XXX.XXX.XXX.XXX, where XXX is a number between 0 and 255, except:</p> <ul style="list-style-type: none"> • 0.X.X.X - zero address • 127.X.X.X - loopback address • 255.255.255.255 - broadcast address • or a valid IP hostname starting with a letter and containing only letters, numbers, dashes, or dots.

Ethernet devices that use a Duet Module have the display-only item Duet Module listed as a device property. This is the file path and name of the Duet Module associated with the device.



NOTE

VisualArchitect does not provide support for login information on IP devices that require a login. If the device uses a module that specifically handles login information, the Module Initialization Properties (User Name and Password) are displayed. Use these additional fields to specify required login information.

However, if you have an IP device that requires a login, the device must be added to the Custom.AXI file after system file generation, but prior to file transfer. This is a process that requires NetLinx programming experience and is not recommended for the novice VA user.

Ethernet Connection Types

When you add a Device Discovery (DD) device to the System Diagram, the Connection Type is always set to Ethernet 10/100T. There are several types of Ethernet 10/100T connections supported by VA, as indicated in the drop-down menu that is accessible by clicking on the Connection Type (Ethernet 10/100T) field in the Device Properties:



NOTE

DD devices can also support Serial (RS-232/422/485) connections, as indicated in the drop-down menu.

- **Ethernet 10/100T** - This is the default Ethernet connection type used by DD devices. This connection type supports both "Standard" Ethernet" and "Fast" Ethernet.
 - Uses a bus or star topology that supports data transfer rates of 100 Mbps.
 - Uses a bus or star topology that supports data transfer rates of 10 Mbps.

- **Ethernet 1000T** - This represents a "Gigabit" Ethernet connection, which supports data rates of 1 gigabit (1,000 megabits) per second.
- **Ethernet 802.11b** - (also referred to as "802.11 High Rate" or "Wi-Fi") -- an extension to 802.11 that applies to wireless LANs and provides 11 Mbps transmission (with a fallback to 5.5, 2 and 1 Mbps) in the 2.4 GHz band. 802.11b uses only DSSS, and allows wireless functionality comparable to Ethernet.
DSSS = Direct Sequence Spread Spectrum. DSSS is used in wireless local-area network transmissions where a data signal at the sending station is combined with a higher data rate bit sequence, or chipping code, that divides the user data according to a spreading ratio. The chipping code is a redundant bit pattern for each bit that is transmitted, which increases the signal's resistance to interference. If one or more bits in the pattern are damaged during transmission, the original data can be recovered due to the redundancy of the transmission.
 802.11 refers to a family of specifications developed by the IEEE for wireless LAN technology.
- **Ethernet 802.11g** - Also applies to wireless LANs, and provides 20+ Mbps in the 2.4 GHz band.
- **RS-232/422/485** - Standard Serial (RS-232, RS-422 or RS-485) connection. Serial connections have their own communication parameters, unrelated to Ethernet communication parameters.



NOTE

All four Ethernet connection types share the same communication parameters.

Communication Parameters - IR Connections

The following parameters are required for IR-controlled devices, and are set via fields in the Device Properties window. These fields are only displayed if IR is selected as the Connection Type for the device.

Communication Parameters - IR Connections	
• Remote Control Model:	This field displays the model number of the IR hand controller associated with this device. If this device supports more than one remote control, you can select from the drop-down menu of supported models.
• IR File:	This field displays the name of the IR File associated with the selected remote control.

Communication Parameters - Modem Connections

The following parameters are required for Modem connections for Central Controllers (which can be accessed from your PC via a modem connection), and are set via fields in the Device Properties window. Click inside any of these fields to access a drop-down menu of supported options. These fields are only displayed if Modem is selected as the Connection Type for the device.

Communication Parameters - Modem Connections	
• COM Port:	Select an available COM (communications) port to use for communication with this device. The COM ports available to choose from will depend on the number of COM ports present on the selected device (default = COM1).
• Baud Rate:	Select a baud rate for communications with this device. For most devices the choices range from 75 to 128,000 BPS (default = 115200).
• Data Bits:	Select the number of data bits used for encoding characters. For most devices, the options are 5, 6, 7 or 8 (default = 8).
• Parity:	Select a method of parity checking. For most devices, the options are Odd, Even, Space or Mark (default = None).
• Stop Bits:	Select 1 or 2 (default = 1).
• Flow Control:	Select a method of flow control. For most devices, the options are Xon/Xoff, RTS/CTS, DTR/DSR (default = None).
• Phone Number:	Enter the phone number of the modem connected to the target NetLinx Central Controller.



NOTE

In most applications, the default communications settings should suffice and should only be changed by advanced users.

Communication Parameters - Serial (RS-232/422/485) Connections

The following parameters are required for Serial (RS-232/422/485) connections, for Central Controllers, (which can be accessed from your PC via a serial port), and are set via fields in the Device Properties window. Click inside any of these fields to access a drop-down menu of supported options. These fields are only displayed if Serial (RS-232, RS-422 or RS-485) is selected as the Connection Type for the device.

Communication Parameters - Modem Connections	
• COM Port:	Select an available COM (communications) port to use for communication with this device. The COM ports available to choose from will depend on the number of COM ports present on the selected device (default = COM1).
• Baud Rate:	Select a baud rate for communications with this device. For most devices the choices range from 75 to 128,000 BPS (default = 115200).
• Data Bits:	Select the number of data bits used for encoding characters. For most devices, the options are 5, 6, 7 or 8 (default = 8).
• Parity:	Select a method of parity checking. For most devices, the options are Odd, Even, Space or Mark (default = None).
• Stop Bits:	Select 1 or 2 (default = 1).
• Flow Control:	Select a method of flow control. For most devices, the options are Xon/Xoff, RTS/CTS, DTR/DSR (default = None).



NOTE

By default, Serial devices are always added to the system with RS-232 set as the Connection Type. Change the Connection Type to match the device's requirements via the Connection Type field in the Device Properties window.

Communication Parameters - TCP/IP Connections

The following parameters are required for TCP/IP connections, and are set via fields in the Device Properties window. These fields are only displayed if TCP/IP is selected as the Connection Type for the device.

Communication Parameters - TCP/IP Connections	
• Host Name:	Enter a Host Name for this Central Controller in this field (example = "NetLinx").
• Port Number:	By default, the Port Number is 1319. In most situations, the Port Number should not be changed.
• Ping For Availability:	<p>Click inside this field to access the drop-down menu and specify whether to ping the Controller before attempting a TCP/IP connection (select True or False). By default, this option is enabled (True).</p> <p>Pinging a device is relatively fast and will determine if the device is off-line, or if the IP address that was entered was incorrect.</p> <p>If you decide NOT to ping for availability and the controller is off-line, or you have an incorrect IP address, the program will try for 30-45 seconds to establish a connection.</p> <p>If you are trying to connect to a Central Controller that is behind a firewall, you may have to disable this option (set to False). Most firewalls will not allow ping requests to pass through for security reasons.</p>



NOTE

In most applications, the default communications settings should suffice and should only be changed by advanced users.

Device Addressing

Device:Port:System (D:P:S)

A device is any hardware component that can be connected to the NetLinx bus. Each device must be assigned a unique number to locate that device on the bus.

The NetLinx programming language allows numbers in the range 0-32,767.

Device 0 refers to the local Central Controller; numbers greater than 32,767 are reserved.

NetLinx requires a Device:Port:System (D:P:S) specification. This D:P:S triplet can be expressed as a series of constants, variables separated by colons, or a DEV structure.

For example:

```
STRUCTURE DEV
{
  INTEGER Number // Device number
  INTEGER Port // Port on device
  INTEGER System // System the device belongs to
}
```

The D:P:S notation is used to explicitly represent a device number, port and system. For example, 128:1:0 represents the first port on device 128 on this system. If the system and Port specifications are omitted, (e.g. 128), system 0 (indicating this system) and port 1 (the first port) is assumed. Here's the syntax:

```
NUMBER:PORT:SYSTEM
```

where:

- NUMBER: 16-bit integer represents the device number
- PORT: 16-bit integer represents the port number (in the range 1 through the number of ports on the Controller or device)
- SYSTEM: 16-bit integer represents the system number (0 = this system)

Modero® Touch Panels Device Addressing

1. Press the gray Front Setup Access button for 3 seconds to open the Setup page
2. Press the **Protected Setup** button (located on the upper-left of the panel page) to open the Protected Setup page and display an on-screen keypad.
3. Enter **1988** into the Keypad's password field and press Done when finished.
4. Press the red **Device Number** field to open the Device Number keypad.
5. Enter the Device Number value for the panel into the Device Number Keypad.
6. Press **Done** to close the keypad, assign the number, and return to the Protected Setup page.
7. Press the on-screen **Reboot** button to restart the panel and incorporate any changes.

Mio Modero Keypad Device Addressing

1. If connected, disconnect the power supply.
2. Locate the 8-position Device DIP switch on the rear panel.
3. Set the DIP switch according to the switch values shown below:

Switch	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128

- The device number is set by the total value of DIP switch positions that are ON.
- If you later change the device number, remove and reconnect the AxLink power connector to enter the new device number into memory.

Central Controller Addressing Via Telnet

Establishing a Terminal Connection:

1. Launch the Hyper Terminal application from its' default location (**Start > Programs > Accessories > Communications**).
2. Apply power to the Central Controller and allow it to boot up.
3. Connect the PC COM (RS232) port from your computer to the RS232 Program port on the Controller. Note the baud rate settings for the Controller.
4. Enter any text into the Name field of the Hyper Terminal Connection Description dialog window and click **OK** when done.
5. From the Connect Using field, click the down-arrow and select the PC COM port being used for communication by the target Controller and click **OK** when done.
6. From the *Bits per second* field, click the down-arrow and select the baud rate being used by the target Controller.
 - Configure the remaining communication parameters as follows: Data Bits: 8, Parity: None, Stop bits: 1, and Flow control: None (default is *Hardware*).
 - Click **OK** to complete the communication parameters and open a new Terminal window.



NOTE

Type echo on to view the characters while entering commands. If that does not work, press <ENTER> key on your keyboard.

Getting and Setting the IP Address:

Within the Terminal session, type **get ip** and press <ENTER> to view the current IP communication parameters. Here is a listing of some sample information pulled from the Central Controller:

```
>get ip
IP Settings for 0:1:1
HostName NetLinx
Type DHCP
IP Address 192.192.199.99
Subnet Mask 255.255.255.0
Gateway IP 192.192.199.2
MAC Address 00:61:9h:91: aa:6e
```

1. Type **set ip** and press <ENTER> to either retain a DHCP Address or assign a pre-reserved IP Address. Throughout the following setting options you can enter new values or press <ENTER> to keep current settings enabled.
2. When prompted to enter a Host Name you can either press <ENTER> to accept the current name (NetLinx) or enter a new name and press <ENTER>.

Enter Host Name: **NetLinx**
3. When prompted to enter an **IP Type**, the entry defaults to DHCP but you can assign either a DHCP or Static IP Address to the target Controller.

Assigning a DHCP Address:

1. Enter IP type. Type D for DHCP or S for Static IP and then Enter: DHCP

If you press <ENTER> the setting remains defaulted to pull a DHCP Address from the DHCP Server.
2. Enter IP type. Type D for DHCP or S for Static IP and then Enter: DHCP
3. When prompted to enter a Gateway IP, press <ENTER> to accept the default setting and display the entered information:


```
Enter Gateway IP: 192.168.5.2
You have entered: Host Name NetLinx
Type DHCP
Gateway IP 192.168.99.3
```
4. When prompted to confirm that the previous information was correctly entered, you can either accept the default y (yes) and press <ENTER> or change the entry to n (no) to repeat the process:

Is this correct? Type Y or N and Enter -> y
Settings written. Device must be rebooted to enable new settings.

5. Incorporate the new settings by cycling power to the unit.

Assigning a Static IP Address:

1. Enter IP type. Type D for DHCP or S for Static IP and then Enter: Static

If you type in S or Static and press <ENTER>, you are then prompted to enter the pre-reserved IP Address, Gateway, and Subnet Mask information. This information can be obtained from your System Administrator.

```
Enter IP Address: 192.199.99.2
Enter Subnet Mask: 255.255.255.0
Enter Gateway IP: 192.199.99.3
```

2. After you have completed entering the Gateway IP Address, the previously entered information is then displayed.

```
You have entered: Host Name NetLinx
Type Static IP
IP Address 192.199.99.2
Subnet Mask 255.255.255.0
Gateway IP 192.199.99.3
```

3. When prompted to confirm that the previous information was correctly entered, you can either accept the default y (yes) and press <ENTER> or change the entry to n (no) to repeat the process:

Is this correct? Type Y or N and Enter -> y
Settings written. Device must be rebooted to enable new settings.

NetLinx Device Addressing via the Central Controller UI

Step 1: Access the Central Controller's UI and Configuring the NetLinx Device

Once the Central Controller's IP Address has been set through either a Terminal or Telnet session:

1. Launch your web browser.
2. Enter the IP Address of the target Controller (ex: http://198.198.99.99) into the web browser's Address field.
3. Press the Enter key on your keyboard to begin the communication process between the target Controller and your computer.
 - Initially, the **Master Security** option is disabled (in the *System Security* page) and no user name and password is required for access or configuration.
 - Both HTTP and HTTPS Ports are enabled by default (via the **Manage System > Server** page).
 - The first active page displayed within your open browser page is Manage WebControl Connections. To access this page click on the **Manage System** link (from within the System Settings section of the Navigation frame).

Step 2: Configure the Network Settings via the Device Menu

1. Click the System Settings > Manage System link from within the System Settings section of the Navigation frame.
2. Click on a violet Device icon from within the Online Tree to open the Device menu buttons within the right frame.
3. Click the Network Settings button to open the Network Settings dialog. This dialog allows a user to setup the network settings for the specified device. The fields are populated with the current settings (when initially loaded).

	Feature	Description
IP Address:	Host Name	Use this field to view/edit the target Central Controller's current Host Name.
	DHCP/Specify IP Address	Use these radio buttons to specify an address for the target Controller: <ul style="list-style-type: none"> • DHCP - obtained from a DHCP Server. • Specify an IP Address - typically obtained from a System Administrator.
	IP Address	Use this field to view/edit the target Controller's current IP Address.
	Subnet Mask	Use this field to view/edit the target Controller's current Subnet Mask assignment.
	Gateway	Use this field to view/edit the target Controller's current Gateway assignment.
DNS Address:	Domain Suffix	Use this field to view/edit the target Controller's current Domain Suffix.
	DNS IP #1, #2, #3	Use these fields to view/edit the target Controller's current DNS IP addresses.

4. Enter a new or updated name within the **Host Name** field. This entry can be 1 - 50 alphanumeric characters in length.
5. Select either the **DHCP** or **Specify an IP Address** check box to chose the source of the IP Address information being used within the remaining fields.
6. Enter or change any IP Address or DNS Address information within the remaining fields.
7. Click **Update** to save any changes. If your changes are successfully updated to the Central Controller, the following message appears. "Network Settings updated. Device must be rebooted for the setting to take effect".
8. Return to the System menu by clicking on the purple System icon (within the Online Tree), click the **Reboot** button, and then allow the Controller a short time to reboot itself.

- Click on the **Refresh** macro from the browser's menu bar. If no security is currently enabled on the target Controller, you are directed back to the Manage WebControl Connections page. If security is enabled, you are directed to the initial Username/Password page to enter your access information.

Step 3: Change the System Number via the System Menu

- Click the **Manage System** link (from within the System Settings section of the Navigation frame).
- Click on the purple System icon from within the Online Tree to open the System menu buttons within the right frame.
- Click the **System Number** button to open the Change System Number dialog. This dialog shows the current system number (read-only) on the target Central Controller.
- Enter a new numeric value into the **New Device Number** field.
- Click the **Update** button to save this new value to the device. The message; "Device number changed to XXX. Device must be rebooted for the change to take effect.", reminds the user that the Controller must first be rebooted before the new settings take effect.

Step 4: Reboot the Central Controller via the System Menu

- Click the **Manage System** link (from within the System Settings section of the Navigation frame).
- Click on the purple System icon (within the Online Tree) to open the System menu buttons within the right frame.
- Click the **Reboot** button to remotely reboot the target Central Controller. No dialog appears while using this button. The Online Tree then reads "Rebooting...". After a few seconds, the Online Tree refreshes with the current system information (showing the newly updated system number).

If the Online Tree contents do not refresh within a few minutes, press the browser's **Refresh** button and reconnect to the Controller.

Device Accessories

VisualArchitect supports various Accessories for each supported AMX device.

For example, the accessories available for the NI-700 Central Controller include: AC-SMB (Surface-Mount Bracket), AC-RK (Rack Kit), PSN2.8, PSN4.4 and PSN6.5 (Power Supplies), CC-COM (Serial Programming Cable), etc.

To determine which accessories are compatible with any AMX device, right-click on a device in the System Diagram, and select Accessories from the System Diagram context menu (alternatively, with a device selected in the System Diagram, select Device > Accessories).

This action invokes the Accessories dialog, which provides a full listing of accessories supported by VA and compatible with the selected device.

- Most accessories will not show up on the System Diagram, but those with control system connections will be displayed. For instance, the NXA-AVB/Ethernet and NXA-AVB/RGB Touch Panel breakout boxes would be displayed, since they utilize device connections to the Touch Panel, but a conduit box would not be displayed.
- All accessories included in the project are represented in the System Report (in the Accessory List section).

Adding Accessories to an AMX Device

Right-click on any AMX device in the System Diagram, and select Device > Accessories to open the Accessories dialog. The Accessories dialog lists all accessories associated with the selected device. All Accessories included in the project are represented in the System Report (in the Accessory List section).



NOTE

If the selected device does not support any accessories, this option is disabled.

- The **Included** column indicates whether or not this accessory is included with the selected device. If it is, this column indicates how many are included; a dash indicates none.
- The **Additional** column indicates the quantity of an accessory that the user has chosen to purchase above and beyond what is included with the device.

1. In the Accessories dialog, select the Accessory that you want to add and click the **Change Quantity** button. This opens the Quantity dialog.
 - a. The *Included Quantity* field indicates how many of the selected Accessory are already included with the device (this field reflects the Included column in the Accessories dialog).
 - By default, all included Accessories are assumed to be used.
 - Note that you can reduce the number of Included Accessories, but you cannot exceed the number provided by VA. To add more than is Included with the device, adjust the *Additional Quantity* number.
 - b. The *Additional Quantity* field indicates how many additional Accessories of this type to include (reflecting the Additional column in the Accessories dialog).
 - By default, Additional Quantity is set to zero.
 - The number entered into Additional Quantity field is added to the number already in the *Included Quantity* field. The total number of this Accessory is represented in the System Report for this device (in the Accessory List section).
2. Click **OK** to close the Quantity dialog.

Changing the included quantity for Accessories that are represented in the System Diagram causes them to be added or removed from the System Diagram as needed.

Alternatively, you may delete any visible accessories directly from the System Diagram in the same manner as any other device. Doing so will remove the device from any *Additional Quantity* first, and then from the *Included Quantity*.



NOTE

Adding a visible accessory back to the System Diagram requires changing the quantity via the Accessories dialog.

Prerequisite Devices

Many AMX Devices have certain prerequisite devices in order for them to be functional parts of the system. For example, in order to use a Mio R-4 remote controller, you must also have a ZigBee connection (NXR-ZGW or NXR-ZRP). Another example would be that in order to use a MVP-8400 wireless touch panel, you must also include a Wireless Internet Connection.

See the *Prerequisite Devices* section on page 100 for details.

Multi-Port Devices

Multi-port device addressing is supported via the Port Activation and Naming dialog.



NOTE

This option is only available for devices that support two or more ports for at least one component.

Port Activation

Right-click on a multi-port device in the System Diagram, and select Port Activation and Naming from the System Diagram context menu to invoke the *Port Activation and Naming* dialog. This dialog is used to manage ports on the selected device.



NOTE

Multi-port devices include the AXB-VOL3, NXC-VOL4, MAX Media Servers, DAS-T0804/8, and AutoPatch Switchers.

1. Activate/deactivate individual ports by checking/unchecking the check box in the **Active** column.
 - Use SHIFT+click to select a range of ports to activate/deactivate.
 - Use CTRL + click to select two or more individual ports to activate/deactivate.
2. Select the **Activate Selected** or **Deactivate Selected** button.
Activate/deactivate all ports (except port 1) of all components by selecting the Activate All or Activate None buttons.
3. Click **OK** to save all changes, or Cancel to cancel all changes.

Port Naming

Right-click on a multi-port device in the System Diagram, and select **Port Activation and Naming** from the System Diagram context menu to invoke the Port Activation and Naming dialog. This dialog is used to manage ports on the selected device.

The main window lists the ports on the selected device, separated by Component

Click the + icon to expand each Component to see all ports.

The **Port Name** column indicates the Port Name for each port. Click in the Port Name cell for any Port to edit directly in the text field (FIG. 98):

Active	Port Number	Port Name
[-] IVolumeComponent2		
<input checked="" type="checkbox"/>	2	Port 2
<input checked="" type="checkbox"/>	3	Port 3
<input checked="" type="checkbox"/>	4	Port 4
Always Active	1	Port 1

FIG. 98 Port Naming

The Port Name specified here is represented in CodeBuilder, in the **Port Number** drop-down (in the Event Window for multi-port devices. For example, if on the NXC-VOL4, "Port 4" is renamed to "Port Four", CodeBuilder represents the modified name as shown below (FIG. 99):

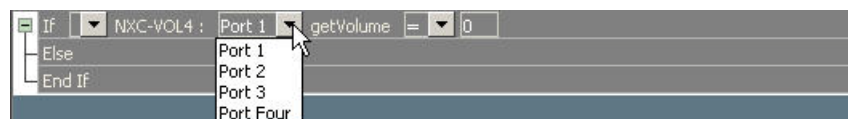


FIG. 99 Port Naming - Port Number

Component Port Usage

Right-click on a multi-port device in the System Diagram, and select **Port Activation and Naming** from the System Diagram context menu to invoke the Port Activation and Naming dialog. This dialog is used to activate ports on the selected multi-port device.

Component port usage appears in the CodeBuilder at the functions/status level for particular component functionality.

Using the AMX AutoPatch Precis switcher as an example, the first four ports on the Gain component have been activated and named, as shown below (FIG. 100):

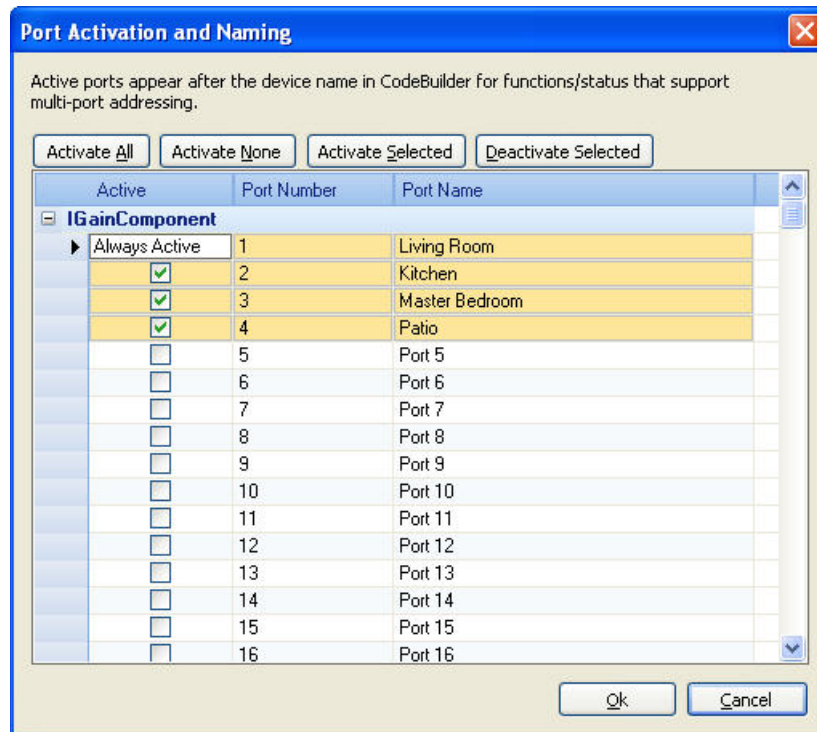


FIG. 100 Port Activation and Naming dialog

As a result, any function/status from the Gain component that supports multi-port addressing will appear in CodeBuilder with a drop-down list box for the port option.

- The port option appears after the device name and before the function/status name.
- By default the first port is always defined.

For example, with the definition above we can open CodeBuilder on the switcher and see that the first button event, Gain Down, has default code.

The default code, **AMX_AutoPatch Precis : Living Room setGainRamp DOWN** has "Living Room" automatically set because this function supports multiple port addressing and "Living Room" is the first port (FIG. 101).

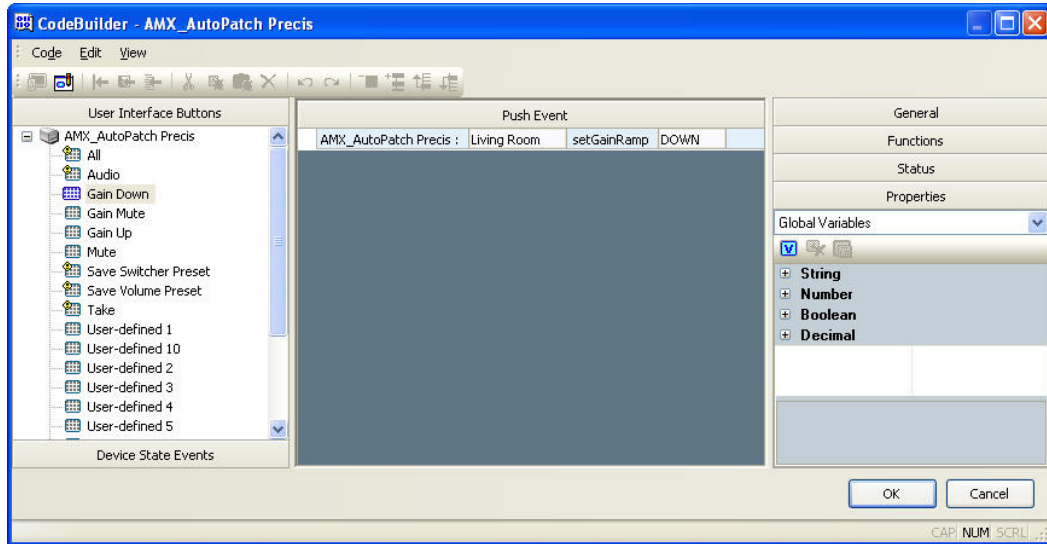


FIG. 101 CodeBuilder dialog

We can change this option to any of the other ports: Kitchen, Master Bedroom, and Patio.

If we add the function "setVolume" we would see that it also supports multiple ports with the default port names "Port 1" to "Port 8". If all ports for the volume component are disabled, the port option will still appear with the default "Port 1" option to indicate that this function is capable of addressing more than one port, but has been deactivated.

- Port 1 is always active and can not be deactivated.
- Functions/status that do not support multiple ports will not have this option.

The figure below shows three more examples of multi-port usage with the status **getGain** (FIG. 102):

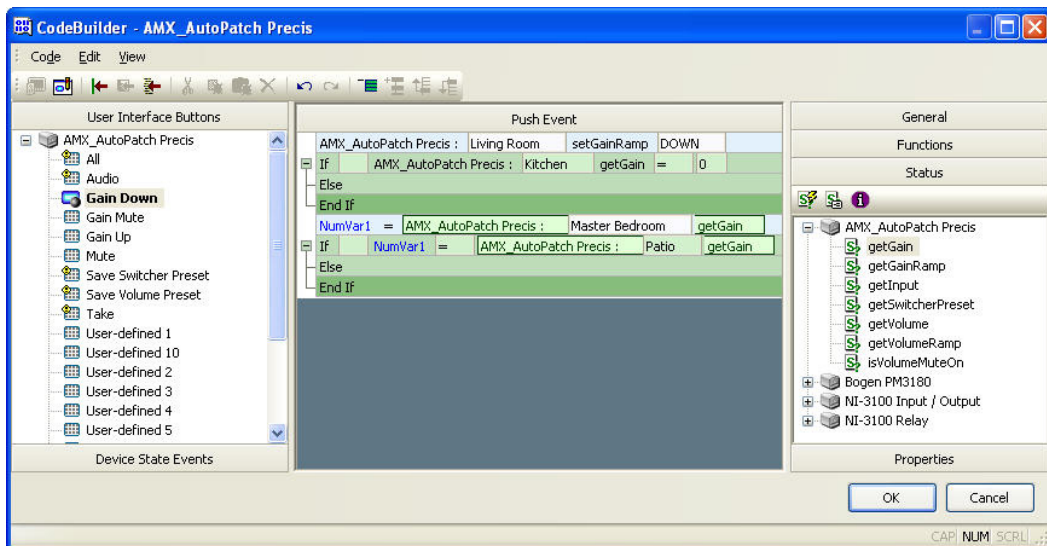


FIG. 102 CodeBuilder dialog

- The first shows *getGain* in a conditional
- The second shows the result of *getGain* being assigned to a variable
- The last shows the result of *getGain* being compared to a variable

All versions of *getGain* show that the port can be changed.



NOTE

VA (v1.4 or higher) will automatically convert older projects so that port usage is available for all function/status that map back to a component that supports multiple ports.

Multi-Port Code Generation

For each device port that the user defines usage of, VA will generate a NetLinx device statement.

If a port is defined across multiple components in a device, only a single NetLinx device statement will be generated, and its comment will reference all components that use that port. For example, a switcher with multi-port Volume and Gain components, for which the user has activated and named the first four ports, will be generated as follows:

```
dvSWT1 = 5001:1:0 // AMX_AutoPatch Precis real device, via NI-900 Serial #1
vdvSWT1 = 41001:1:0 // AMX_AutoPatch Precis virtual device, via NI-900 Serial #1
vdvSWT1_P2 = 41001:2:0 // AMX_AutoPatch Precis (Gain:Patio, Volume:Patio) virtual device
vdvSWT1_P3 = 41001:3:0 // AMX_AutoPatch Precis (Gain:Office, Volume:Office) virtual device
vdvSWT1_P4 = 41001:4:0 // AMX_AutoPatch Precis (Gain:Master Bedroom, Volume:Master Bedroom)
virtual device
```

Any reference to these ports in CodeBuilder will cause the resulting NetLinx statement to use the proper virtual device from those declared. For example, using the switcher defined above, ramping the volume up for the Master Bedroom (port 4) will generate the following code:

```
// Ramp volume up
TO [vdvSWT1_P4, VOL_UP]
```

Device Discovery (DD)

NetLinx Masters equipped with firmware build 320 or higher support Device Discovery (DD), via the Dynamic Device Detector.

The Dynamic Device Detector monitors the system for newly connected devices. New devices can be detected via either an external discovery protocol manager, Multicast reception of a Dynamic Device Beacon, or via the receipt of a beacon response on an application specified list of serial devices. This Dynamic Device Detector process begins by detecting new devices within a NetLinx/Duet system, binding those devices to application instances, and then starting a Duet module to control those new devices.

Device Discovery was created to take advantage of Java's Dynamic Class Loading and the Duet Standard NetLinx API (SNAPI). Java loads classes as they are needed. Therefore it is feasible to load a Duet control/protocol module on the fly as each new device is discovered. SNAPI provides a fixed interface for communicating with a certain type of device. The "glue code" refers to the developer defined NetLinx program that runs on a Central Controller and controls a system.

Take for example a VCR. The majority of control features are common to all VCRs (play, stop, pause, etc.). SNAPI provides the "glue code" developer the ability to write common code that will control any type of VCR having an associated Duet module. The underlying Duet module could be swapped in and out based on the actual physical device with no changes needed to the higher level "glue code".

Every device category in the Devices tab of the Toolbox contains a listing for "Device Discovery". Device Discovery (DD) devices are automatically detected by the Central Controller when they are connected and powered-up.

To view Device Discovery devices in the Toolbox, enable the **Show Device Discovery** option (FIG. 103):

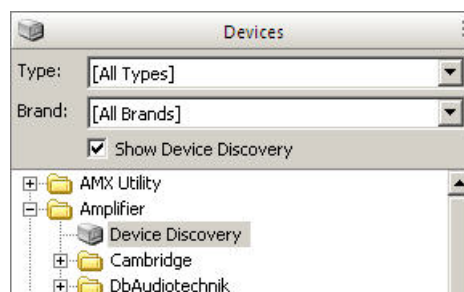


FIG. 103 Toolbox - Show Device Discovery option enabled

By default, Device Discovery devices always connect to the Central Controller via Ethernet 10/100T connection, as indicated in the Connection Type field of the Properties window (FIG. 104):



FIG. 104 Device Element - Device Discovery device

You can select another Ethernet connection type, or RS-232 as the connection type for Device Discovery devices.



NOTE

In order to use Device Discovery devices in your system, your Central Controller must have Internet access enabled. See Enabling Internet Access On The Central Controller.

Device Discovery (DD) Concepts

- **Application Device:** A Duet Device (41000-42000) that is used as a control interface to a physical device. This is also referred to as the Duet virtual device. All control requests are made to the application device rather than to the physical device.
There are two types of application devices: *Static Bound* application devices and *Dynamic* application devices:
Static Bound application devices specify both a Duet virtual device and its associated Device SDK class type, as well as a NetLinx physical device port to which the application device is always associated (i.e. statically bound).
Dynamic application devices specify both the Duet virtual device and its associated Device SDK with no association to a physical port. Binding of an application device to a physical device/port occurs at run-time (either via auto-binding or manual binding).
Application devices that have a "bound" physical device display their physical device ID within the Physical Device column. If an associated Duet module has been started to communicate with the device, its associated property information is displayed in a mouse-over popup dialog when the cursor hovers over the physical device ID.
- **Binding:** In concrete programming, the application device is forever associated with the NetLinx physical device. In Device Discovery, this association is dynamic. The act of associating an application device with a physical device is called "binding".
- **Device Discovery:** In Device Discovery, physical devices are detected in the system at run-time. There are two different methods of detection: via DD or via user definition within the Central Controller's Web interface.
- **SDK Class:** Each application device in the Device Discovery world is associated with a particular device type as defined by SNAPI. When using a VCR or a Receiver as an example, each of these device types would correspond with a Java Interface within the Duet Device Software Development Kit (SDK). When writing programs for DD, the developer specifies the device type of a particular application device by using one of these SDK Class names.
- **Polling:** Dynamic physical devices can be detected by DD through both Serial and IP interfaces. But whereas IP connections are then able to utilize the network's higher layers of multicast to broadcast their existence, Serial devices speak a fixed protocol that is incompatible with DD. Serial devices are passive and will only broadcast their existence if polled to do so. The program developer must specify which NetLinx interfaces/ports (i.e. serial ports) should be polled for devices.

Enabling Internet Access On The Central Controller

Use the options on the Details for Additional Devices page (in the NetLinX Central Controller's WebConsole) to manage 3rd party Device Discovery devices.



NOTE

Refer to the *NetLinX Integrated Controllers WebConsole & Programming Guide* for details on using the WebConsole.

To access the NetLinX Central Controller's WebConsole, enter the following URL In your web browser:

http://masters-ip/ (example: <http://123.45.6.78/>)

In the NetLinX Central Controller's WebConsole:

1. Select **System**, and open the **Manage Devices** tab (FIG. 105):

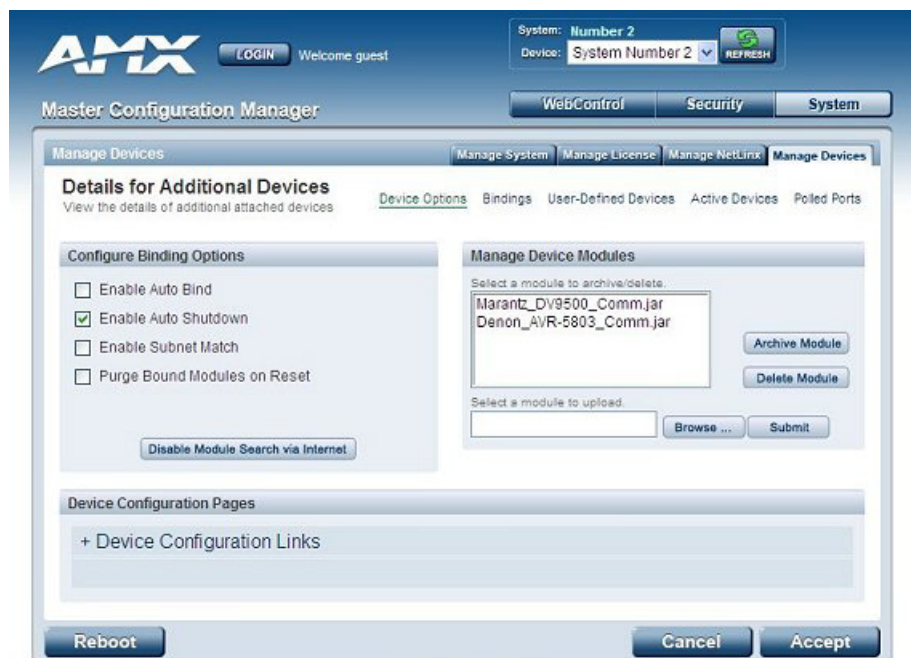


FIG. 105 NetLinX Central Controller's WebConsole - Manage Devices tab

2. In your web browser, enter the following URL to access the Central Controller's built-in web interface:
http://masters-ip/ (example: <http://123.45.6.78/>);
3. Click the **Device Options** link to access the Details for Additional Devices page. This page is used as the entry point for the management of all Third-Party Device Discovery (DD) devices.
4. In the *Configure Binding Options* section of this page, click in the check boxes to enable the following options:
 - **Enable Auto Bind:** This selection allows an end-user to toggle the state of the automatic binding for Device Discovery (DD) devices (On/Off).
When auto-binding is enabled, the Central Controller automatically attempts to connect any newly discovered DD device with an associated application device (defined in the running NetLinX application). Auto-binding can only be accomplished if the Central Controller's firmware determines a one-to-one correlation between the newly discovered device and a single entry within the list of defined application devices (accessed by pressing the Manage Device Bindings button at the top of the page).
For example, if the application only has one VCR defined and a VCR is detected in the system, auto-binding can then be accomplished. If there were two VCRs defined within the application, auto-binding could not be completed due to the lack of a clearly defined one-to-one correspondence.



NOTE

When the *Enable Auto Bind* option is not selected, no auto-binding activity takes place and all binding of the newly discovered devices must be accomplished manually via the Web control interface *Manage Other Devices*.

- Enable Module Search on Internet:** Clicking this button toggles the capability of searching the Internet (either AMX's site or a device specified site) for a device's compatible Duet modules. This capability is automatically disabled if the Central Controller does not have Internet connectivity. Upon enabling Internet connectivity, the AMX License Agreement is displayed for acceptance. The AMX License Agreement must be accepted (by pressing the Accept button on the upper-right of the page) for the Internet Module search to be enabled. When the Internet search for modules feature is enabled (the button then reads Disable Module Search via Internet), the Central Controller queries either AMX's Online database of device Modules and/or pulls Modules from a separate site specified by the manufacturer's device.



NOTE

You can later disable this feature by toggling this button's state.

- Click **Accept**.



NOTE

Refer to the *NetLinx Integrated Controllers WebConsole and Programming Guide* (available at www.amx.com) for configuration instructions, and descriptions of all *WebConsole Pages/Options*.

Managing Device Bindings

Use the options on the Manage Device Bindings page (in the NetLinx Central Controller's WebConsole) to configure application-defined Duet virtual devices with discovered physical devices.

To access the NetLinx Central Controller's WebConsole, enter the following URL In your web browser:

http://masters-ip/ (example: <http://123.45.6.78/>)

In the NetLinx Central Controller's WebConsole:

- Select **System**, and open the **Manage Devices** tab.
- Click the **Bindings** link to access the *Manage Device Bindings* page (FIG. 106):



FIG. 106 NetLinx Central Controller's WebConsole - Manage Device Bindings tab

- Use the options on this page to configure application-defined Duet virtual devices with discovered physical devices.

The table on this page displays a list of all application-defined devices, including each device's "Friendly Name", the Duet virtual device's D:P:S assignment, the associated Duet Device SDK class (indicating the type of the device), and the physical device's D:P:S assignment. This information has to be pre-coded into the NetLinx file currently on the Central Controller.

Each entry in the table has one of four buttons to the right of the Physical Device D:P:S assignment:

Static Bound application devices will either be blank, or display a **Release** button:

- Static Bound application devices that have not yet detected a physical device attached to their associated port have a blank button.
- Once a physical device is detected and its associated Duet module has been started, a Release button is then displayed. Click Release to force the associated Duet module to be destroyed and the firmware then returns to detecting any physical devices attached to the port.

Dynamic application devices either display a **Bind** or **Unbind** button:

- Dynamic application devices that have been bound display an Unbind button. When the user selects Unbind, any associated Duet module is then destroyed and the "link" between the application device and the physical device is then broken.
- Dynamic application devices that have not been bound to a physical device display a Bind button. When this button is selected, a secondary display appears with a listing of all available unbound physical devices that match the application device's Device SDK class type.



NOTE

If a currently bound device needs to be replaced or a Duet Module needs to be swapped out, the device should be unbound and the new module/driver should then be bound.

The administrator/user can then select one of the available physical devices to bind with the associated application device. When the Save button is selected, the binding is created and a process begins within the target Master to find the appropriate Duet Module driver. Once a driver is found, the Duet Module is then started and associated with the specified application device (Duet virtual device). If the Cancel button is selected, the binding activity is then aborted.



NOTE

If the manufacturer device does not support Dynamic Device Discovery (DDD) beaconing, you must use the Add New Device page to both create and manage those values necessary to add a dynamic physical device. This process is described in detail within the following section.

Configuring Application-Defined Devices

Elements such as DUET_DEV_TYPE_DISC_DEVICE and DUET_DEV_POLLED are defined within the NetLinx.AXI file. The NetLinx.AXI file contains both the new API definitions, as well as the pre-defined constants that are used as some of the API arguments (ex: DUET_DEV_TYPE_DISC_DEVICE).



NOTE

Physical device names are typically prefixed with "dv" and Virtual device names are typically prefixed with "vdv".

Example Code:

```
PROGRAM_NAME='DDD'
DEFINE_DEVICE
COM1 = 5001:1:0
COM2 = 5001:2:0
dvRECEIVER1 = 41000:1:0
dvDiscDevice = 41001:1:0
DEFINE_CONSTANT
DEFINE_TYPE
DEFINE_VARIABLE
DEFINE_START
STATIC_PORT_BINDING(dvDiscDevice, COM1, DUET_DEV_TYPE_DISC_DEVICE,
    'My DVD', DUET_DEV_POLLED)

DYNAMIC_POLLED_PORT(COM2)
DYNAMIC_APPLICATION_DEVICE(dvRECEIVER1, DUET_DEV_TYPE_RECEIVER,
    'My Receiver')
```

```
(*****)
(* THE EVENTS GO BELOW *)
(*****)
DEFINE_EVENT
DATA_EVENT [dvRECEIVER1]
{
// Duet Virtual device data events go here
}
```

Sample code can be found within the DEFINE_START section.

This code gives the Central Controller a “heads-up” notification to look for those devices meeting the criteria outlined within the code.

Troubleshooting - Device Discovery (DD) Devices

There are two error messages that might be received from the Central Controller under the following project conditions:

- The Project loaded on the Central Controller uses only Device Discovery devices (that is, there are 0 non-Device Discovery devices in the project).
- The Central Controller has not been loaded with code files that refer to non-Device Discovery devices.

In this situation the following errors are visible, if you have connected to the Central Controller via Telnet, and have messaging turned on (MSG ON):

Error Message:

```
DynamicDeviceDetector.retrieveUrlJar: missing filename in URL response
DynamicDeviceDetector.retrieveDriverDependencies: failed to retrieve
dependencydevicesdkrt.jar
```

This message indicates that the following requires system file is missing from the Central Controller: "devicesdkrt.jar"

Error Message:

```
DynamicDeviceDetector.retrieveUrlJar: missing filename in URL response
DynamicDeviceDetector.retrieveDriverDependencies: failed to retrieve
dependencysnapirouter.jar
```

This message indicates that the following requires system file is missing from the Central Controller: "snapirouter.jar"

Solution:

Copy the missing files to the Central Controller, via the Controller's built-in web UI:

1. In your web browser (i.e.: Internet Explorer or compatible), enter the following URL:
http://masters-ip/ (example: <http://123.45.6.78/>), to access the Controller's built-in web interface.
2. Open the Manage Other Devices page: click on the Manage Other Devices link (from within the System Settings section of the Navigation frame).
3. In the Manage Device Modules section of this page, select the Browse button (next to Select File To Upload).
4. Locate and select the file: **devicesdkrt.jar**.
By default, VA copies these files to the following directory:
Program Files\Common Files\AMXShare\Duet\Bundle
5. Select **Upload File**.
6. Select the **Browse** button (next to Select File To Upload).
7. Locate and select the file: **snapirouter.jar**.
8. Select **Upload File**.

External Device Configuration Files

For configuring the module layout for the Hydraport HPX-1600, AMX provides the Hydraport Connection Preview web application. The Hydraport Connection Preview application is available on the AMX website. Follow the on-screen directions to configure the module layout for an HPX-1600.

The **Save Config** option under *Manage Configurations* in the left window of the Hydraport Connection Preview page saves the current module configuration as an *.HPX file (FIG. 107):

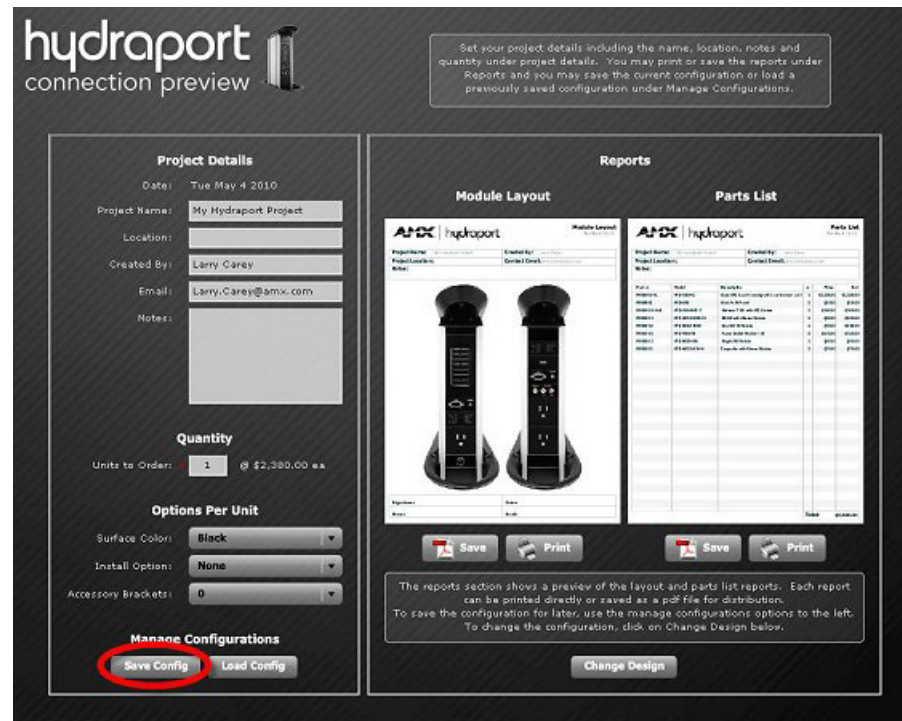


FIG. 107 Hydraport Connection Preview web application

VA allows you to import this file as an external device configuration file for the HPX-1600.

Importing a Device Configuration (*.HPX) File

1. In the System Diagram, select the device to which you will apply the imported External Configuration file.
2. Select **Device > Import Configuration**.
3. The program will alert you that the existing external configuration will be replaced with that from the imported external file, and prompt you to continue with the import operation.
4. Click **OK** to proceed. This action invokes the *Import External Config File* dialog.
5. Locate and select the desired external configuration (*.HPX) file to import, and click **Open**.

Exporting a Device Configuration File

1. In the System Diagram, select the device from which you will export an External Configuration file.
2. Select **Device > Export Configuration**.
3. Specify a target directory for the HPX file, and click **OK**.

System Design

Overview

System Design is managed in the System Diagram. When you create a new VA Project (see *Creating a New VA Project* on page 21), the System tab contains at least one *Device Element*: the default NetLinx Central Controller (NI-3100). Other devices are added to the system by clicking and dragging devices from the Toolbox into the System Diagram. See *Adding Devices To The System Diagram* on page 100 for details.

- Each device in the System is represented in the System Diagram with a separate Device Element. See *Device Elements* on page 99 for details.
- Each Device Element uses Connection Nodes (IN and OUT) to connect to other devices in the System Diagram. See *Connection Nodes - Device Elements* on page 102 for details.
- Device connections are defined by drawing Connection Lines between the Device Elements. See *Connection Lines* on page 104 for details.
- Select any Device Element in the System Diagram to view/edit the Device Properties for the selected Device. See the *Device Properties* on page 68 for details.

System Diagram

Click on the **System** tab in the Diagram Area to view the *System Diagram* - a layout of the entire system, including the NetLinx Central Controller, AMX devices and third-party (controlled) devices, as well as all device connections (FIG. 108):

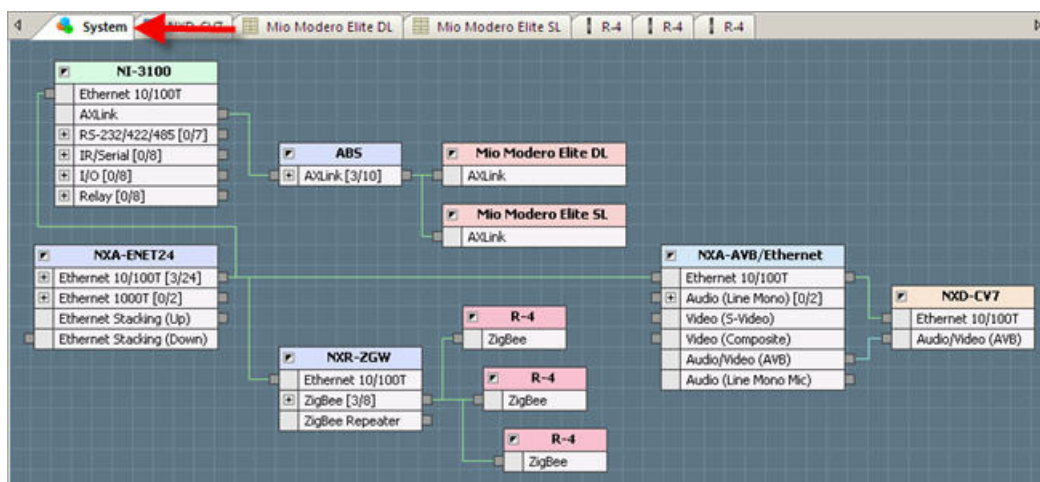


FIG. 108 System Diagram

Device Elements

Each device is represented in the System Diagram by a *Device Element*. To add devices to the system, simply select each device in the Toolbox, and drag-and-drop into the System Diagram (FIG. 109):

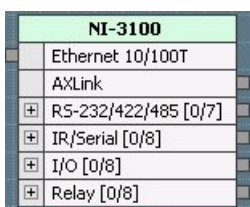


FIG. 109 Device Element (Central Controller)

Hover the cursor over any device in the System Diagram (or the Toolbox) to view basic device information (FIG. 110):



FIG. 110 Device Element (Central Controller) - Basic Device Information

Adding Devices To The System Diagram

The first step in developing a new VA project is to define the devices in the system. This includes selecting the devices that you want in the system and adding them to the System Diagram, establishing device connections, and configuring device properties.

1. In the Toolbox, click on a device tab to display the supported devices of that type available to choose from.
2. Select the desired device and drag-and-drop it into the System Diagram. Each device in the System Diagram is represented by a Device Element.
3. Connect the Device Elements to the NetLinx Central Controller. Different device types have different connection requirements.
4. Review the device properties (including communication settings) for this device, and edit if necessary.

Prerequisite Devices

Many AMX Devices have certain prerequisite devices in order for them to be functional parts of the system. For example, in order to use a Mio R-4 remote controller, you must also have a ZigBee connection (NXR-ZGW or NXR-ZRP). Another example would be that in order to use a MVP-8400 wireless touch panel, you must also include a Wireless Internet Connection.

Since in these cases, you absolutely must have the other prerequisite devices in your system in order to depict a fully function control system, VA assists you in making sure that all prerequisite devices are included, and helps you choose the correct devices according to the other devices in your system.

A given device may contain one or more groups of prerequisite (or required support) devices; each group having a name and a designation of either required or optional.



NOTE

An example of an "optional" support device would be the ABS (AxLink Bus Strip), for Radia controllers. Since there is only a single AxLink connection available on NetLinx Central Controllers, the ABS is only required if you need to connect more than one AxLink device to the Controller.

Upon adding a device to the System Diagram, VA establishes whether that device has any groups of support devices, and then checks to see if the system currently contains at least one of the devices in those groups. If none of the devices in a group is found in the system, VA prompts you to choose one to be added prior to the original device being added, via the *Choose Required Support Device* dialog (XXXXXXXXXX).

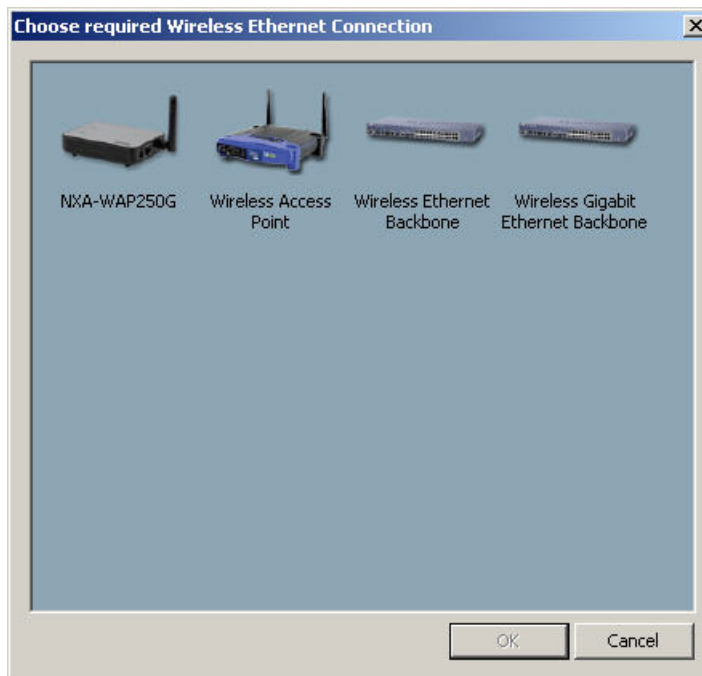


FIG. 111 Choose Required Support Device (Wireless Ethernet Connection) dialog



NOTE

In the case of both required and optional support devices, cancelling the dialog will cancel the entire operation, and no devices will be added to the system.

VA also prompts you to add any additional prerequisite devices that the original prerequisites may have, and so on. For example, from an empty system, adding an R-4 remote will require a ZigBee connection and will give the user the choice of an NXR-ZGW or NXR-ZRP. If you choose the NXR-ZGW gateway, VA will further prompt you to select the Ethernet connection required by the NXR-ZGW, giving the choices of an NXA-ENET24, NXA-ENET24PoE, or Ethernet Backbone.

Again, canceling the dialog at any point will abort the entire operation-no devices will be added.



NOTE

For a comprehensive listing of devices and their prerequisite devices, as well as listing of all supported Accessories, refer to the VisualArchitect online help.

Removing Devices From The System Diagram

There are several ways to remove devices via the System Diagram:

- Right-click on device in the System Diagram and select Delete from the System Diagram context menu.
- Select a device in the System Diagram and select Delete from the Edit menu.
- Select a device in the System Diagram and click the Delete Toolbar button.
- Select a device in the System Diagram and press the Delete key.

Alternatively, you can use the Device list in the System Tree to select and delete devices from the System:

- Right-click on device in the System Tree and select Delete from the System Tree context menu.
- Select a device in the System Tree and select Delete from the Edit menu.
- Select a device in the System Tree and click the Delete Toolbar button.
- Select a device in the System Tree and press the Delete key.

The program will prompt you to verify this action before the device is removed from the system. Click the **Don't Show Again** option in the *Remove Element* dialog to avoid being prompted again.

You can reactivate this prompt at any time via the **Help > Reset Message Boxes** option.



You are not allowed to delete the Central Controller. You can change the Central Controller's type via the Replace option.

Connection Nodes - Device Elements

Each Device Element has Connection Nodes on either side that represent the physical ports on the device. Connection Nodes allow each Device Element to be connected to other Device Elements in the System Diagram (FIG. 112).

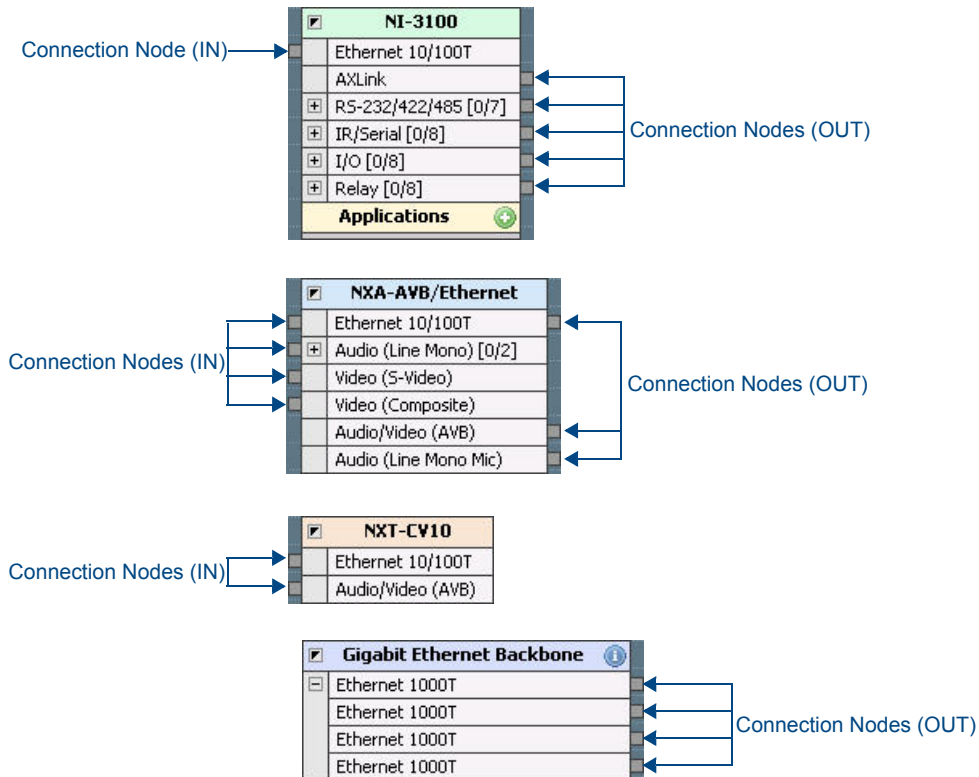


FIG. 112 Device Elements - Connection Nodes

- The nodes on the left side of the Device Element are Input (IN) Nodes, and accept incoming connections to the device from other devices.
- The nodes on the right side of the Device Element are Output (OUT) Nodes, and provide outgoing connections from the device to other devices.

The number and types of Connection Nodes provided on each Device Element depends on the device type and the physical ports it uses.

Expand / Collapse Multi-Connection Nodes

Many Device Elements feature more than one port/Connection Node of a given type. For example, the NI-3100 NetLinx Central Controller features eight IR/Serial ports, eight I/O ports and eight Relay ports. By default, each port and associated Connection Node of a given connection type is not shown individually on the Device Element. Instead, they are collapsed to provide a cleaner view on the System Diagram.

In most cases, you don't need to view every port, since VA will automatically connect devices to the next available port of the appropriate type. However, multi-connection ports can be expanded to show each individual port.

To expand the port view, click the plus-sign (+) to the left of the port name. FIG. 113 shows the IR/Serial, IO and Relay ports on the NI-3100 first in their (default) collapsed state, and expanded:

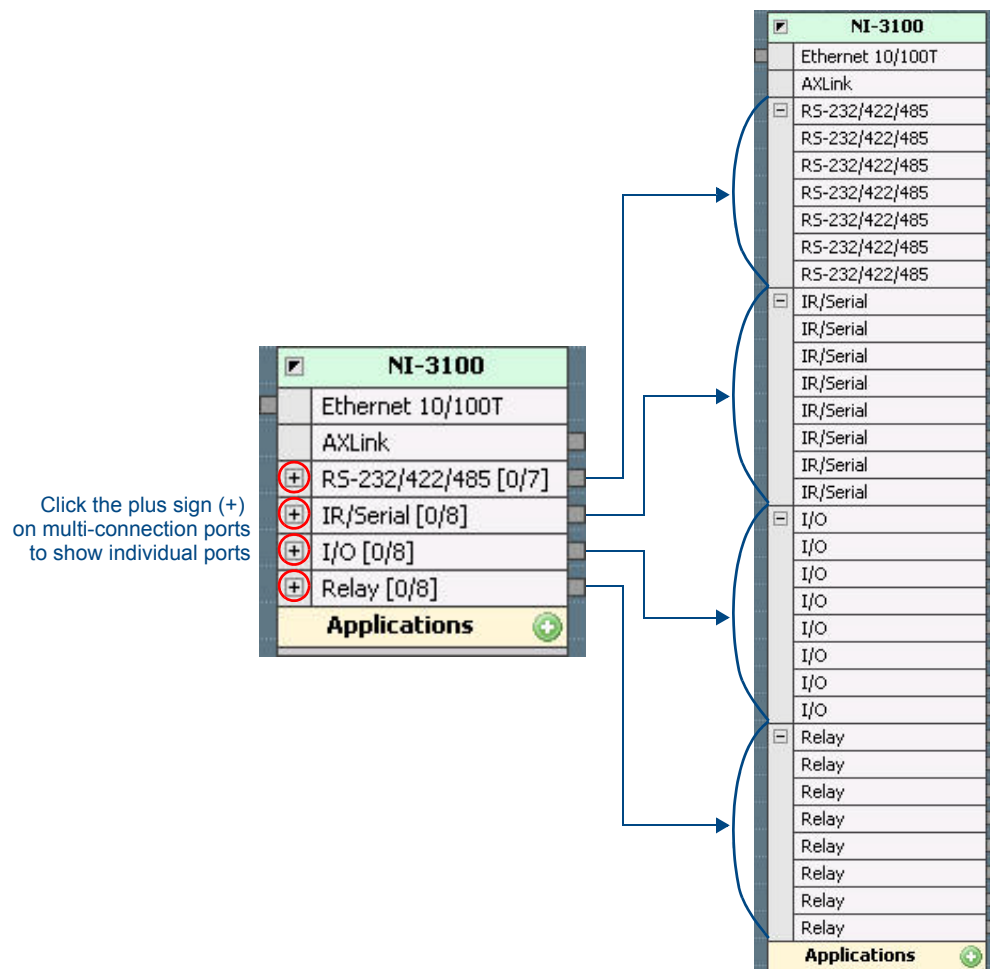


FIG. 113 Expanding the Port View

Click the minus sign (-) next to the top port in a set of expanded ports to collapse that set of ports.

The numbers following the port name on multi-port connections indicate the number of ports, and number of those ports already used (FIG. 114).

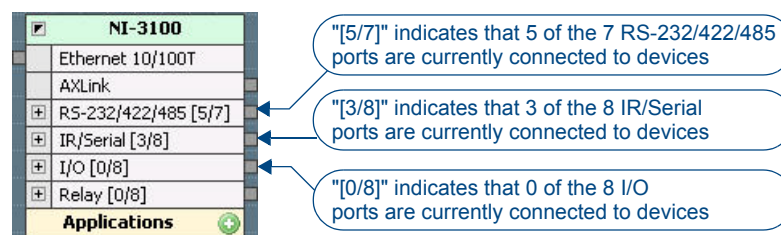


FIG. 114 Number of Ports / Available Ports

Connection Lines

Each Device Element must be connected to the NetLinx Central Controller in the System Diagram, either directly or via an intermediate Networking or Expansion device.

Device connections are indicated in the System Diagram with connection lines. Connection lines connect to the Connection Nodes on the Device Elements.

Connection lines are colorized to represent different connection types:

Connection Lines - Color Scheme	
• Control:	green
• Power:	red
• Audio:	white
• Video:	blue
• Audio/Video:	cyan

- Use the **Connect** feature to let VA establish device connections automatically, based on the device's control type (select Device > Connect, or select Connect from the System Diagram context menu).
- Use the **Auto-Connect** feature to have VA automatically draw a connection between a new device and the Central Controller (or intermediate device required for the device to connect to the Controller), when a new device is dropped into the System Diagram (select Auto-Connect from the System Diagram context menu).
- Use the **Filter Connections** option (in both the View menu and the System Diagram context menu to filter device connection lines on the System Diagram by connection type, to present a more targeted view of the system connections (in the *Define Filter* dialog). See the *Filtering Device Connections* section on page 107 for details.
- Use the **Connection Style** option (in both the View menu and the System Diagram context menu to switch between straight lines (default) and curved lines. See the *Changing the Connection Line Style* section on page 109 for details.

Connecting Devices

Each Device Element in the System Diagram has at least one Connection Node. Connection nodes represent ports on the actual device, and are used to establish connections between devices and other system devices as well as the NetLinx Central Controller.

More typically, Device Elements will feature several Connection Nodes to accommodate the different physical connectors on the actual device (FIG. 115).

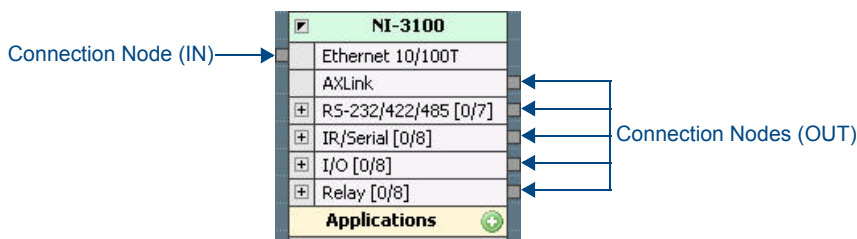


FIG. 115 Connection Nodes on a NetLinx Central Controller

- The nodes on the left side of the Device Element are Input (IN) Nodes, and accept incoming connections to the device from other devices.
- The nodes on the right side of the Device Element are Output (OUT) Nodes, and provide outgoing connections from the device to other devices.
- See *Connection Nodes - Device Elements* on page 102 for additional details.

Click-and drag on the System Diagram to connect devices. Device connections are established by drawing lines from an OUT Connection Node on one Device Element to a matching IN Connection Node on another Device Element.

For example, the figure below shows that to connect an ABS AxLink Bus Strip to the Central Controller, the AxLink OUT Connection Node on the Central Controller connects to the AxLink IN Connection Node on the ABS (FIG. 116):

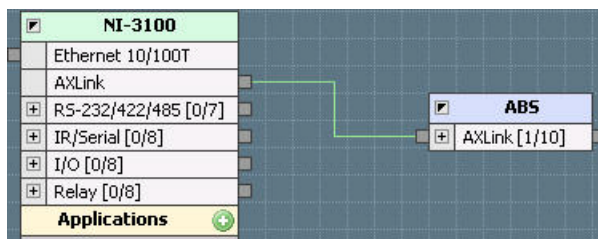


FIG. 116 ABS AxLink Bus Strip Connected to the Central Controller

- Some devices do not connect directly to the Central Controller. For example, wireless MVP touch panels require a (WAP) Wireless Access Point between the panel and the Central Controller. Similarly, Ethernet 10/100T panels require a Network Switch between the panel and the Controller. See *Prerequisite Devices* on page 100 for details.
- Many connection nodes have a plus sign icon to indicate that there are multiple ports of that connection type available on this device. Click the plus sign to expand the port view. See *Expand / Collapse Multi-Connection Nodes* on page 103 for details.
- Use the Connection Manager dialog to define more detailed connection information, including individual connectors (such as audio/video inputs and outputs) on each device. See *Defining Physical Connectors For System Devices* on page 107 for details.

VA provides a couple of quick and easy ways to automatically connect Device Elements in the System Diagram:

- **Auto Connect** - Select **Edit > Auto Connect** (or click the toolbar button in the Standard Toolbar) to let VA establish device connections automatically when each device is added to the System Diagram. By default, Auto-Connect is enabled.
- **Connect (device)** - Select **Device > Connect** (or select *Connect* from the System Diagram Context menu). If a Device Element is selected, this option draws connection lines only for the selected Device Element. If no Device Element is selected, this option draws connection lines between all devices in the System Diagram.

Manually Connecting Devices in the System Diagram:

1. In the System Diagram, left-click and hold on an OUT Connection Node on one Device Element.
2. Drag your mouse over an IN Connection Node of a matching type on the Device Element with which you want to connect (FIG. 117):

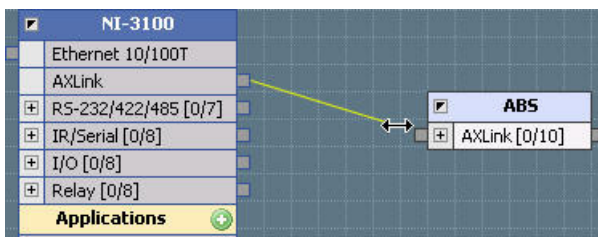


FIG. 117 Drawing a Connection Line between Device Elements in the System Diagram

For example, if you add an AxLink device, you will connect that device's AxLink (IN) Connection Node to an AxLink (OUT) Connection Node on the NetLinx Controller (or intermediate device).

- As you drag the cursor, a connection line is drawn on the System Diagram, indicating the connection. Until a connection is established, the line is yellow (as shown above). When you release the mouse button on a valid connection, the line color changes to indicate the connection type (for example green, as shown in FIG. 118):

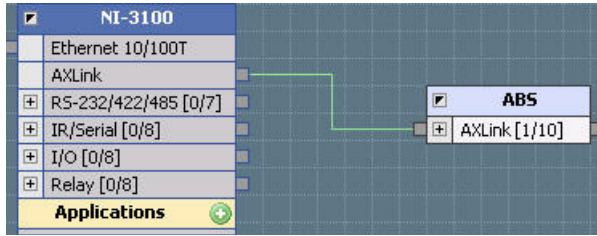


FIG. 118 Connection Established between Device Elements

See *Connection Lines* on page 104 for details.

If an invalid connection is attempted, the cursor will change to indicate that the connection is not allowed (FIG. 119):

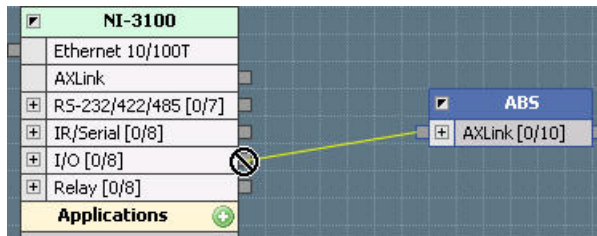


FIG. 119 Connection Not Allowed

Devices/Modules With Multiple Connection Types

Devices that support more than one connection type are listed up to three times in the System Tree with a separate listing for each connection type supported by that device.

One example is the HPX-1600 Hydraport, which can be configured to use several different modules, all with different connection types. An example System Tree including HPX-1600 is shown below (FIG. 120):

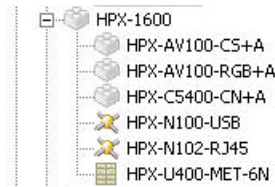


FIG. 120 System Tree (HPX-1600)

When a device of a particular connection type is added to the System Diagram, you can change the device properties and communication parameters for the selected connection type, but you cannot change the connection type.

Defining Physical Connectors For System Devices

In addition to establishing the connection between the NetLinx Central Controller and each device in the System Diagram, VA allows you to specify how to connect each individual physical connector on a controlled device, in the Connection Manager dialog.

The detailed connection information that you can define with the Connection Manager is included in the System Report, and is intended to assist in the installation process. However, this information is optional and does not affect the control aspect of the devices in any way. While it is recommended that you take advantage of this feature of VA, it is possible to skip this process and just connect the equipment without any documentation.

For example, while you can draw a connection line from a IR-controlled DVD player to an IR port on the NetLinx Central Controller in the System Diagram, there is no way to indicate how to connect the DVD player's audio and video outputs (or any other connectors that exist on the player) to other devices in the system, until you establish each of these physical connectors via the Connection Manager dialog.

You will need to consult the manufacturer's documentation (or the device itself) to know exactly what connectors exist on each device.

1. Right-click on a device element in the System Diagram, and select Connection Manager from the context menu.
2. Click the **Add Connection** button (FIG. 121):

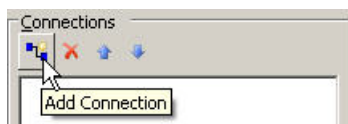


FIG. 121 Connection Manager dialog - Add Connection button

This adds a new connection to the Connections window. When a new connection is added, by default the type is A/C Power

3. In the *Properties* window, click in the **Type** field to activate the Connection Type drop-down menu, and select a connection type.
4. By default, the **Name** field is populated with the connection type name. Edit the name as desired.
5. Click in the **Direction** field to select either input or output (default = output).
6. By default, each connection is added as single connector. To indicate multiple connectors of this type, click in the **Count** field and use the Up and Down arrows to adjust the number of connectors of this type to add. If there are more than one connector of a given type, the number of connectors are indicated in the Connections window, in parenthesis after the Connector type.

An example Connection Manager dialog for a DVD Player is shown below (FIG. 122):

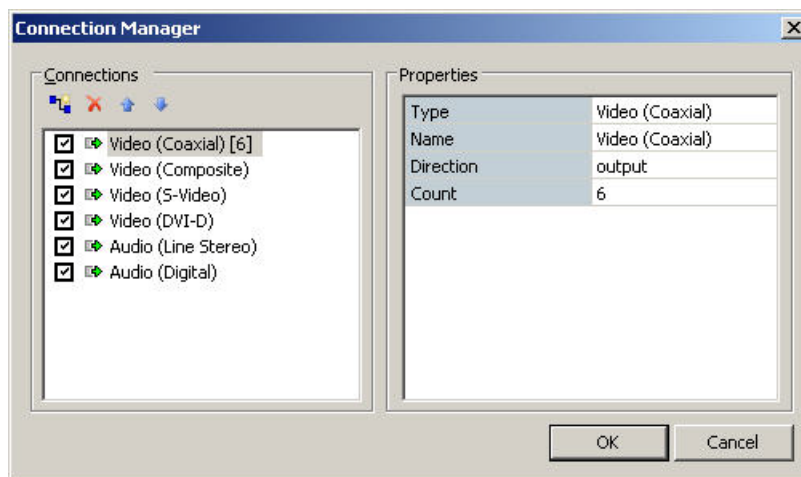


FIG. 122 Connection Manager dialog

Once each connector has been added in the Connection Manager dialog, the DVD Player's Device Element in the System Diagram will indicate these connectors, as shown below (FIG. 123):

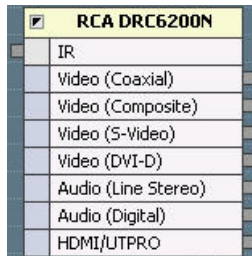


FIG. 123 Example Device Element indicating various connection types

Once these connections are available in the Device Element, they can be connected to other devices in the diagram just like any other (drag-and-drop to draw a connection line between each input/output node to a compatible node on the Central Controller or another device in the system).

To remove a Connection, select it in the Connections window, and click the **Delete** button (FIG. 124):

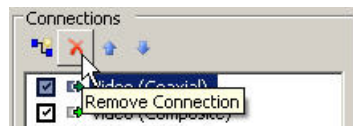


FIG. 124 Connections window - Delete button

To change the order in which the Connections are listed on the Device Element, select a Connection, and use the Up and Down arrow buttons to re-order the list (FIG. 125):

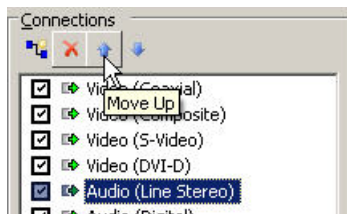


FIG. 125 Connections window - Up/Down button

Filtering Device Connections

Use the options in the **View > Filter Connections** sub-menu to filter the connection lines on the System Diagram by connection type, to present a “cleaner” or more targeted view of the system connections. This sub-menu can also be accessed via the Filter Connections toolbar button (FIG. 126):

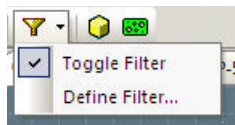


FIG. 126 Filter Connections toolbar button

The options in this sub-menu are:

- **Toggle Filter** - This option toggles the device connection filter, as specified in the Define Filter dialog. By default, the filter is Off.
- **Define Filter** - Click to open the Define Filter dialog, where you can specify which connection types to filter out of the System Diagram view. By default, all connections types are included in the view (no filtering).

To define a device connection filter:

1. Select **View > Filter Connections > Define Filter** to open the Define Filter dialog.



Alternatively, the Define Filter dialog can be accessed via the System Diagram context menu (select Filter Connections > Define Filter).

Click the plus signs to expand the view of any of the five connection types, and de-select the connection types that you do not want to include in the System Diagram when the filter is toggled On.

- To filter all connections types within any of the five categories, select the top-level check box.
 - Use the **Select All** button to select all connection types (so that they are all included in the view, even when the filter is toggled On).
 - Use the **Clear All** button to clear all selections (so that no connections are included in the view when the filter is toggled On).
2. Click **OK** to save the filter settings.
 3. To apply the filter, select **View > Filter Connections > Toggle Filter** (or click the Toolbar button). Select this option again to turn the filter off.
 - When filtered out, the connection lines for a given type will not be visible on the diagram, and any diagram element connection point that is of the filtered out type will be shown in a “disabled” style.
 - If a connection point is filtered out, you will not be able to drag any connection lines to or from it; though any connections made by Auto-Connect when adding a new device will be allowed, but the connection lines will not be shown.

Removing Device Connections

To remove a device connection in the System Diagram:

1. Select a device in the System Diagram.
2. Select **Device > Remove Connections** (or select Remove Connections from the System Diagram context menu). You can also select a connection line and press **Delete**.

Changing the Connection Line Style

By default, all connection lines drawn in both the System Diagram and UI Diagrams are drawn as straight lines. Select **View > Connection Style > Curves** to change the line style to curves (FIG. 127):

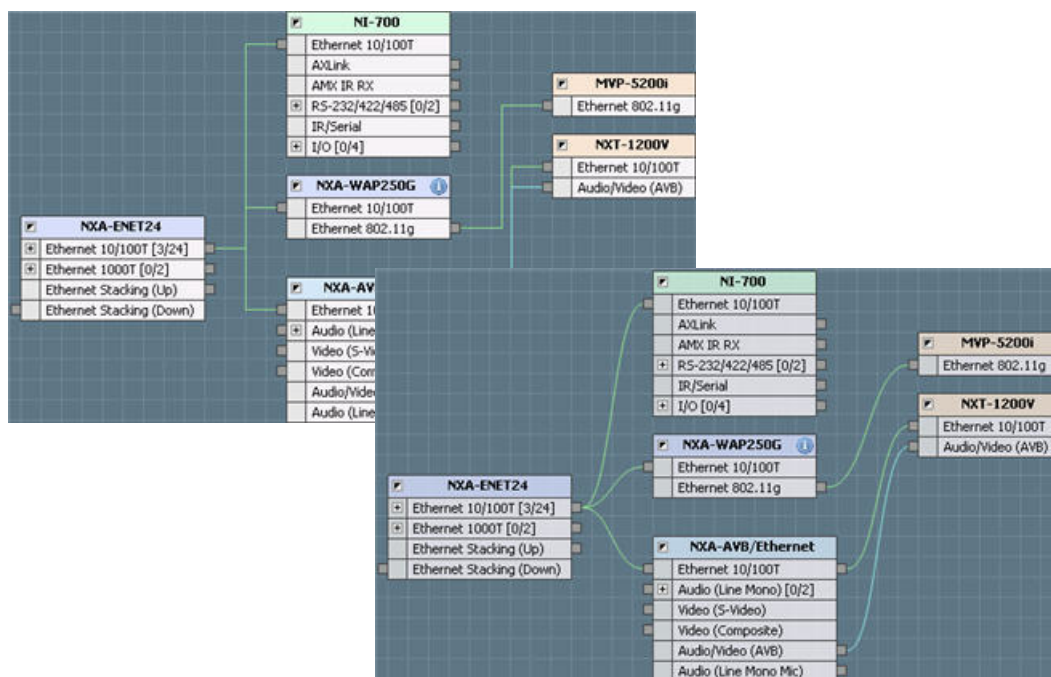


FIG. 127 Connection Line Styles

Connection Node Types

Refer to the VisualArchitect online help for a description of each connection node type.

Replacing Devices

Replacing the Central Controller

VA requires that there is always one NetLinx Central Controller in each system.

Since you are not allowed to delete the Central Controller, you must use Replace to use a different type:

1. Select the device in the system diagram that you want to replace.
2. Select the device that you want to replace it with, in the Toolbox.
3. Select Edit > Replace (or select Replace Device from the Toolbox System Devices context menu).

Alternatively, you can drag-and-drop a replacement Central Controller from the Toolbox into the System Diagram:

1. Position the replacement Central Controller directly on top of the existing one to replace it.
2. When the replacement Controller is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor (FIG. 128):

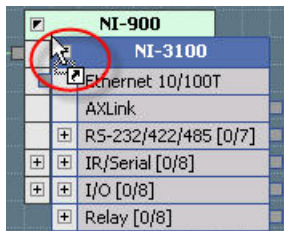


FIG. 128 Replacing the Central Controller

3. When the Replace Icon appears, release the Controller that you are dragging, and it will replace the existing Central Controller.

It is important to note that depending on the differences between the original Central Controller and the one that is selected to replace it, some device connections may be lost.

For example, if you replace a NI-4000 - which features eight IR/Serial ports, with a NI-700 - which has one IR/Serial Port, you will lose IR/Serial Ports 2-8.

- If you have devices connected to any ports on the original Controller that do not exist on the replacement Controller, the device connections will be lost for the missing ports, but the devices will remain in the System. However, if the replacement Controller has the same number of port types as the original, no device connections will be lost.
- Also note that when you replace the Central Controller, device properties relative to connection type may be lost.

All Central Controllers are added to the system (including replacements) with the same default Connection Settings:

- Connection Type = TCP/IP
- IP Address/Host Name = (none)
- IP Port Number = 1319
- Ping For Availability = true
- Requires Authentication = false

If any of the settings were changed before the Central Controller was replaced, they will have to be re-entered (since the replacement Controller will apply the default settings).

- This also holds true for the System Number assignment, which will return to the default setting of 1.
- Any Comments entered will carry over after replacing the Controller.

Replacing Touch Panels

VA supports replacing a touch panel with another touch panel in the System Diagram. To accommodate differences between panel types, VA prompts you to choose from all applicable resolutions and compatible templates for the chosen replacement touch panel via options in the Replace Touch Panel dialog:

1. Select the touch panel in the System Diagram that you want to replace.
2. Select the touch panel with which you want to replace it from the Toolbox.
3. Select **Edit > Replace** (or select Replace Device from the Toolbox System Devices context menu).
4. At this point, the *Replace Touch Panel* dialog is invoked (FIG. 129).

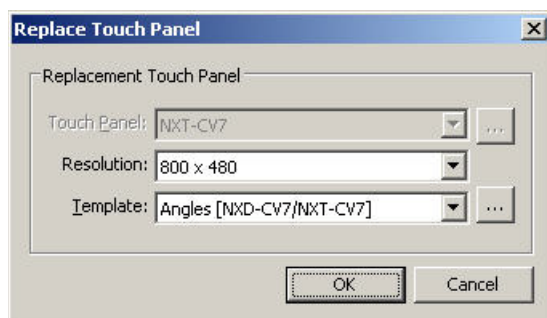


FIG. 129 Replace Touch Panel dialog

5. Use the options in this dialog to select a Resolution and Template from all applicable resolutions and compatible templates for the replacement touch panel.
If the chosen template for the replacement panel is the same as the template used by the original panel, there will be no loss of programming, configuration, or customization.
However, if the chosen template for the replacement touch panel differs from the one used by the original touch panel, VA will prompt you with a list of incompatibilities, in the Incompatibilities dialog.
6. Click **OK** to continue with the touch panel replacement operation, or click *Cancel* to cancel the operation and leave the original touch panel in place.

Alternatively, you can drag-and-drop a replacement touch panel from the Toolbox into the System Diagram:

1. Position the replacement touch panel directly on top of the existing one to replace it.
2. When the replacement touch panel is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor (FIG. 130):

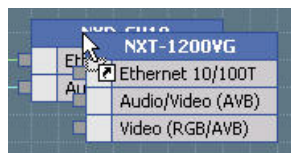


FIG. 130 Replacing a Touch Panel

3. When the Replace Icon appears, release the touch panel that you are dragging, and it will replace the existing touch panel.
4. At this point, the *Replace Touch Panel* dialog is invoked.
5. Use the options in this dialog to select a Resolution and Template from all applicable resolutions and compatible templates for the replacement touch panel (see above).
6. Click **OK** to continue with the touch panel replacement operation, or click *Cancel* to cancel the operation and leave the original touch panel in place.

Touch Panel Replacement - Incompatibilities

Where possible, the replacement touch panel will retain from the original touch panel navigation routing, navigation text, navigation programming, Feature/Sub-Feature usage and programming, element configuration properties, and UI-centric device programming.

The following are the exceptions that will cause incompatibilities:

- If the replacement template differs from the original template, all UI customizations will be lost.
- If the replacement template differs from the original template, all external button programming will be lost.
- If the palette used by the original touch panel does not exist, by name, in the replacement template, the replacement template's default palette will be used.
- If the replacement template does not have a set of device pages used by the original touch panel, a Placeholder will be used instead.
- If the replacement template does not have a flow element (Mode, Navigation, or Sub-Navigation) with the same number of items as used by the original touch panel, it will be replaced by a like-type flow element with the closest number of items greater than the original. If no suitable replacement is found, the element will be removed.

Replacing Keypads

VA supports replacing a Keypad in the System Diagram with another Keypad. VA will copy as much data as possible over to the new Keypad (CodeBuilder data, LCD Menu structure, Color, etc.) while at the same time preserving Button layout as much as possible. Before the replacement, VA will alert you if any incompatibilities or data will be lost, via the Incompatibilities dialog.

For instance, if the new Keypad does not support engraving, or if any CodeBuilder data would be lost because due to decrease in button count, VA will alert you before replacement, to give you the chance to cancel the operation. See the Keypad Replacement Table for details.

1. Select the Keypad in the system diagram that you want to replace.
2. Select the Keypad with which you want to replace it from the Toolbox.
3. Select **Edit > Replace Device** (or select *Replace Device* from the Toolbox System Devices context menu).

If the replacement Keypad is the same as the original Keypad, there will be no loss of programming, configuration, or customization.

However, if the replacement Keypad differs from the original Keypad, VA will prompt you with a list of incompatibilities, in the *Incompatibilities* dialog (FIG. 131).

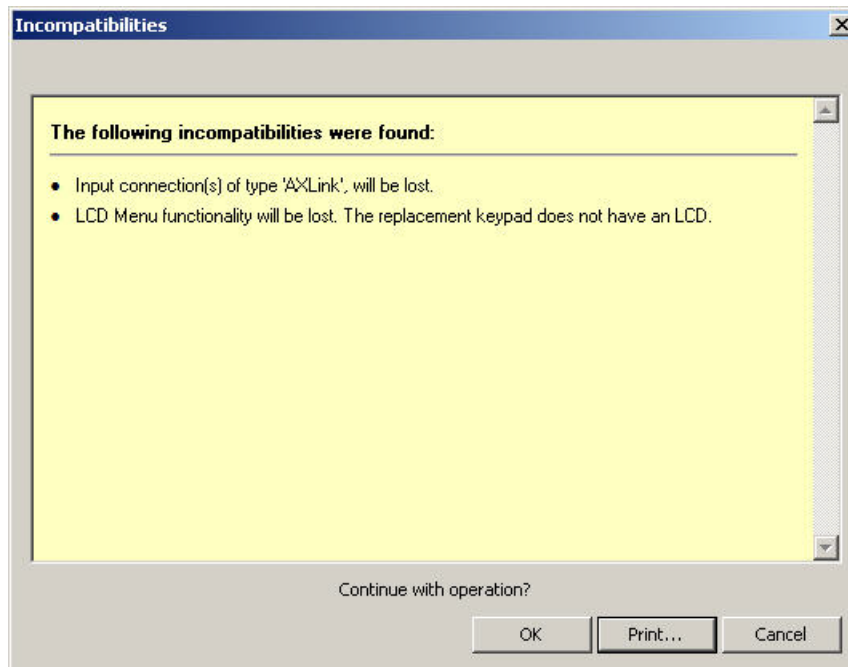


FIG. 131 Incompatibilities dialog

There is no sure way to replace one Keypad with another, especially when the new Keypad contains fewer buttons. Therefore, the Keypad Replacement Table is provided to document a clear direction of what will and will not be replaced for all Keypad combinations.

- Click **OK** to continue with the Keypad replacement operation, or click *Cancel* to cancel the operation and leave the original Keypad in place.

Alternatively, you can drag-and-drop a replacement Keypad from the Toolbox into the System Diagram:

- Position the replacement Keypad directly on top of the existing one to replace it.
- When the replacement Keypad is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor (FIG. 132):



FIG. 132 Replacing a Keypad

- When the Replace Icon appears, release the Keypad ad that you are dragging, and it will replace the existing Keypad.

If the replacement Keypad is the same as the original keypad, there will be no loss of programming, configuration, or customization.

However, if the replacement Keypad differs from the original Keypad, VA will prompt you with a list of incompatibilities in the Incompatibilities dialog.

- Click **OK** to continue with the Keypad replacement operation, or click *Cancel* to cancel the operation and leave the original keypad in place.

When devices are not compatible for replacement (for example, if they require incompatible connection types), the cursor icon indicates that replacement is not allowed (FIG. 133):



FIG. 133 Replacing a Keypad - Replacement Not Allowed



Keypad Replacement Table


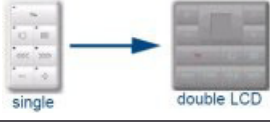








There is no sure way to replace one keypad with another, especially when the new keypad contains fewer buttons. Therefore, the table below is provided to document a clear direction of what will and will not be replaced for all keypad combinations.

The right two columns show the button mapping. For example, when replacing a single gang keypad with a double gang keypad with LCD, the table shows the following button mapping:






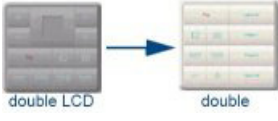




Original Keypad 1..8 | New Keypad 1..4, 13..16

This means buttons 1..4 of the original will be mapped (copied to) buttons 1..4 of the new keypad and buttons 5..8 will be copied to buttons 13..16 of the new keypad.

Keypad Replacement		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
	Original Keypad	New Keypad
 <p>single → single</p>	1..8	1..8
 <p>single → single LCD</p>	1	1

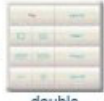











Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
	Original Keypad	New Keypad
 <p>single → double</p>	1..8	1..8
 <p>single → double LCD</p>	1..8	1..4, 13..16
 <p>single → triple LCD</p>	1..8	9..16
 <p>single → MET-6N</p>	1..6	1..6
 <p>single → MET-7</p>	1..8	1..6, 7Left, 7Right
 <p>single → MET-13</p>	1..8	1..8
 <p>single LCD → single</p>	1	1
 <p>single LCD → single LCD</p>	1	1
 <p>single LCD → double</p>	1	1
 <p>single LCD → double LCD</p>	1	5

Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
 <p>single LCD → triple LCD</p>	1	5
 <p>single LCD → MET-6N</p>	1	1
 <p>single LCD → MET-7</p>	1	1
 <p>single LCD → MET-13</p>	1	1
 <p>double → single</p>	1..8	1..8
 <p>double → single LCD</p>	1	1
 <p>double → double</p>	1..16	1..16
 <p>double → double LCD</p>	1..4, 5, 13..16	1..4, 5, 13..16
 <p>double → triple LCD</p>	1..16	9..24

Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
 <p>double → MET-6N</p>	1..6	1..6
 <p>double → MET-7</p>	1..8	1..6, 7Left, 7Right
 <p>double → MET-13</p>	1..14	1..12, 13Left, 13Right
 <p>double LCD → single</p>	1..4, 13..16	1..8
 <p>double LCD → single LCD</p>	5	1
 <p>double LCD → double</p>	1..4, 5, 13..16	1..4, 5, 13..16
 <p>double LCD → double LCD</p>	1..4, 5, 13..16	1..4, 5, 13..16
 <p>double LCD → triple LCD</p>	1..4, 5, 13..16	9..12, 1, 21..24
 <p>double LCD → MET-6N</p>	1..4, 13..14	1..6
 <p>double LCD → MET-7</p>	1..4, 13..16	1..6, 7Left, 7Right

Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
 <p>double LCD → MET-13</p>	1..4, 5, 13..16	1..9
 <p>triple LCD → single</p>	9..16	1..8
 <p>triple LCD → single LCD</p>	1	1
 <p>triple LCD → double</p>	9..24	1..16
 <p>triple LCD → double LCD</p>	9..12, 1, 21..24	1..4, 5, 13..16
 <p>triple LCD → triple LCD</p>	1, 9..24	1, 9..24
 <p>triple LCD → MET-6N</p>	9..14	1..6
 <p>triple LCD → MET-7</p>	9..16	1..6, 7Left, 7Right
 <p>triple LCD → MET-13</p>	9..22	1..12, 13Left, 13Right

Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
 <p>MET-6N → single</p>	1..6	1..6
 <p>MET-6N → single LCD</p>	1	1
 <p>MET-6N → double</p>	1..6	1..6
 <p>MET-6N → double LCD</p>	1..6	1..4, 13..14
 <p>MET-6N → triple LCD</p>	1..6	9..14
 <p>MET-6N → MET-6N</p>	1..6	1..6
 <p>MET-6N → MET-7</p>	1..6	1..6
 <p>MET-6N → MET-13</p>	1..6	1..6
 <p>MET-7 → single</p>	1..6, 7Left, 7Right	1..8
 <p>MET-7 → single LCD</p>	1	1

Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
 →  MET-7 double	1..6, 7Left, 7Right	1..8
 →  MET-7 double LCD	1..6, 7Left, 7Right	1..4, 13..16
 →  MET-7 triple LCD	1..6, 7Left, 7Right	9..16
 →  MET-7 MET-6N	1..6	1..6
 →  MET-7 MET-7	1..6, 7Left, 7Right	1..6, 7Left, 7Right
 →  MET-7 MET-13	1..6, 7Left, 7Right	1..8
 →  MET-13 single	1..8	1..8
 →  MET-13 single LCD	1	1
 →  MET-13 double	1..12, 13Left, 13Right	1..14
 →  MET-13 double LCD	1..9	1..4, 5, 13..16

Keypad Replacement (Cont.)		
Keypad Replacement Scenario	CodeBuilder Button Mapping, Button Name, and Engraving Features (If Supported)	
	1..12, 13Left, 13Right	9..22
	1..6	1..6
	1..8	1..6, 7Left, 7Right
	1..12, 13Left, 13Right	1..12, 13Left, 13Right

Replacing Remotes

VA supports replacing a R-1, R-2, or R-3 Remote in the System Diagram with another R-1, R-2, or R-3 remote.



The R-4 is considered by VA to be a "touch remote" and cannot be used to replace a "standard" Remote or a Touch Panel.

The replacement Remote will retain all button name, engraving, device mode (if applicable), and programming data from the original Remote.

1. Select the Remote in the System Diagram that you want to replace.
2. Select the Remote with which you want to replace it from the Toolbox.
3. Select **Edit > Replace Device** (or select Replace Device from the Toolbox System Devices context menu).

Alternatively, you can drag-and-drop a replacement Remote from the Toolbox into the System Diagram:

1. Position the replacement Remote directly on top of the existing one to replace it.
2. When the replacement Remote is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor (FIG. 134):

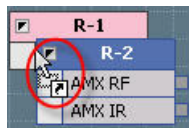


FIG. 134 Replacing a Remote

When the Replace Icon appears, release the remote that you are dragging, and it will replace the existing Remote.

When devices are not compatible for replacement (as is case with MIO R-4 Remotes), the cursor icon indicates that replacement is not allowed (FIG. 135):



FIG. 135 Replacing a Remote - Replacement Not Allowed

Replacing Controlled Devices

VA supports replacing a controlled (third-party) device in the System Diagram with another device of the same type.

To replace a controlled device with another similar device from the Toolbox (Devices tab):

1. Click and drag a device from the Devices tab of the Toolbox into the System Diagram.
2. Position the selected device directly on top of the device that you want to replace.
3. Assuming the devices are of the same device type, when the replacement device is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor. When the Replace Icon appears, release the device that you are dragging, and it will replace the existing one (FIG. 136).



FIG. 136 Replacing a Controlled Device

If the devices are not compatible for replacement, the cursor icon indicates that replacement is not allowed (FIG. 137):



FIG. 137 Replacing a Controlled Device - Replacement Not Allowed

Alternatively, you can use the Replace Device option in the Toolbox System Devices context menu:

1. Select the device in the System Diagram that you want to replace.
2. Select the device that you want to replace it with, in the Toolbox.
3. Select **Edit > Replace Device** (or select Replace Device from the Toolbox System Devices context menu). This option is only enabled if the devices are of the same device type and compatible for replacement.

It is important to note that device properties relative to connection types may be lost:

- All devices are added to the System with the default connection settings for that device's connection type. For example, by default all RS-232/422/485 devices are added with RS-232 set as the Connection Type. So, if any of the default settings were changed before the device is replaced, the properties for the replacement device will need to be re-entered.
- Input mapping information may also be lost when a controlled device is replaced, since each device is likely to have different I/O options.
- Note that any Comments entered will carry over after replacing the device.

Duplicating Devices

Duplicating Touch Panels

VA supports the ability to create a functional duplicate of a touch panel already defined and used in the project, via the **Edit > Duplicate** menu item or the **Duplicate** item in the System Diagram context menu when a touch panel is selected on the System diagram.

1. Select a touch panel in the System Diagram.
2. Select **Edit > Duplicate** (or right-click on the selected touch panel and select **Duplicate** from the System Diagram context menu). This action invokes the *Duplicate Touch Panel* dialog (FIG. 138).

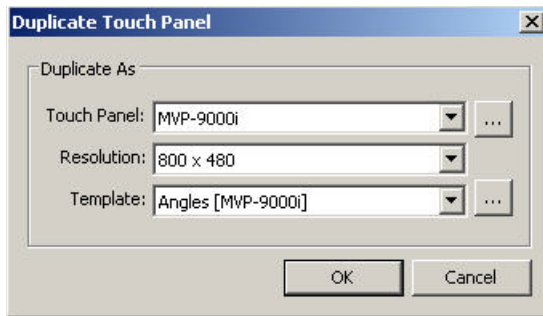


FIG. 138 Duplicate Touch Panel dialog

3. Select the type of Touch Panel to use for the duplicate panel. Click the Browse (...) button to view thumbnails of all supported touch panels in the *Select Control Device* dialog (FIG. 139).

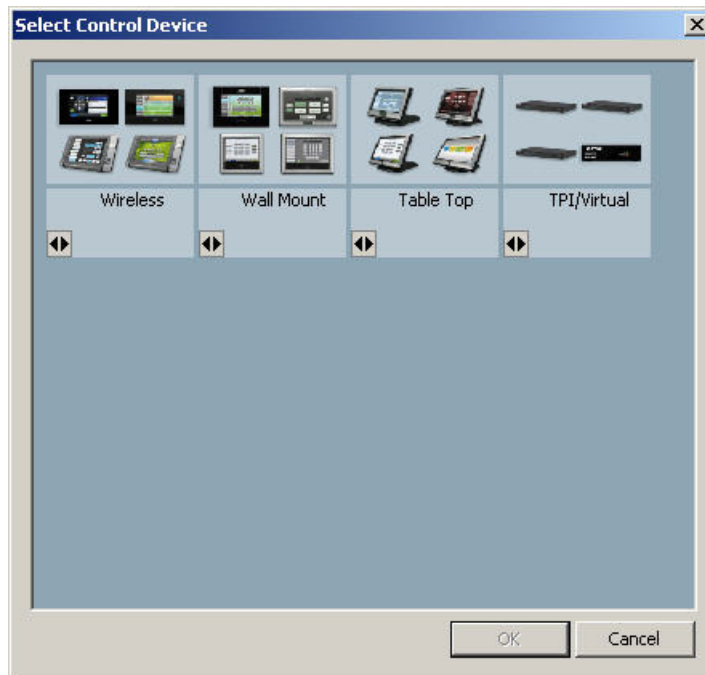


FIG. 139 Select Control Device dialog

4. Select the screen **Resolution** for the duplicate panel (if you have selected a touch panel that supports multiple screen resolutions).
5. Select the **Template** to use on the duplicate panel. Click the Browse (...) button to view thumbnails of all available templates in the *Select User Interface Template* dialog (FIG. 140).

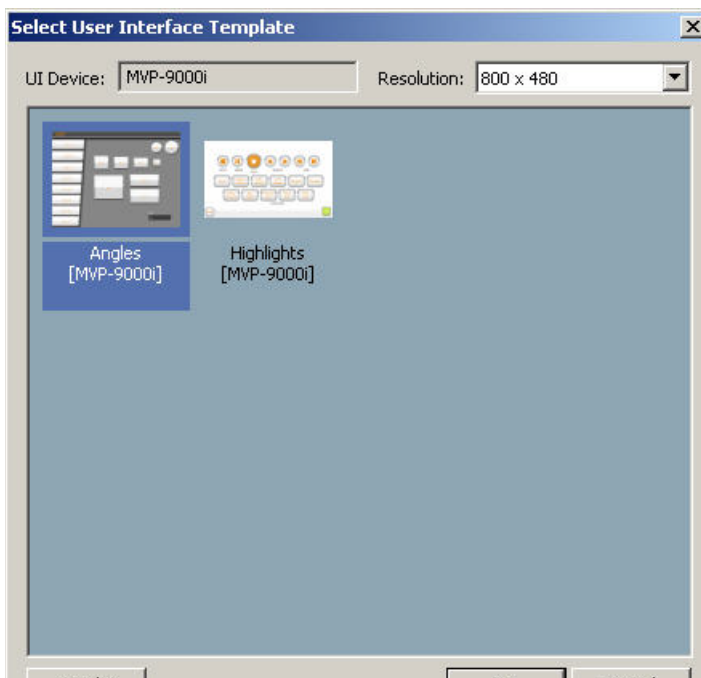


FIG. 140 Select User Interface Template dialog

6. Click **OK** to close the *Duplicate Touch Panel* dialog.

If you select the exact same template that is used by the source touch panel, the new touch panel will be an exact copy with no information lost. However, if the template selected for the duplicate touch panel differs from that used by the source panel, this operation is subject to the same incompatibilities described in the *Replacing Touch Panels* section on page 111.

If incompatibilities are found, VA will present the *Incompatibilities* dialog (see FIG. 131 on page 113), in which you can view the list of incompatibilities, and either proceed or cancel the operation.

Duplicating DMS Keypads

VA supports the ability to create a functional duplicate of a DMS Keypad already defined and used in the project, via the **Edit > Duplicate** menu item or the **Duplicate** item in the System Diagram context menu when a DMS Keypad is selected on the System diagram:

1. Select a DMS Keypad in the System Diagram.
2. Select **Edit > Duplicate** (or right-click on the selected Keypad and select **Duplicate** from the System Diagram context menu). This action invokes the *Duplicate DMS Keypad* dialog (FIG. 141).

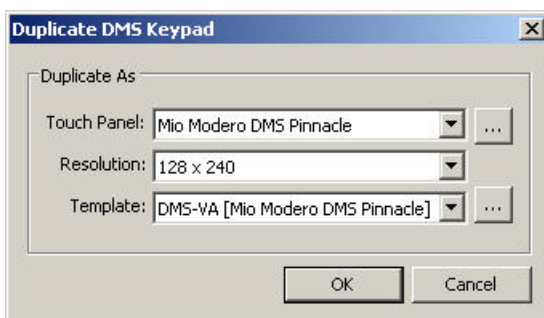


FIG. 141 Duplicate DMS Keypad dialog

3. Select the type of Touch Panel (in this case, a Keypad) to use for the duplicate Keypad. Click the Browse (...) button to view thumbnails of all supported DMS Keypads in the *Select Control Device* dialog.
4. Click **OK** to close the *Duplicate DMS Keypad* dialog.

Duplicating R-4 Remotes

VA supports the ability to create a functional duplicate of an MIO R-4 Remote already defined and used in the project, via the **Edit > Duplicate** menu item or the **Duplicate** item in the System Diagram context menu when an MIO R-4 Remote is selected on the System diagram:

1. Select an R-4 Remote in the System Diagram.
2. Select **Edit > Duplicate** (or right-click on the selected R-4 Remote and select **Duplicate** from the System Diagram context menu). This action invokes the *Duplicate Remote* dialog (FIG. 142)..

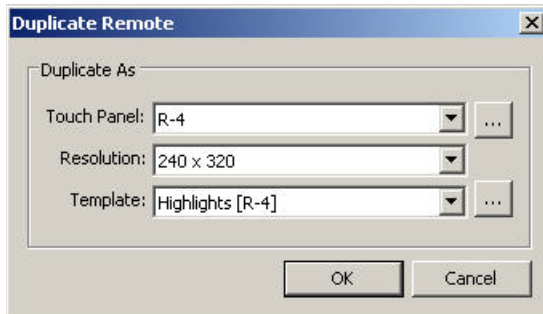


FIG. 142 Duplicate Remote dialog

3. Click **OK** to close the *Duplicate Remote* dialog.

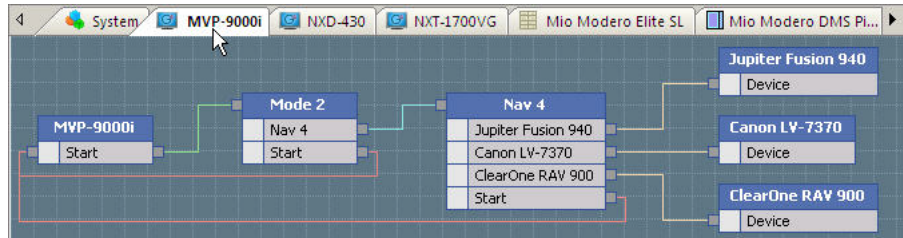
System Diagram context menu

Right-click anywhere inside the System Diagram to access the System Diagram context menu. Refer to the VA online help for descriptions of the options in the context menu.

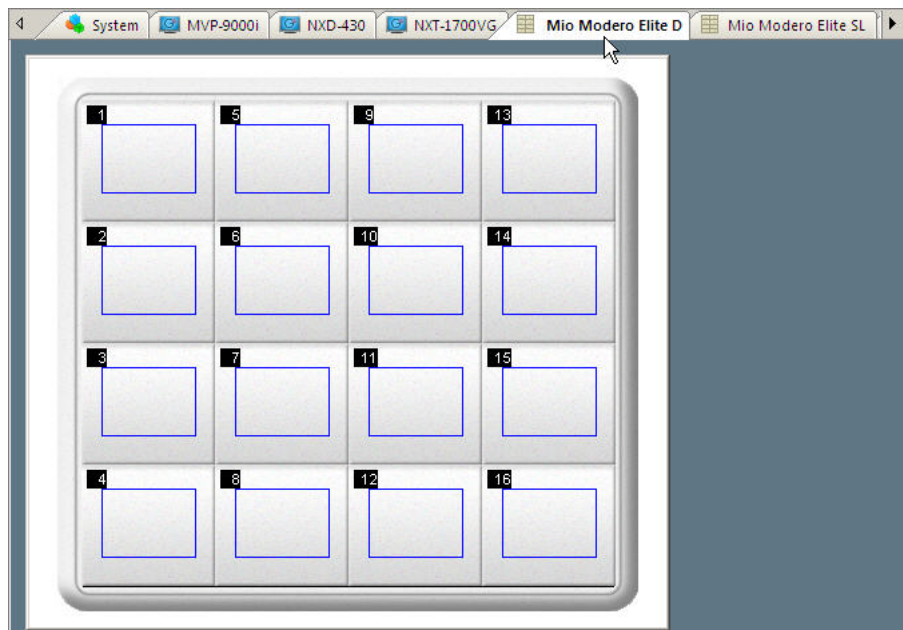
UI Design

Overview

A separate UI tab is added for each User-Interface device added to the system. Use these tabs to design the navigation layout for each of the UI devices.



Touch Panel UI Diagram



Keypad UI Diagram



Remote UI Diagram

FIG. 143 UI Diagrams

- For each Touch Panel and R-4 in the system, there is a **Touch Panel UI** tab, which displays the UI diagram for each panel. See the *Defining the UI - Touch Panels* section on page 144.
- For each Keypad in the system, there is a **Keypad UI** tab, which displays the Keypad Diagram for each keypad. See the *Defining the UI - Keypads* section on page 159.
- For each Remote in the System, there is a **Remote UI** tab, which displays the Remote Diagram for each remote. See the *Defining the UI - Remote Controllers* section on page 169.

The navigation that is established here will be reflected in the resulting Touch Panel, Keypad, and Remote templates generated by VA.

Adding UI Elements To The UI Diagram

The first step in defining the UI for a panel-equipped UI device (Touch Panel, R-4 remote or DMS Keypad) is to add UI Elements to the UI Diagram.

This includes selecting the elements (pages and popup pages) that you want in the UI, adding them to the UI diagram, connecting elements (to establish) the flow from one page to the next, and configuring UI element properties.

Notes:

- You must select a template for the panel (via the *Template* option in the *Properties* window) to populate the UI element tabs in the *Toolbox* with selections.
- You must install at least one template (via the *User Interface Template Manager* dialog) to have a template available to apply to your panel.

1. In the *Toolbox*, click on an UI element tab to display the UI elements of that type available to choose from, within the template currently applied to this panel (FIG. 144).

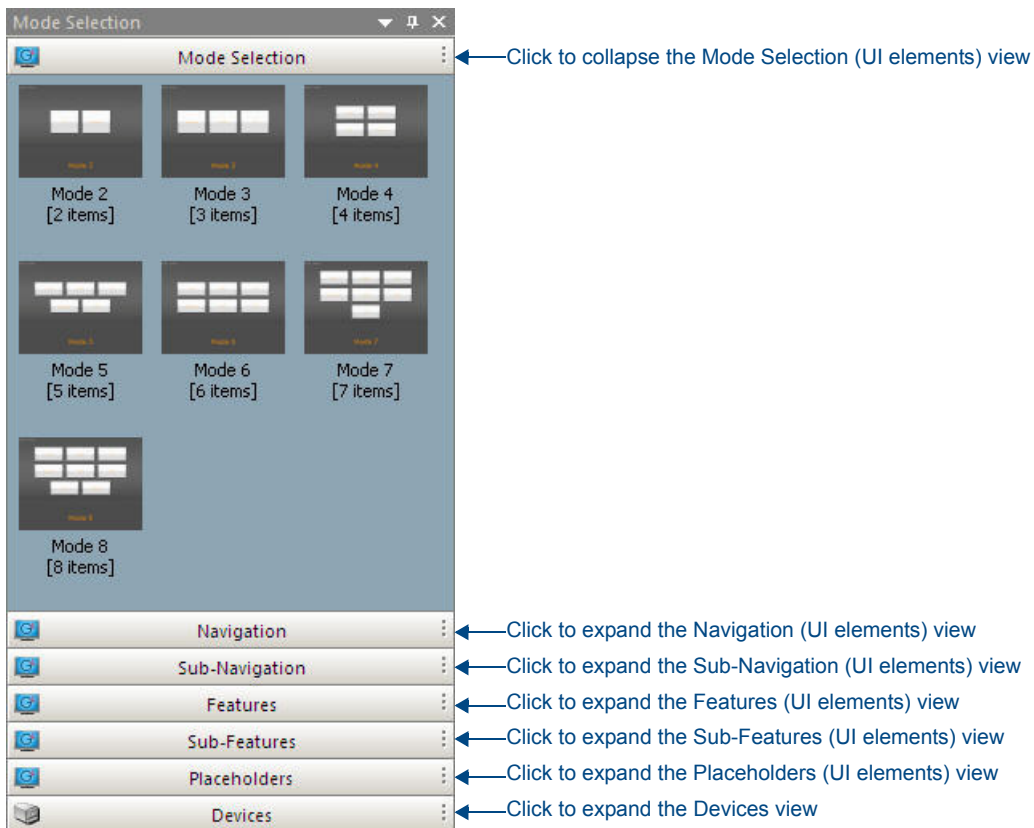


FIG. 144 Toolbox (with a UI tab selected in the Diagram area)

2. Select the desired UI element and drag-and-drop it into the UI diagram. Each element in the UI diagram is represented by a UI element.

- **Mode Selection Elements** - Select a Mode Selection element with the number of modes that you want to define. Mode Selection elements can define from 2 to 8 mode selections.
 - **Navigation Elements** - Select a Navigation element with the number of devices that you want to allow access to. Navigation elements can support up to 8 devices per page.
 - **Sub-Navigation Elements** - Select a Sub-Navigation element with the number of devices that you access from the page. Sub-Navigation elements can support up to 8 devices per page.
 - **Placeholder Elements** - These elements provide empty pages to which functionality can be added in TPDesign4 after the panel project is generated. As such, you can include one or more of these in their project as if it were a device interface. Note that each placeholder must be named uniquely.
3. Connect the UI Elements to each other, to establish flow between pages. Different UI element types have different connection requirements.
 4. Review the UI element properties for this element and edit if necessary.

Connection Nodes - UI Elements

Each Touch Panel UI Element has Connection Nodes on either side that allow each UI Element to be connected to other UI Elements in the Panel UI Diagram (FIG. 145).

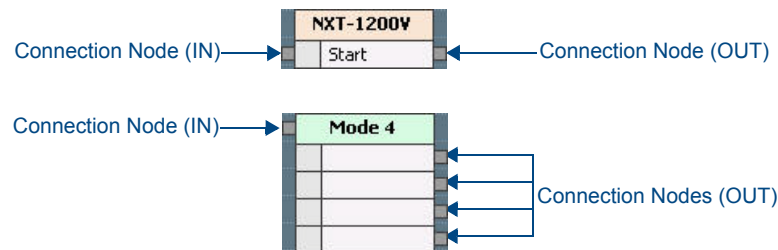


FIG. 145 UI Elements - Connection Nodes

- The node on the left side of the UI Element is the Input (IN) Node, and accepts incoming connections from other UI Elements.
- The nodes on the right side of the UI Element are Output (OUT) Nodes, and provide outgoing connections to other UI Elements.

Connecting Elements In The UI Diagram

Each element in the UI diagram has at least two Connection Nodes. Connection nodes represent connections between elements (pages) in the Touch Panel UI. UI element connections are established by creating lines from one element's Output connection node to another element's Input connection node.

1. In the UI diagram, left-click and hold on the output node of a desired device element.
2. Drag your mouse over a valid input connection node on another UI element, or the required intermediate device (such as an Expansion or Networking device) that allows the device to connect to the Central Controller.

The cursor will change to indicate which nodes are not permitted for the type of connection you are attempting (FIG. 146):

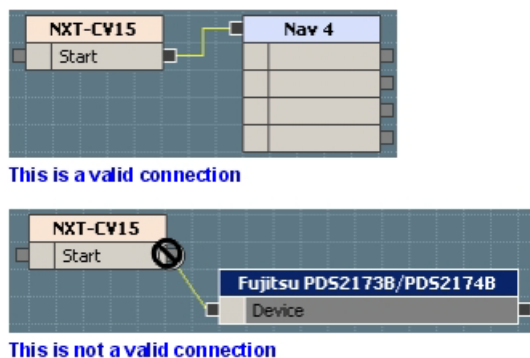


FIG. 146 Connecting UI Elements

Connection Lines - UI Diagram

The connection lines used on UI diagrams are color-coded to indicate the type of UI Element the connection is being made to.

Unique colors are used when a connection is being made to a Mode, Navigation, Sub-Navigation, Device, Placeholder, Feature, Sub-Feature, or back to the Start Device node:

Connection Lines - UI Diagram	
Connection Type	Connection Line Color
• Mode Selection	green
• Navigation	cyan
• Sub-Navigation	cyan
• Features	blue
• Sub-Features	blue
• Placeholders	white
• Devices	light brown

Removing UI Element Connections

To remove a UI element connection:

1. Select an element in the UI diagram and right-click to open the UI Diagram context menu.
2. Select **Remove Connections**.



NOTE

Alternatively, you can select **Remove Connections** from the Device menu. You can also select a connection line and press Delete.

Changing the Connection Line Style

Refer to *Changing the Connection Line Style* section on page 109.

UI Element Types

UI Element Type - Start Device

Initially, the only UI Elements in a Touch Panel UI Diagram are the third-party devices that have been added to the system, and the *Start Device*.

The Start Device represents the Touch Panel for which you are designing the UI in this UI Diagram, and represents the starting point for the UI. In other words, the Start Device represents the "Home Page" on the Touch Panel. Other UI Elements connect to the Start Device Element to establish paths of navigation within the Touch Panel UI.

Start Device UI elements have one Input (IN) Connection Node on the left side, and one Output (OUT) Connection Node on the right side (FIG. 147):

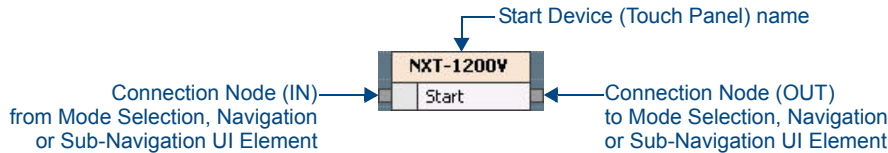


FIG. 147 UI Element Type - Start Device

Use the IN Connection Node on the Start Device element to create one or more paths for the end-user to return to the Home Page.

The path back to the Start Device can only be made from a Mode Selection element, or from a Navigation (or Sub-Navigation) element.

You can create this path back to the Start Device page from more than one Mode Selection or Navigation element. Depending on the overall layout of the UI, you might consider creating multiple paths back to the Home Page (FIG. 148):

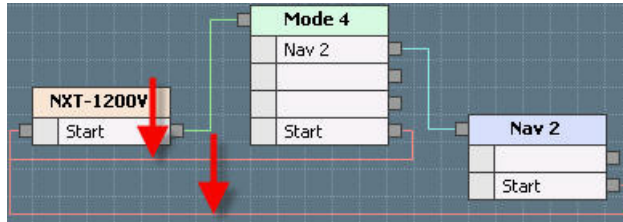


FIG. 148 Creating a Return To Home

Use the OUT Connection Node on the Start Device to connect the Home Page to either a *Mode Selection* UI Element or a *Navigation* UI Element.

UI Element Type - Mode Selection

Mode Selection elements provide the end user the ability to select from multiple modes on the panel (FIG. 149).

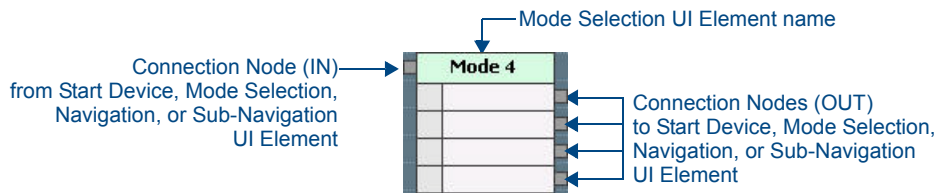


FIG. 149 UI Element Type - Mode Selection ("Mode 4" shown)

Modes are used to separate areas of the Touch Panel UI, so that you don't have to try to fit a device button for every device in the system on a single Navigation page. Modes can be used for several purposes, including:

- To separate functionality - for example, one Mode could provide access to all A/V equipment, while a different mode could be used for non-A/V equipment.
- To separate zones - in a system that includes equipment that is installed in four separate areas, you could assign each zone to its own Mode.
- To customize panel layout - modes can be used to provide a separate UI for different individuals. For example, Dad has his own mode that provides to access to the equipment that he wants to control, while Mom has a different mode that provides access to devices that she is interested in using. You could even set up a mode for the kids that allows them to control some limited set of devices like the TV and DVD player.
- These are only a few basic examples, and modes can be used to accomplish any combination of these and more, depending on your job requirements.
- Consider using one of the exit nodes on the Mode and Navigation elements to connect back to the Start Device. This will provide the end-user with a button that brings them back to the Start page (see FIG. 148 on page 129).



NOTE

Mode Selection UI Elements may be replaced by dragging a new one into the UI diagram. This saves time by replacing all connections automatically - see Replacing UI Elements on page 143 for details.

UI Element Type - Navigation

Navigation (Nav) elements provide the end user the ability to select a third-party device to control. Navigation elements are panel pages containing a buttons that represent each controlled device in the system (FIG. 150).

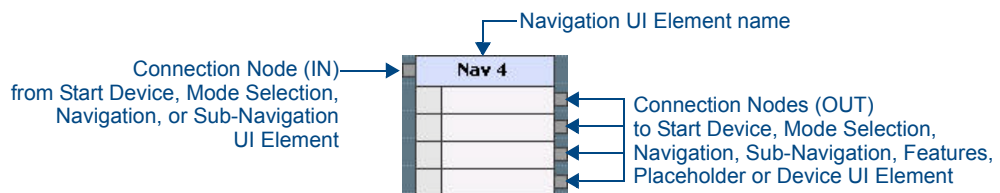


FIG. 150 UI Element Type - Navigation ("Nav 4" shown)

- If your panel is designed for a single-mode system (does not utilize Mode Selection UI Elements), then the Navigation pages are accessed directly from the Start device element.
- If your panel uses multiple modes, then each Mode would provide access a separate Navigation element.
- Sub-Navigation UI Elements provide a method of presenting additional functionality to Navigation Elements in cases where you need more room than the Navigation UI Element provides.
- Device UI Elements can be connected directly to Mode Selection UI Elements, providing access to Device Control pages, directly from the Navigation Page.
- Consider using one of the output (OUT) nodes on Navigation Selection UI Elements to connect back to the Start Device. This will provide the end-user with a button that brings them back to the Start page.



NOTE

Navigation UI Elements may be replaced by dragging a new one into the UI diagram. This saves time by replacing all connections automatically - see Replacing UI Elements on page 143 for details.

UI Element Type - Sub-Navigation

Sub-Navigation elements provide a method of presenting additional functionality to Navigation Elements in cases where you need more room than the Navigation element provides.

- Device UI Elements can be connected directly to Sub-Navigation UI Elements, providing access to Device Control pages, from the Sub-Navigation Page.
- Consider using one of the output (OUT) nodes on Sub-Navigation UI Elements to connect back to the Start Device. This will provide the end-user with a button that brings them back to the Start page.



NOTE

Sub-Navigation UI Elements may be replaced by dragging a new one into the UI diagram. This saves time by replacing all connections automatically - see Replacing UI Elements on page 143 for details.

UI Element Type - Features

Features UI Elements represent panel pages containing buttons that provide specific device functions, including *ComputerControl*, *TakeNote*, *Macro Buttons* and *Video Window* (FIG. 151).

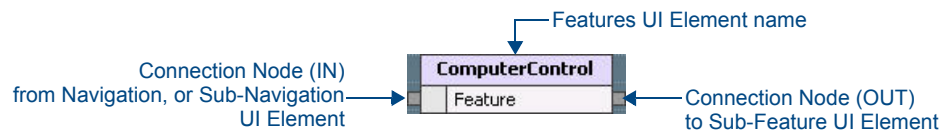


FIG. 151 UI Element Type - Feature

Features elements provide the end user the ability to access a specific set of features for a third-party controlled device.

UI Element Type - Sub-Feature

Sub-Features elements are popup pages that provide specific feature sets (i.e., *Volume Controller*) that can be applied to device UI pages (FIG. 152).



FIG. 152 UI Element Type - Sub-Feature

UI Element Type - Placeholder

Placeholder elements provide empty pages to which functionality can be added in TPDesign4 after the panel project is generated. Placeholders can be thought of as specialized device interfaces that have no function.

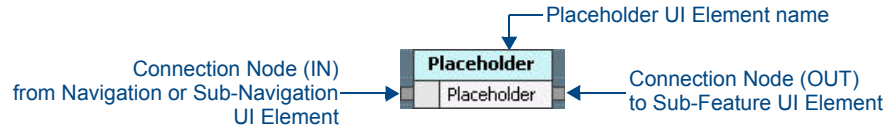


FIG. 153 UI Element Type - Placeholder



All Placeholders must be named uniquely.

UI Element Type - Device Elements

Device Elements represent the device-specific pages in the UI. Device Elements provide access to the controlled functions of each device in the system (FIG. 154).

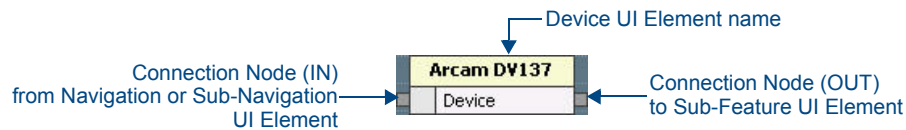


FIG. 154 UI Element Type - Device Element

UI Element Properties

When a UI element is selected in a UI Diagram, detailed information for that UI element is displayed in the Properties window. The rows displayed this table will vary depending on the nature of the selected UI element.

Using Quick Input

Select **Quick Input** from the Edit menu (or the System Diagram context menu or Panel UI Diagram context menu) to access the Quick Input sub-menu.

The Quick Input setting allows you to enter a particular device or UI element property, without having to select the property in the Properties Window.

Use the **Edit > Quick Input** submenu to specify which device property to assign Quick Input to. The options are:

- **Name** (default setting): With this option selected, you can select a device and type to change that device's name.
- **Current Property**: Highlight any device property (in the Properties window) and select Current Property to assign the selected property to Quick Input.
For example, select the Device Number property (in the Properties window), and select Current Property from the Quick Input sub-menu, then any time you select a device in the System Diagram, you can just type and press the Enter key to enter a device number for the selected device.
Note that VA will prompt you if the value entered is outside of the allowed range for the selected property.
- **Disabled**: This option disables the Quick Input feature.

UI Element Properties - Start Device Element

The Start Device represents the Touch Panel or MIO R-4 remote for which this project is being designed. An example Start Device element for a MVP-5200i touch panel is shown below (FIG. 155):



FIG. 155 UI Element Type - Start Device (MVP-5200i)

The parameters for the Start Device Element are set via fields in the Properties window (FIG. 156):

Properties	
Name	MVP-5200i
Comments	
Category	Touch Panel
Model Number	MVP-5200i
Color	Gloss Black
FG Number	FG5966-01
MSRP	\$4,200
Device Number	10001
IP Address/Host Name	
Template	Angles [MVP-5200i]
Color Scheme	Charcoal & Orange
Skin	Angles
Unicode Font	none

FIG. 156 UI Element Properties - Start Device

When the Start Device element is selected in a UI diagram, the Properties window is populated with the following properties:

UI Element Properties - Start Device	
• Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Model Number	See page 139.
• Color	See page 137.
• FG Number	See page 138.
• MSRP	See page 139.
• Device Number	See page 137.
• IP Address/Host Name	See page 139.
• Template	See page 140.
• Color Scheme	See page 137.
• Skin	See page 140.
• Unicode Font	See page 140.

UI Element Properties - Mode Selection

Mode Selection elements provide panel pages used specifically for selecting between two or more modes on the panel (FIG. 157).

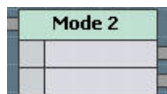


FIG. 157 UI Element Type - Mode Selection

The parameters for Mode Selection UI Elements are set via fields in the Properties window (FIG. 158):

Properties	
Name	Mode 2
On-Screen Name	
Comments	
Category	Mode Selection
Template Element	Mode 2
Device Port Number	12
Items	
Item 1	Nav 8
Item 2	Start

FIG. 158 UI Element Properties - Mode Selection

When a Mode Selection element is selected in a UI diagram, the Properties window is populated with the following properties:

UI Element Properties - Mode Selection	
• Name	See page 140.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Template Element	See page 140.
• Device Port Number	See page 137.
Items	
• Item 1...	See page 139.

UI Element Properties - Navigation

Navigation elements provide panel pages that provide access to other elements in the UI diagram (FIG. 159).

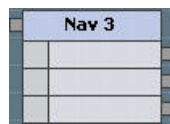


FIG. 159 UI Element Type - Navigation

The parameters for Navigation UI Elements are set via fields in the Properties window (FIG. 160):

Properties	
Name	Nav 3
On-Screen Name	
Comments	
Category	Navigation
Template Element	Nav 3
Device Port Number	11
Items	
Item 1	
Item 2	
Item 3	

FIG. 160 UI Element Properties - Navigation

When a Navigation element is selected in a UI diagram, the Properties window is populated with the following properties:

UI Element Properties - Navigation	
• Name	See page 140.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Template Element	See page 140.
• Device Port Number	See page 137.
Items	
• Item 1...	See page 139.

UI Element Properties - Sub-Navigation

Sub-Navigation elements provide panel pages that provide access to other elements in the UI diagram. When a Sub-Navigation element is selected in a UI diagram, the Properties window is populated with the following properties:

UI Element Properties - Navigation	
• Name	See page 140.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Template Element	See page 140.
• Device Port Number	See page 137.
Items	
• Item 1...	See page 139.

UI Element Properties - Features

Feature elements provide panel pages containing buttons that represent specific functions (including ComputerControl, TakeNote, Video Window and Macro Buttons) in the UI diagram. Features elements also provide the end user the ability to access a specific set of features for a third-party controlled device (FIG. 161).



FIG. 161 UI Element Type - Features

The parameters for Feature UI Elements are set via fields in the Properties window (FIG. 162):

Properties	
Name	TakeNote
On-Screen Name	
Comments	
Category	Feature
Template Element	TakeNote
Device Port Number	16
Graphic - BACKGROUND Configuration	
TakeNote Host	
TakeNote Port	0
Graphic - BACKGROUND Configuration	
TakeNote Host	192.168.223.45
TakeNote Port	1541

FIG. 162 UI Element Properties - Features

When a Feature element is selected in a UI diagram, the upper portion of the Properties window is populated with the following properties:

UI Element Properties - Features	
• Name	See page 140.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Template Element	See page 140.
• Device Port Number	See page 137.

The lower portion of the window presents Feature-specific options:

- Features UI Element Properties - ComputerControl (see *Feature Property - ComputerControl* on page 141)
- Features UI Element Properties - TakeNote (see *Feature Property - TakeNote* on page 142)

- Features UI Element Properties - Video Window (see *Feature Property - Video Window* on page 142)

Use the options in the Customize UI Pages dialog to edit the default Features pages as desired.

UI Element Properties - Sub-Features

Sub-Feature elements provide panel pages provide specific feature sets (i.e., Volume Control) that can be applied to device UI pages (FIG. 163).



FIG. 163 UI Element Type - Sub-Features

The parameters for Sub-Feature UI Elements are set via fields in the Properties window (FIG. 164):

Properties	
Name	Volume Controller
On-Screen Name	
Comments	
Category	Sub-Feature
Template Element	Volume Controller
Device Port Number	17

FIG. 164 UI Element Properties - Sub-Features

When a Sub-Feature element is selected in a UI diagram, the upper portion of the Properties window is populated with the following properties:

UI Element Properties - Sub-Features	
• Name	See page 140.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Template Element	See page 140.
• Device Port Number	See page 137.

UI Element Properties - Placeholder

Placeholder elements provide empty pages to which functionality can be added in TPDesign4 after the panel project is generated. Placeholders can be thought of as specialized device interfaces that have no function. As such, you can include one or more of these in their project as if it were a device interface (FIG. 165).



FIG. 165 UI Element Type - Placeholder

The parameters for Placeholder UI Elements are set via fields in the Properties window (FIG. 166):

Properties	
Name	Placeholder
On-Screen Name	
Comments	
Category	Placeholder
Template Element	Placeholder
Device Port Number	18

FIG. 166 UI Element Properties - Placeholder

When a Placeholder element is selected in a UI diagram, the upper portion of the Properties window is populated with the following properties:

UI Element Properties - Sub-Features	
• Name	See page 140. Note: All placeholders must be named uniquely.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Template Element	See page 140.
• Device Port Number	See page 137.

UI Element Properties - Device Elements

Device elements contain the UI for each controlled device in the system (FIG. 167).



FIG. 167 UI Element Type - Device Elements

The parameters for Device UI Elements are set via fields in the Properties window (FIG. 168):


Properties	
Name	Tascam MDCCD1
On-Screen Name	
Comments	
Category	CD Player / Changer
Manufacturer	Tascam
Model Number	MDCCD1

FIG. 168 UI Element Properties - Device Elements

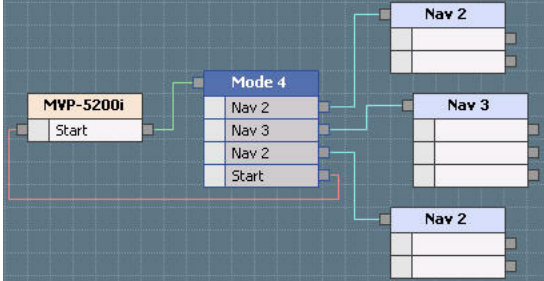
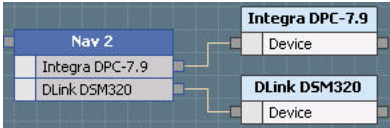
When a Device element is selected in a UI diagram, the Properties window is populated with the following properties:

UI Element Properties - Device Elements	
• Name	See page 140.
• On-Screen Name	See page 140.
• Comments	See page 137.
• Category	See page 137.
• Manufacturer	See page 139.
• Model Number	See page 139.
• Template Element	See page 140.
• Device Port Number	See page 137.

UI Element Properties

UI Element Properties	
Button Name	<p>The button name is for use within VA only, and is intended to assist in developing unique descriptive names.</p> <p>This is <i>not</i> the text that will be engraved on the button (see <i>Engraving Text</i> on page 138).</p> <p>Note: This property applies only to MIO-R-1, R-2 and R-3 Remotes.</p>
Category	<p>The VA device category of this Controller (read-only).</p> <p>Note that the Category field is displayed as both a Device property and a UI Element property.</p>
Color	<p>Click to access the drop-down menu, and select from a listing of color options available for this device.</p> <p>Note that this selection is automatically reflected in the FG Number field.</p> <p>Note that the Color field is displayed as both a Device property and a UI Element property.</p>
Color Scheme	<p>Once a Template has been selected, this field is enabled. Click to access the drop-down menu and select a color theme to apply to the selected template.</p> <p>Color themes can be used in conjunction with Templates and Skins to easily create custom UI page layouts.</p> <p>The Color Scheme affects the text and background area of the selected Template.</p> <p>Note that the Color Scheme field is displayed as both a Device property and a UI Element property.</p>
Comments	<p>Click to add developer's comments regarding this device.</p> <p>Once comments have been added to a device, a yellow comment icon is added to the Device Element in the System Diagram (or the Start Element in a UI Diagram), and the comments are displayed when the cursor hovers over the element:</p>  <p>The screenshot shows a device element labeled 'MVP-5200i' with a sub-label 'Ethernet 802.11g'. A yellow tooltip box titled 'Device Comments:' is overlaid on the element, containing the text 'Hey now'.</p> <p>Note that the Comments property is displayed as both a Device property and a UI Element property.</p>
Device Mode	<p>This field allows you to specify a device to be controlled with the remote with any of the bottom six buttons on the remote.</p> <p>Select the device mode from the drop-down menu of devices in your system. Note that this field is only available when one of the lower six button is selected in the Remote UI.</p> <p>Note: This property applies only to MIO-R-1, R-2 and R-3 Remotes.</p>
Device Number	<p>Central Controllers: The current Device Number setting for this Controller (default = 0).</p> <ul style="list-style-type: none"> Other devices: The current Device Number setting for this device (see <i>Device Number Defaults</i> on page 75). Note that the Device Number field is displayed as both a Device property and a UI Element property.
Device Port Number	<p>The Touch Panel's default device port number assignment (click to edit).</p> <p>The first UI Element added to the UI Diagram is assigned default Device Port Number 10; each one added thereafter increments it's default Device Port Number by +10 (20, 30, 40, etc).</p>

UI Element Properties (Cont.)	
Engraving Font	<p>Select AMX Icon 2 (for symbols), or Arial, Arial Narrow or Arial Unicode MS for text from the drop down menu.</p> <p>AMX Icon 2 provides various control-oriented icons that can be engraved on the buttons.</p> <p>The VA Engraving module supports the fonts included in the supported OS (System) languages. You must have the language loaded on your OS and then use Arial Unicode MS to render the text on the button.</p> <p>Note: <i>This property applies only to MIO-R-1, R-2 and R-3 Remotes.</i></p>
Engraving Scale	<p>Select a scale factor to apply to the engraved text on the selected button (default = 1.0, or 100%).</p> <p>Click inside the text field to enable Up and Down arrows to scale the selected button text up or down, in .1 (or 10%) increments.</p> <ul style="list-style-type: none"> • 0.5 = 50% • 0.6 = 60% • 0.7 = 70% • 0.8 = 80% • 0.9 = 90% • 1.0 = 100% (default) • 1.1 = 110% • 1.2 = 120% • 1.3 = 130% • 1.4 = 140% • 1.5 = 150% <p>Note: <i>This property applies only to MIO-R-1, R-2 and R-3 Remotes.</i></p>
Engraving Text	<p>Enter the text that you want to have engraved on the selected button in this text field. To enter text, click inside the text field and type directly into the field.</p> <p>Alternatively, click on the browse button (...) to access the <i>Enter Text</i> dialog - enter the button text and click OK to save.</p> <p>Note: <i>In addition to the 10 character limit in the KeypadBuilder application, the maximum number of characters allowed is based on font choice as well as size and specific characters used.</i></p> <p>Note: <i>This property applies only to MIO-R-1, R-2 and R-3 Remotes.</i></p>
FG Number	<p>The AMX "Finished Goods" number associated with this device (read-only).</p> <p>Note that the FG Number field is displayed as both a Device property and a UI Element property.</p>

UI Element Properties (Cont.)																	
Items	<p>The Items list at the bottom of the Properties window indicates the UI Elements and controlled devices that are connected to the selected UI element.</p> <p>When other UI Elements are connected to the selected Element, each connected Element's Name is added to the slot associated with the node to which it is connected. For example, a Mode 4 Mode Selection element with connections to three Navigation elements and to the Start Device element (as shown below),</p>  <p>Will indicate Nav 2, Nav3, Nav2 and Start in the Items list:</p> <table border="1"> <thead> <tr> <th colspan="2">Items</th> </tr> </thead> <tbody> <tr> <td>Item 1</td> <td>Nav 2</td> </tr> <tr> <td>Item 2</td> <td>Nav 3</td> </tr> <tr> <td>Item 3</td> <td>Nav 2</td> </tr> <tr> <td>Item 4</td> <td>Start</td> </tr> </tbody> </table> <p>When controlled devices are connected to this element, the default device names (Manufacturer and Model Number) are added to the Item slots for easy identification (click to edit). For example, a Nav 2 Navigation element with connections to two device elements (as shown below),</p>  <p>Will indicate the connected devices in the Items list:</p> <table border="1"> <thead> <tr> <th colspan="2">Items</th> </tr> </thead> <tbody> <tr> <td>Item 1</td> <td>Integra DPC-7.9</td> </tr> <tr> <td>Item 2</td> <td>DLink DSM320</td> </tr> </tbody> </table> <p>Note that when you edit an Item name, the new name is reflected in the selected device element (in the UI diagram).</p>	Items		Item 1	Nav 2	Item 2	Nav 3	Item 3	Nav 2	Item 4	Start	Items		Item 1	Integra DPC-7.9	Item 2	DLink DSM320
Items																	
Item 1	Nav 2																
Item 2	Nav 3																
Item 3	Nav 2																
Item 4	Start																
Items																	
Item 1	Integra DPC-7.9																
Item 2	DLink DSM320																
IP Address/Host Name	<p>Enter an IP address (or Host Name if applicable) for this device.</p> <p>Note that the IP Address/Host Name field is displayed as both a Device property and a UI Element property.</p>																
Manufacturer	<p>This field indicates the name of the selected device's manufacturer (read-only).</p>																
Model Number	<p>The product model number of this device (read-only).</p> <p>Note that the Model Number field is displayed as both a Device property and a UI Element property.</p>																
MSRP	<p>The AMX Manufacturer's Suggested Retail Price for this device (read-only).</p> <p>Note that the MSRP field is displayed as both a Device property and a UI Element property.</p>																

UI Element Properties (Cont.)	
Name	<p>Start Device - The (default) system name for the UI (Start Device) element (click to edit). Note that for the Start Device, the UI Element Name is the same as the Device Name.</p> <p>All other UI Elements - The (default) system name for the selected UI element.</p> <p>Note: <i>It only appears on the UI diagram, it is not displayed on the generated Touch Panel page.</i></p>
On-Screen Name	<p>This field allows you to specify a On-Screen Name for this UI element (click to edit). The On-Screen Name is displayed on the panel page that this element represents. Click inside this row to enter a View Name (which may contain Unicode characters) in the Enter View Name dialog.</p> <p>When you add a On-Screen Name to an element, the On-Screen Name is indicated in parenthesis beneath the Name on this element (in the UI diagram).</p> <p>Typically, the On-Screen Name is used to enter Unicode text for display on the panel, or to leave the system name of a device to as the default 'Manufacturer Model Number' (e.g., 'Marantz DV9500) while displaying a different name on the panel (e.g., 'DVD').</p>
Skin	<p>Once a Template has been selected, this field is enabled. Click to access the drop-down menu and select a Skin to apply to the selected template.</p> <p>Skins can be used in conjunction with Templates and Color Schemes to easily create custom UI page layouts.</p> <p>Skins allow you to further customize your UI page layout by easily changing the appearance of the Menu area of the page, without altering the Template or Color Scheme selections.</p> <p>Note that the Skin field is displayed as both a Device property and a UI Element property.</p>
Template	<p>Click inside this field to access the drop-down menu and select a template to apply to this panel.</p> <p>Note: <i>VA only presents templates that include a resolution supported by the selected panel.</i></p> <p>Click Browse to access the <i>Select User Interface Template</i> dialog.</p> <p>Note that the Template field is displayed as both a Device property and a UI Element property.</p>
Template Element	<ul style="list-style-type: none"> • <i>Navigation UI Elements:</i> The selection's UI element type (read-only). • <i>Device UI Elements:</i> Click to select the template element type from the drop-down list that best describes the type of device selected. The options in the drop-down list reflect the device types listed in the Devices tab of the Toolbox.
Unicode Font	<p>This field is enabled only after a Template has been selected. Click to access the drop-down menu and select a font to use with the selected template.</p> <ul style="list-style-type: none"> • Note that you can scroll through the font list by double-clicking in the text field. • Note that the Unicode Font field is displayed as both a Device property and a UI Element property.

Feature Property - ComputerControl

When a ComputerControl (Feature) UI Element is selected in the UI Diagram, the following properties are presented in the lower portion of the Properties window (FIG. 169):

ComputerControl Configuration	
Remote Host	
Remote Port	5900
Password	
Color Depth	high color (16-bit)
Compression	no
Scale To Fit	no
TakeNote Enabled	no
Button - LEFT-CLICK Configuration	
Address Code	1
Button - CENTER-CLICK Configuration	
Address Code	1
Button - RIGHT-CLICK Configuration	
Address Code	1
Button - KEYBOARD Configuration	
Address Code	1
Button - DOUBLE-CLICK Configuration	
Address Code	1

FIG. 169 UI Element Feature Property - ComputerControl

UI Element Feature Property - ComputerControl	
ComputerControl Configuration	
• Remote Host	Enter the IP Address of the PC running the VNC client used by ComputerControl.
• Remote Port	Enter the port number used by the VNC client (default = 5900).
• Password	Enter the Password required by the VNC client (if required).
• Color Depth	Select either high color (16-bit), or true color (24-bit). The default setting is 16-bit.
• Compression	Select whether to enable compression on the ComputerControl image to fit the target touch panel (Yes or No, default = No).
• Scale To Fit	Select whether to scale the ComputerControl image to fit the target touch panel (Yes or No, default = No).
• TakeNote Enabled	Select whether ComputerControl is TakeNote enabled (Yes or No, default = No).
Button Configuration	
• LEFT-CLICK Address Code	Enter the address code to be assigned to the "Left-Click" button in the ComputerControl touch panel page.
• CENTER-CLICK Address Code	Enter the address code to be assigned to the "Center-Click" button in the ComputerControl touch panel page.
• RIGHT-CLICK Address Code	Enter the address code to be assigned to the "Right-Click" button in the ComputerControl touch panel page.
• KEYBOARD Address Code	Enter the address code to be assigned to the "Keyboard" button in the ComputerControl touch panel page.
• DOUBLE-CLICK Address Code	Enter the address code to be assigned to the "Double-Click" button in the ComputerControl touch panel page.

Use the options in the Customize UI Pages dialog to edit the default Features pages as desired.

Feature Property - TakeNote

When a TakeNote (Feature) UI Element is selected in the UI Diagram, the following properties are presented in the lower portion of the Properties window (FIG. 170):

Graphic - BACKGROUND Configuration	
TakeNote Host	
TakeNote Port	0
Graphic - BACKGROUND Configuration	
TakeNote Host	192.168.223.45
TakeNote Port	1541

FIG. 170 UI Element Feature Property - TakeNote

UI Element Feature Property - TakeNote	
Graphic - BACKGROUND Configuration	
• Graphic	BACKGROUND Configuration
• TakeNote Host	Enter the IP Address of the PC running the VNC client used by ComputerControl and TakeNote.
• TakeNote Port	Enter the port number used by the VNC client (default = 1541).

Feature Property - Video Window

When a Video Window (Feature) UI Element is selected in the UI Diagram, the following properties are presented in the lower portion of the Properties window (FIG. 171):

Video Preview Configuration	
Video Fill	composite video
Video Cropping	4:3/16:9 Anamorphic (0 ...
Video Touch Pass-Thru	no

FIG. 171 UI Element Feature Property - Video Window

UI Element Feature Property - Video Window	
Video Preview Configuration	
• Video Fill	Select video signal type (Composite, Component/RGB, Streaming Video or None) from the drop-down menu (default = Composite)
• Video Cropping	Select a video cropping option from the drop-down menu (default = 4:3/16:9 Anamorphic). This option is only presented if <i>Composite</i> or <i>Component/RGB</i> are selected as the Video Fill.
• Video Touch Pass-Thru	Select whether to enable video touch pass-thru on this video window button (default = no). This option is only presented if <i>Composite</i> or <i>Component/RGB</i> are selected as the Video Fill.

Removing UI Elements

There are several ways to remove UI Elements from the UI Diagram:

- Right-click on an element in the UI diagram and select Delete from the UI Diagram context menu.
- Select an element in the UI diagram and select Delete from the Edit menu.
- Select an element in the UI diagram and click the Delete Toolbar button.
- Select an element in the UI diagram and press the Delete key.

The program will prompt you to verify this action before the device is removed from the system.



NOTE

Click the **Don't Show Again** option in the Remove Element dialog to avoid being prompted again. You can reactivate this prompt at any time via the Help > Reset Message Boxes option.

Replacing UI Elements

VA supports replacing a Mode, Navigation, or Sub-Navigation UI Element on a UI diagram with another element of the same type.

To replace a Mode, Navigation, or Sub-Navigation element:

1. Click and drag a UI element from the Toolbox into a UI Diagram.
2. Position the selected UI element directly on top of the element that you want to replace.
3. Assuming the elements are of the same type, when the replacement element is positioned correctly to replace the existing one, the Replace icon is displayed on the cursor.

When the Replace Icon appears, release the element that you are dragging, and it will replace the existing one (FIG. 172):

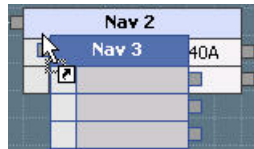


FIG. 172 Replacing UI Elements

If the elements are not compatible for replacement, the cursor icon indicates that replacement is not allowed (FIG. 173):



FIG. 173 Replacing UI Elements - Replacement Not Allowed

Alternatively, you can use the Replace Element option in the Toolbox User Interfaces context menu:

1. Select the element in the UI Diagram that you want to replace.
2. Select the element that you want to replace it with, in the Toolbox.
3. Select Edit > Replace (or select Replace Element from the Toolbox User Interfaces context menu).



NOTE

This option is only enabled if the elements are compatible for replacement.

It is important to note that depending on the differences between the original UI element and the one that is selected to replace it, some UI element properties may be lost.

- If the replacement element has an equal or greater number of connections, all connections, connection names, comments and CodeBuilder data will be carried over to the replacement element in the order they existed on the original element.
- If the replacement element has fewer number of connections, the original connection data will be transferred to the replacement in order, skipping unused connections, until all available connections in the replacement have been used. After which, any remaining connections in the original element will be lost.

Defining the UI - Touch Panels

Defining the UI - Touch Panels

For every panel-equipped UI device (Touch Panel, R-4 remote or DMS Keypad) added to the System Diagram, a Panel UI tab is created. This is where you will create a UI diagram that defines the layout and navigation of the panel pages and buttons that provide the GUI for the end-user.

As a basic example of Touch Panel navigation, each panel has a start page that is displayed when the panel is powered up. The start page will typically contain several buttons that, when pushed by the user, will flip to other pages on the panel. A very simple scenario would be to have buttons on the Start page that provide access to device-specific pages. In this case, the user might be presented with four buttons:

CD Player, DVD Player, Display and Sound System. When the user presses the CD Player button, the device page for the CD Player is invoked, allowing the user to control the CDP via the control buttons on that page. Similarly, the DVD Player button would open the DVD Player's device page with transport controls for that device. Likewise, the Display and Sound System buttons would take the user to the Display device page and the Sound System device page.

More typically, Panel UI navigation can be more complex, to accommodate multiple modes and zones of control within the system. For more complex systems, the Start page might contain buttons that take the user to Mode Selection pages to allow them to select from two or more control modes (for example to separate A/V equipment from HVAC equipment), rather than directly to a device page.

In many cases, controlled devices are too complex to represent all of their functions on a single Touch Panel page. In these cases, you might choose to use multiple pages to organize device functions in a way that makes it easy for the end-user to control the device.

Note that when you select a Panel UI tab, the options in the Toolbox change to support UI design, and the Touch Panel Toolbar is displayed.

Select and apply a UI Template before starting the UI design. Without a template, there are no UI elements available to select from.

Initially the UI diagram indicates the selected UI device as the Start Device element, and the controlled devices in the system. Note that each device in the system is represented with its own UI element. In the context of the Panel UI tab, these elements represent separate pages in the Touch Panel design, not the physical devices. Each device has its own page, where you will define the buttons that provide access to device functions.

The basics of defining the Panel UI include:

1. Adding UI Elements to the UI diagram - drag-and-drop UI Elements from the Toolbox onto the diagram. See the *Adding UI Elements To The UI Diagram* section on page 126.
2. Connect the UI Elements - draw connection lines to establish the flow between the pages and UI Elements. See the *Connecting Elements In The UI Diagram* section on page 127.
3. Set the UI Element Properties - view and edit properties (including Name, Comments, Category, Device Port Number and more) for each UI element. See the *UI Element Properties* section on page 131.
4. Customizing Panel UI Pages - add, remove and edit buttons on panel UI pages. See the *Customizing Panel UI Pages* section on page 155.

Mode/Navigation/Sub-Navigation Button Feedback

For Mode, Navigation, and Sub-Navigation UI elements that have been added to a Panel UI diagram, VA will automatically establish appropriate feedback for the buttons that represent the individual connection points.

For connection points that are connected to a Device or Feature element, their buttons will be generated with "channel" feedback and the appropriate code generated to establish a mutually exclusive channel group, set output channel state, and connect feedback back to the button.

For connection points that are not connected to a Device or Feature element, either because they are unused or because they are "macro" buttons that perform a programmed action, their buttons will be generated with "momentary" feedback. No code is necessary for these buttons, as the press/release feedback is handled completely by the touch panel itself.

As an example, refer to the following UI Diagram (FIG. 174):

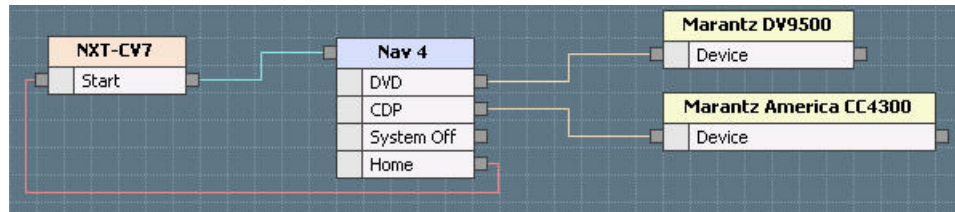


FIG. 174 Panel UI diagram

In the resulting TPDesign4 project for this touch panel, the "DVD" and "CDP" buttons on the Nav 4 page will have "channel" feedback because they are connected to their respective devices; while the "System Off" and "Home" button will have "momentary" feedback because they are unconnected.

If we assume that:

- a. the Nav 4 element has been addressed in the generated code as:

```
dvTP1_NAV_Nav41 = 10001:10:0
```

- b. the four items in the navigation will be assigned channel codes 1 through 4:

```
(DVD = 1, VCR = 2, System Off = 3, and Home = 4),
```

an entry will be made in the DEFINE_MUTUALLY_EXCLUSIVE section of the main source file that looks like the following:

```
DEFINE_MUTUALLY_EXCLUSIVE
// Nav 4 - mutually exclusive group
([dvTP1_NAV_Nav41, 1], [dvTP1_NAV_Nav41, 2])
```

This will establish a mutually exclusive channel group for the "DVD" and "CDP" buttons of the Nav 4 element. This means that a maximum of only one of the channels in the group can be "on" at a time.

NetLinx will automatically turn "off" all other channels in a mutually exclusive group when one member is turned "on". There will be a mutually exclusive channel group for each Mode, Navigation, or Sub-Navigation element in the system that has connections to Device or Feature elements.

Channel activation code will also be generated for connected Mode, Navigation, or Sub-Navigation elements in the system. If a BUTTON_EVENT definition has been generated for the channel, no new event definition will be generated and code to turn "on" (i.e. activate) the output side of the channel when the input side is pressed (i.e. a "TO" statement) will be added to the existing definition. If on the other hand, a BUTTON_EVENT definition hasn't been generated for the related channel, a new event block and push handler will be generated and the activation code will be added to it to appear as follows in the output:

```
//-----
//
// EVENT TYPE: BUTTON_EVENT for dvTP1_NAV_Nav41
// API NAME: DVD
// PURPOSE: This button event is used to handle the
// activation of button channel 1 for
// device NAV_Nav41.
//
//-----
BUTTON_EVENT[dvTP1_NAV_Nav41, 1]
{
  PUSH:
  {
    TO[dvTP1_NAV_Nav41, 1]

// Any additional programming generated here
  }
}
//-----
//
```

```

// EVENT TYPE: BUTTON_EVENT for dvTP1_NAV_Nav41
// API NAME: DVD
// PURPOSE: This button event is used to handle the
// activation of button channel 2 for
// device NAV_Nav41.
//
//-----
BUTTON_EVENT[dvTP1_NAV_Nav41, 2]
{
PUSH:
  {
    TO[dvTP1_NAV_Nav41, 2]
  }
// Any additional programming generated here
}
}

```

Finally, feedback statements will be added to the DEFINE_PROGRAM section that will cause the button display to reflect the current state of the output channel:

```

DEFINE_PROGRAM
// Feedback statements for "Nav 4" (mutually exclusive group support)
[dvTP1_NAV_Nav41, 1] = [dvTP1_NAV_Nav41, 1]
[dvTP1_NAV_Nav41, 2] = [dvTP1_NAV_Nav41, 2]

```

The resulting behavior on the touch panel will be that the Mode, Navigation, or Sub-Navigation buttons that takes the user to a set of control pages will be turned "on" when they are pressed, and remain "on" until another button in the same Mode, Navigation, or Sub-Navigation that takes the user to a set of control pages is pressed. All other buttons on these elements will be turn "on" only for the duration of the press.

External Button Programming

When CodeBuilder is invoked for a device from a UI Diagram (i.e., touch panel, R-4 remote, DMS keypad), and the UI device has external buttons associated with it, an additional tab for External Buttons is available in the Events bar on the left side (FIG. 175):

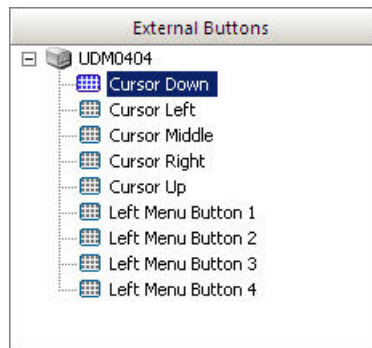


FIG. 175 CodeBuilder dialog - External Buttons tab.jpg

This section displays a list of events for the R-4's external buttons. Only those buttons that have channel codes assigned to them in the UI template will appear.

The names of the events depend upon the button's channel code:

- If the channel code is a G4API code that is defined for the Duet device class of the selected device, its G4API name will be used.
- If the channel code is not defined in the G4API for the Duet device class of the selected device, the name given to the button in the UI template will be used.

Only those external buttons whose channel codes are not defined in the G4API for the Duet device class of the selected device can be programmed. Their handlers are defined just as any other would from within CodeBuilder.

External buttons that have G4API codes defined for the Duet device class of the selected device will still appear in the list, for completeness, but are not programmable, as their events will already appear in the User Interface Buttons section. Buttons that overlap the G4API for a given device are denoted with a red circle with a slash through it. The note 'Programming for this event can be defined in the User Interface Buttons section' is displayed in the Handler area when these buttons are selected.



External buttons on MIO R-4 remotes are handled on a device-by-device basis (see MIO R-4 External Button Programming for details).

UI Templates

VA utilizes UI Template (.VAT) files to greatly simplify the process of designing user-interfaces for the Touch Panel(s) in your system.

A UI Template is a pre-fabricated collection of integrated Touch Panel pages and buttons that provide a consistent and intuitive user-navigation to the end-user. Many templates support multiple resolutions for use on various types and sizes of touch panels. Many templates also offer multiple color themes for additional flexibility.

- While VA comes with at least one template installed and ready for selection, additional templates can be installed. Once installed, templates are available to be applied to touch panels in any VA project.
- VA allows you to apply a different template to each Touch Panel in the system.
- The Basic System Assistant dialog includes options (Resolution and Template) for applying a template to the selected Touch Panel.
- The User Interface Template Manager dialog includes options for Installing new templates, as well as Removing and Previewing installed templates.

Many templates support multiple Color Schemes. Click in the **Color Schemes** field in the Properties window to view and select from the color schemes available for the selected template. Click Browse to access the Color Schemes dialog (FIG. 176):



FIG. 176 Properties Window - Color Schemes drop-down menu

Selecting a UI Template - Via Device Properties

To select and apply a template to a Touch Panel in your system:

1. Select a Touch Panel in the System Diagram.
2. In the Properties window, click on **Template** (FIG. 177):

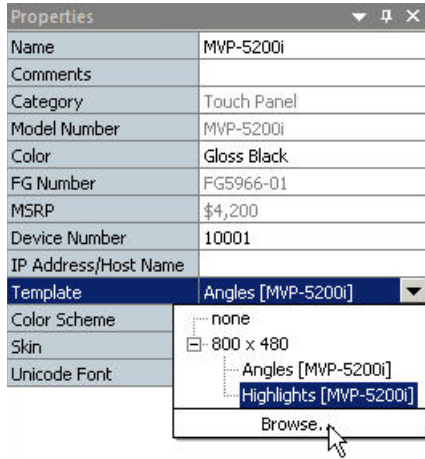


FIG. 177 Selecting a UI Template - Via Device Properties

3. Click Browse to open the *Select User Interface Template* dialog, where you can browse thumbnails of the installed templates (FIG. 178).

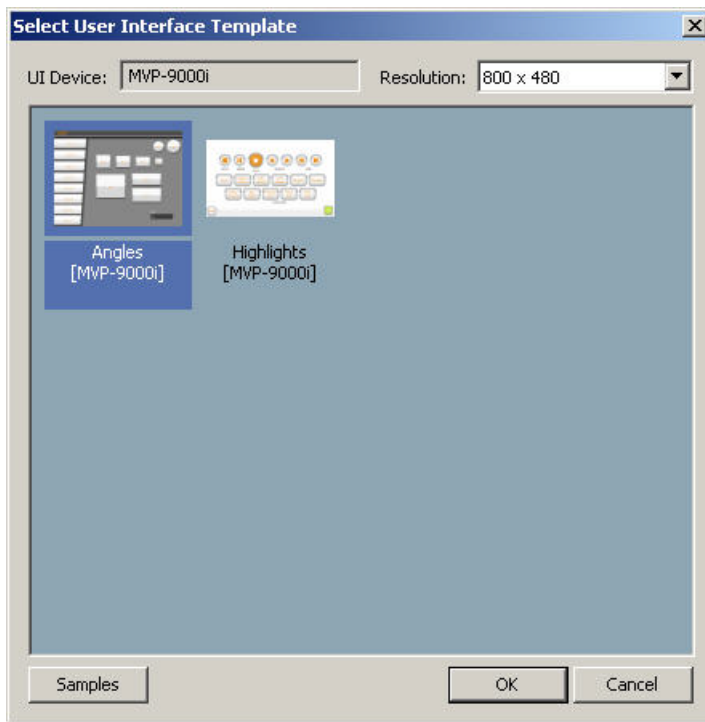


FIG. 178 Select User Interface Template dialog

Templates for Intercom-Enabled Touch Panels

The Touch Panel Templates for the MVP-8400, NXD/NXT-CV7, and NXD/NXT-CV10 have been updated for use with the (intercom-enabled) MVP-8400i, NXD-700Vi, and NXD-1000Vi touch panels respectively.

For each of these templates, an Intercom Feature and/or Sub-Feature has been added, to allow you to selectively add support for intercom control to desired touch panels.

As with other template capabilities (e.g., video windows, etc.), these new elements do not have any functionality if used on a touch panel without intercom support.

Installing UI Templates

VA comes with several Touch Panel templates by default. More Templates are available to download and install via the InConcert Resource Center.

In order to select a UI template to use with the touch panels in your system, you must first install it via the User Interface Template Manager dialog.

1. Select **Managers > User Interface Template Manager** to access the *User Interface Template Manager* dialog. Note that before you have installed any templates (or if you remove all installed templates), the preview window indicates "No Installed Templates".
2. Click the **Install** button to open the Install sub-menu, which provides two ways to install templates - *From AMX.com*, or *From File* (FIG. 179):

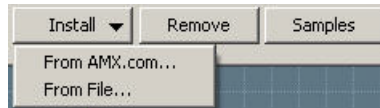


FIG. 179 Install sub-menu (User Interface Template Manager dialog)

From AMX.com - this option allows you to download UI Template files (.VAT) from the www.amx.com web site. You must have Internet access to use this option.

- When you make this selection, the *AMX.com Template Library* dialog retrieves the ,VAT file(s) from the AMX web site (FIG. 180).

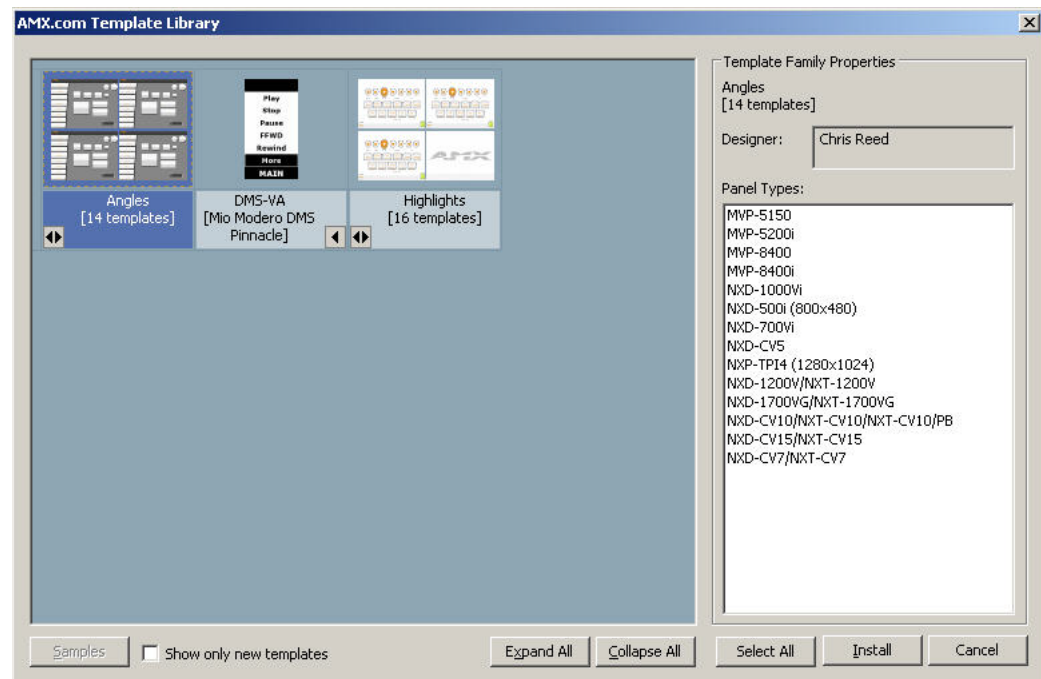


FIG. 180 AMX.com Template Library dialog

- Select the templates that you want to download, and click **Install**.

From File - this option allows you to install VAT files from a local directory (either on your PC or on your LAN). This option is useful in cases where VAT file(s) have previously been downloaded to a local centralized location.

- When you make this selection, the *Install Template From File* dialog is invoked (FIG. 181).

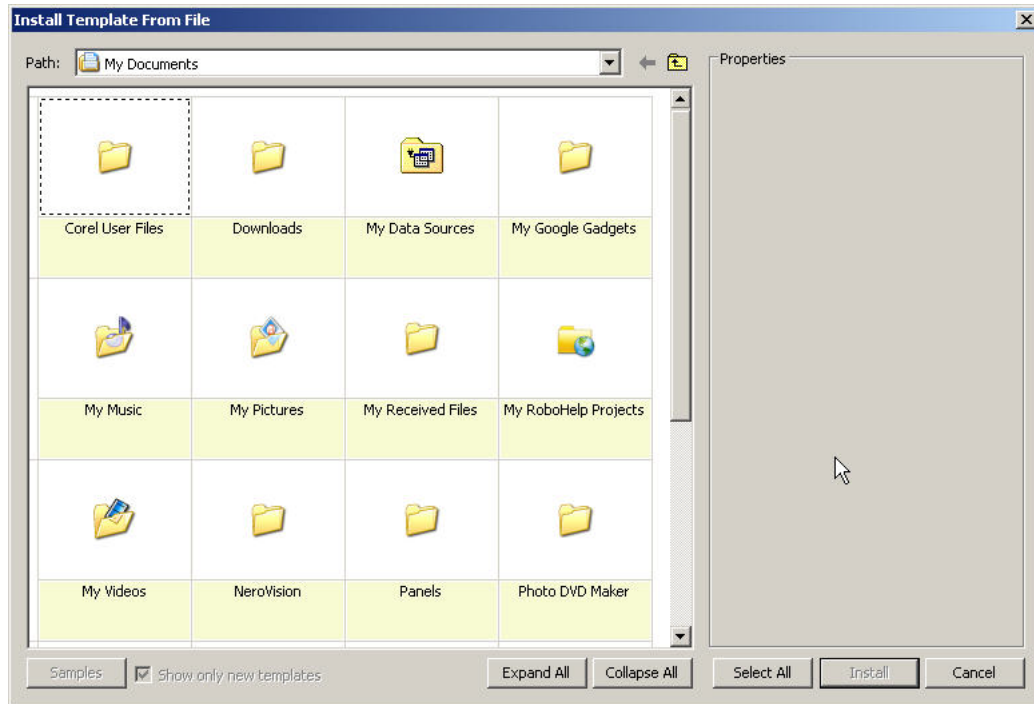


FIG. 181 Install Template From File dialog

- Use the **Path** field at the top of the dialog to navigate and select a file directory that contains at least one ,VAT file.
 - Select a template from the preview window and click **Install**. This action installs the selected ,VAT and closes the dialog, returning you to the *User Interface Template Manager* dialog.
 - The selected template is now represented in the preview area, and is available for selection.
3. Close this dialog to complete the install process.

The templates you've installed are now indicated in the User Interface Template Manager, and are available for selection via the Properties window.

Uninstalling UI Templates

1. Select **Managers > User Interface Template Manager** (or click the Toolbar button) to open the *User Interface Template Manager* dialog.
2. Select the template that you want to uninstall (in the thumbnail preview area of the dialog).
3. Click the **Remove** button (FIG. 182).



FIG. 182 Remove button (User Interface Template Manager dialog)

4. The program will prompt you to verify this action before the template is permanently uninstalled (click **OK** to proceed).

Previewing Touch Panel UI Elements

The *Preview* dialog allows you to preview a selected UI element in a touch panel UI Diagram. Use this feature to preview the touch panel page layout, including the UI Template selection, Color Scheme selection and Skin selection.

1. Select a UI element in a touch panel UI Diagram to activate this option.
2. Select **Touch Panel > Preview UI** (or click the Toolbar button) to preview the selected UI element in the *Preview* dialog (FIG. 183). Note that the preview is based on the selected UI element, as well as the UI template, Color Scheme and Skin selected for the touch panel.

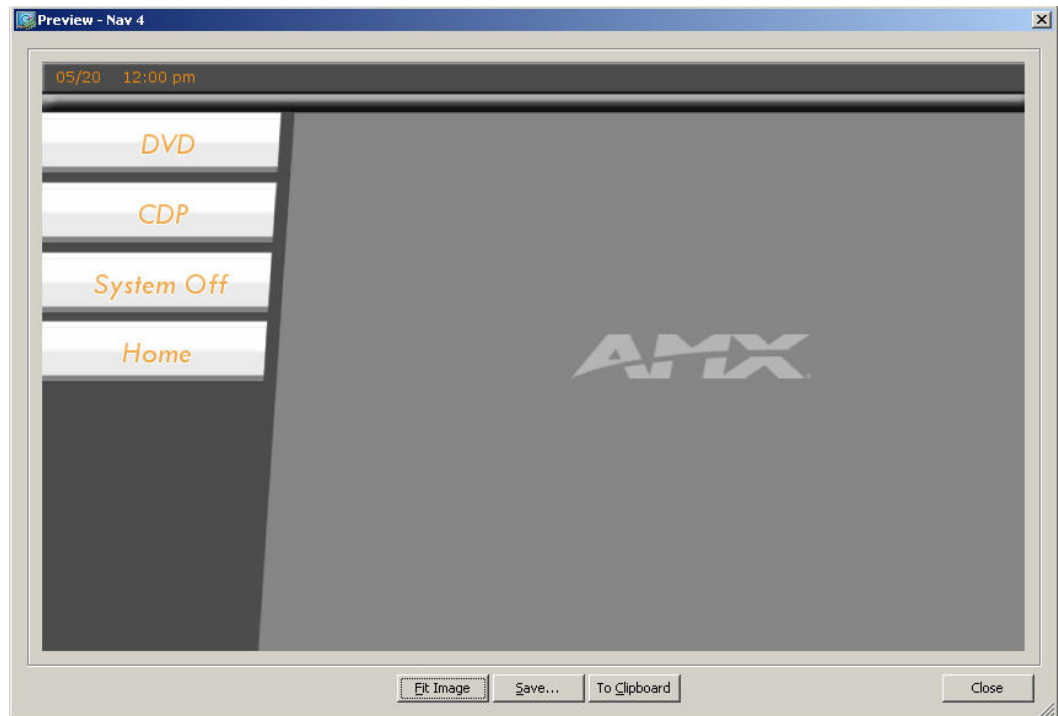


FIG. 183 Install Template From File dialog



NOTE

*Alternatively, you can access this dialog by right-clicking on any UI element and selecting **Preview UI** from the context menu.*

- Click **Fit Image** to scale the preview image to fit the window on this dialog (default = enabled).
- Click **Save** to save the preview image as a .PNG file. This selection invokes the *Save Preview Image* dialog, where you can specify a filename and target directory for the saved .PNG file. By default, the image is named according to the device that the UI element is associated with, and the default target directory is the directory that you have saved your VA project to.
- Click **To Clipboard** to save the preview image to the clipboard. This option is a handy way to open the image in a separate application, via a Paste operation.

Color Schemes

Many UI Templates support multiple *Color Schemes*. Color Schemes add flexibility to your panel UI's visual design by using different palettes to create variations on the template design. An example set of color schemes is shown below (FIG. 184):



FIG. 184 Color Schemes

Use the Color Schemes dialog to preview and select from the Color Schemes available for the selected template.

Changing the Color Scheme on a UI Template

Use the *Color Schemes* dialog to preview and select from the Color Schemes available for the selected User Interface template:

1. Select a Touch Panel in the system diagram to populate the Properties Window for that panel.
2. Select and apply a UI Template, if you haven't already done so.
3. Once you have selected a template, the **Color Scheme** field is enabled in the Properties Window (FIG. 185):

Properties	
Name	MVP-5150
Comments	
Category	Touch Panel
Model Number	MVP-5150
FG Number	FG5966-07
MSRP	\$3,200
Device Number	10001
IP Address/Host Name	
Template	Angles [MVP-5150]
Color Scheme	Charcoal & Orange
Skin	
Unicode Font	none

FIG. 185 Properties window - Color Scheme field

4. Click in the **Color Schemes** field to enable the down-arrow, then click the arrow to display a list of color schemes available for the selected template.
5. Click the Browse button at the bottom of this list to open the *Color Schemes* dialog.
6. Click on the thumbnail image of the color scheme that you want to apply to the selected panel.
7. Click **OK** to close the dialog and apply the selected Color Scheme.

The new Color Scheme is indicated in the Properties Window for this panel.

Skins

Skins allow you to further customize your UI page layout by easily changing the appearance of the Menu area of the page, without altering the Template or Color Scheme selections.

An example set of *Skins* is shown below (FIG. 186):



FIG. 186 Skins

Use the *Skins* dialog to preview and select from the *Skins* available for the selected template.

The images below provide an illustration of how different skins affect the layout of the "Angles" template.

The first Skin option uses the name of the selected Template. This default setting does not apply a Skin (FIG. 187):

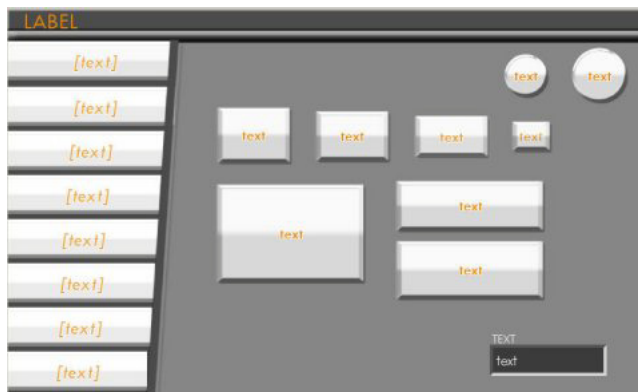


FIG. 187 Skins - Default Setting (No Skin Applied)

The following Skin options add various colors/textures to the selected Template, as shown in the following examples:

An example of the *Granite* Skin (FIG. 188):

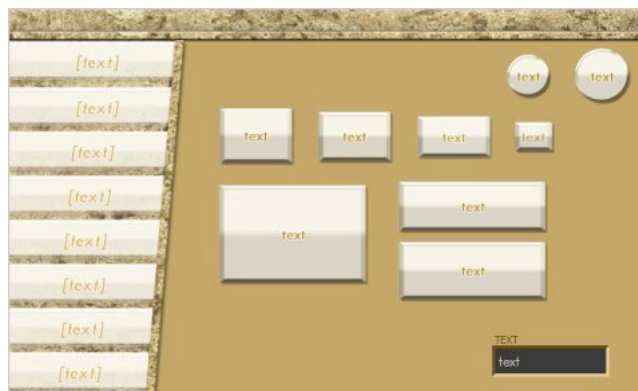


FIG. 188 Skins - Default Setting ("Granite" Skin Applied)

An example of the *Slate* Skin (FIG. 189):



FIG. 189 Skins - Default Setting ("Slate" Skin Applied)

An example of the *Wood* Skin (FIG. 190):

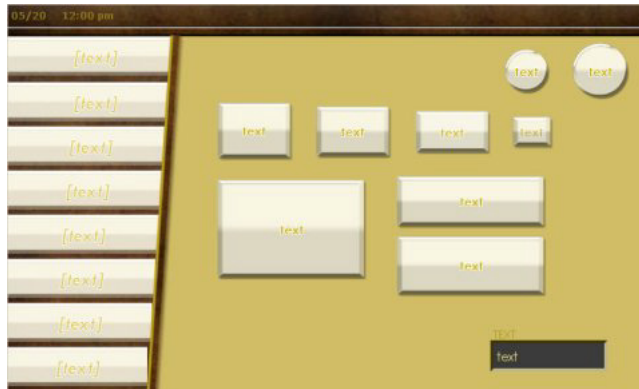


FIG. 190 Skins - Default Setting ("Wood" Skin Applied)

Changing the Skin on a UI Template

Use the *Skins* dialog to preview and select from the Skins available for the selected User Interface template:

1. Select a Touch Panel in the System Diagram to populate the Properties Window for that panel.
2. Select and apply a UI Template, if you haven't already done so.
3. Once you have selected a template, the **Skin** field is enabled in the Properties Window (FIG. 191):

Properties	
Name	MVP-5200i
Comments	
Category	Touch Panel
Model Number	MVP-5200i
Color	Gloss Black
FG Number	FG5966-01
MSRP	\$4,200
Device Number	10001
IP Address/Host Name	
Template	Angles [MVP-5200i]
Color Scheme	Blue
Skin	Angles
Unicode Font	none

FIG. 191 Properties window - Skin field

4. Click in the **Skin** field to enable the down-arrow, then click the arrow to display a list of color schemes available for the selected template.
5. Click the Browse button at the bottom of this list to open the Skins dialog.

6. Click on the thumbnail image of the Skin that you want to apply to the selected panel.
7. Click **OK** to close the dialog and apply the selected Skin.

The new Skin is indicated in the Properties Window for this panel.

Customizing Panel UI Pages

VA generates a default Device page as well as any Features and Sub-Features popup pages that were added to the UI, for each controlled device in the system. These default pages represent the basic functionality of the device, based on device type and the selected UI Template.

Use the options in the Customize UI Pages dialog to edit these default pages as desired.

Adding UI Elements to the Touch Panel Page

VA generates default Touch Panel pages for each third-party (controlled) device in the system. These default pages represent the basic functionality of the device, based on device type and the selected UI Template. Use the options in the *Customize UI Pages* dialog to edit these default pages if necessary.

To add UI elements to the Touch Panel page:

1. With a device element selected in a UI Diagram, select **Touch Panel > Customize UI Pages** (or click the toolbar button) to access the *Customize UI Pages* dialog. The Touch Panel page associated with the selected device is displayed in the Design View window (in its default configuration).

The User Interface Elements window (on the right-side of the dialog) displays a listing of all UI elements supported by this device. Note that these elements are color-coded (blue or gray - FIG. 192):

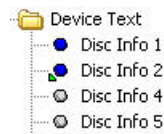


FIG. 192 User Interface Elements window (Customize UI Pages dialog)

- A blue icon indicates that the elements are currently included in the Touch Panel page,
 - A gray icon indicates that the elements that are not currently included on the page. These elements can be added (as new buttons) to the panel page.
 - If you select a button in the Design View window, a green flag next to the element's icon (in the User Interface Elements window) indicates which element the selected button represents.
2. To add an element to the panel page, simply double-click on any unused element in the User Interface Elements list. This action adds a new button for the selected element to the Design View window.
 3. Click and drag the button to position it as desired.
 4. To change the text displayed on the new button, right-click on the button and select **Edit Element Properties** from the context menu (or click the Toolbar button). Type the text that you want to display on this button in the Enter Text dialog.

Editing UI Element Properties

The *Edit Element Properties* dialog allows you to edit various aspects of a selected UI element, including the button's shape/style, button text, text justification, font, text color and word-wrap:

1. With a Device, Feature or Sub-Feature element selected in a UI Diagram, select **Touch Panel > Customize UI Pages** to access the *Customize UI Pages* dialog. The Touch Panel page associated with the selected device is displayed in the Design View window (in its default configuration).
2. Select a button in the Design View window. Note that when you select a UI element in the Design View window, a green flag next to the element's icon (in the *User Interface Elements* window) indicates which element the selected button represents (FIG. 193).



FIG. 193 User Interface Elements window (Customize UI Pages dialog)

3. Click on the Edit Element Properties Toolbar button (or right-click on the button and select **Edit Element Properties** from the Panel UI Diagram context menu). This opens the *Edit Element Properties* dialog.

4. Enter or edit the text that want to show on the selected UI element, and click **OK** to save your changes and close this dialog.

Deleting UI Elements from the Touch Panel Page

VA generates default Touch Panel pages for each third-party (controlled) device in the system. These default pages represent the basic functionality of the device, based on device type and the selected UI Template. You can use the options in the Customize UI Pages dialog to edit these default pages if necessary.

To delete UI elements from the Touch Panel page:

1. With a device element selected in a UI Diagram, select **Touch Panel > Customize UI Pages** to access the *Customize UI pages* dialog. The Touch Panel page associated with the selected device is displayed in the Design View window in its default configuration.
 - The User Interface Elements window (on the right-side of the dialog) displays a listing of all UI elements supported by this device. Note that these elements are color-coded (blue or gray).
 - The elements with a blue icon are currently included in the Touch Panel page, gray icons indicate the elements that are not currently included on the page. These elements can be added (as new buttons) to the panel page.
 - If you select a button in the Design View window, a green flag next to the element's icon (in the User Interface Elements window) indicates which element the selected button represents.
2. Select the button that you want to remove and press **Delete**.
 - Alternatively, you can right-click on any button and select **Delete Element** from the context menu, or click on the Delete Element Toolbar button.
 - You can also select the desired element in the User Interface Elements window and press **Delete** (or right-click and select **Delete Element** from the context menu or click the Delete Element Toolbar button).

Note that once the selected element is deleted in the Design View, the element is indicated as unused in the User Interface Elements window (with a gray icon).

Editing Panel Buttons

VA generates Touch Panel pages for each third-party (controlled) device in the system. These default pages represent the basic functionality of the device, based on device type and the selected UI Template. You can use the options in the Customize UI Pages dialog to edit these default pages as necessary.

To edit a Button on a Touch Panel UI page:

1. With a UI element selected in a UI Diagram (any UI element other than the Touch Panel itself), select **Touch Panel > Customize UI Pages** (or click the toolbar button) to access the *Customize UI pages* dialog. The Panel page associated with the selected device is displayed in the Design View window, in its default configuration.
2. Select a button in the Design View window.

Note that when you select a button, a green flag next to the element's icon (in the User Interface Elements window) indicates which element the selected button represents (FIG. 194).

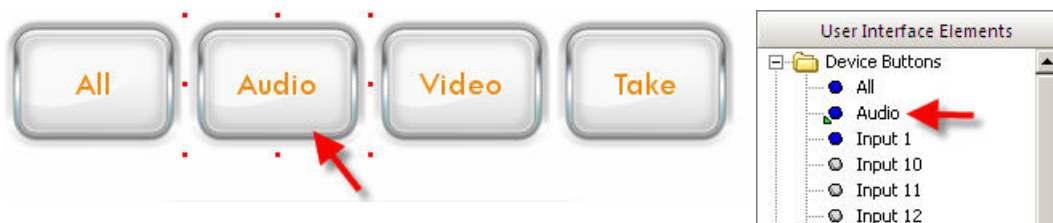


FIG. 194 Button Selection (Customize UI Pages dialog)

3. Click on the Edit Element Properties Toolbar button (or right-click on the button and select Edit Element Properties from the context menu). This opens the Edit Element Properties dialog.

Changing the Button Shape Style:

In the Edit Element Properties dialog:

1. Click the arrow button in the **Shape Style** Property to open the drop-down menu of available shape styles (FIG. 195).



FIG. 195 Properties window - Shape Style

2. Select a Shape Style for the selected button, and click **OK** to save your changes.

Changing the Button Fill Color:

1. Click the Browse (...) button in the **Fill Color** Property (FIG. 196) to open the *Colors* dialog.



FIG. 196 Properties window - Fill Color

2. Select the desired fill color, and click **OK** to save your changes.

Changing the Border Color:

1. Click the Browse (...) button in the **Border Color** Property (FIG. 197) to open the *Colors* dialog.



FIG. 197 Properties window - Border Color

2. Select the desired border color, and click **OK** to save your changes.

Editing Panel Button Text

VA generates Touch Panel pages for each third-party (controlled) device in the system. These default pages represent the basic functionality of the device, based on device type and the selected UI Template. You can use the options in the Customize UI Pages dialog to edit these default pages as necessary.

To edit the text displayed on a Button on a Touch Panel UI page:

1. With a UI element selected in a UI Diagram (any UI element other than the Touch Panel itself), select Touch Panel > Customize UI Pages (or click the toolbar button) to access the Customize UI pages dialog. The Panel page associated with the selected device is displayed in the Design View window, in its default configuration.
2. Select a button in the Design View window.
Note that when you select a button, a green flag next to the element's icon (in the User Interface Elements window) indicates which element the selected button represents (see FIG. 194 on page 156).
3. Click on the Edit Element Properties Toolbar button (or right-click on the button and select Edit Element Properties from the context menu). This opens the Edit Element Properties dialog.

Editing the Button Text:

In the *Edit Element Properties* dialog:

1. Click the Browse (...) button in the **Text** Property (FIG. 198) to open the *Enter Text* dialog.



FIG. 198 Properties window - Text

2. Enter or edit the text that want to show on the selected button, and click **OK** to save your changes.



Use <Ctrl><Enter> to create a line return.

Changing the Button Text Justification:

1. Click the arrow button in the **Text Justification** Property (FIG. 199) to open the drop-down (default = center-middle).

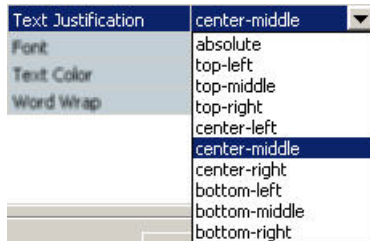


FIG. 199 Properties window - Text Justification

2. Select the desired *Font*, *Style* and *Size*, and click **OK** to save your changes.

Changing the Button Text Font/Style/Size:

1. Click the Browse (...) button in the **Font** Property (FIG. 200) to open the *Choose Font* dialog.



FIG. 200 Properties window - Font

2. Select the desired *Font*, *Style* and *Size*, and click **OK** to save your changes.

Changing the Button Text Color:

1. Click the Browse (...) button in the **Text Color** Property (FIG. 201) to open the *Colors* dialog.



FIG. 201 Properties window - Text Color

2. Select the desired color, and click **OK** to save your changes.

Toggling Word Wrap for Button Text:

1. Click the arrow button in the **Word Wrap** Property (FIG. 202) to open the drop-down (yes / no - default = yes).



FIG. 202 Properties window - Word Wrap

2. Select the desired option, and click **OK** to save your changes.

Character Map dialog

Click the **Character Map** button (in the *Enter Text* dialog or *Enter Display Text* dialog) to view a character map of the selected font, and select a character to be inserted in the button text, in the *Character Map* dialog. To insert a special character in the *Enter Text* dialog, select a character and click **Insert**. The selected character will be inserted into the UI element text, at the cursor location.

Working With Features and Sub-Features

The *Customize UI Pages* dialog treats Features and Sub-Features popup pages much the same as Device pages, with a few notable differences:

Because Feature and Sub-Feature elements are not devices and are not covered by the G4API, the actual names given to the buttons in the template will be used to identify the elements in the User Interface Elements tree.

In the example below, from the 20 buttons originally displayed on the page, buttons 9 through 20 have been removed; and buttons 1 through 8 have been re-labeled and rearranged (FIG. 203):

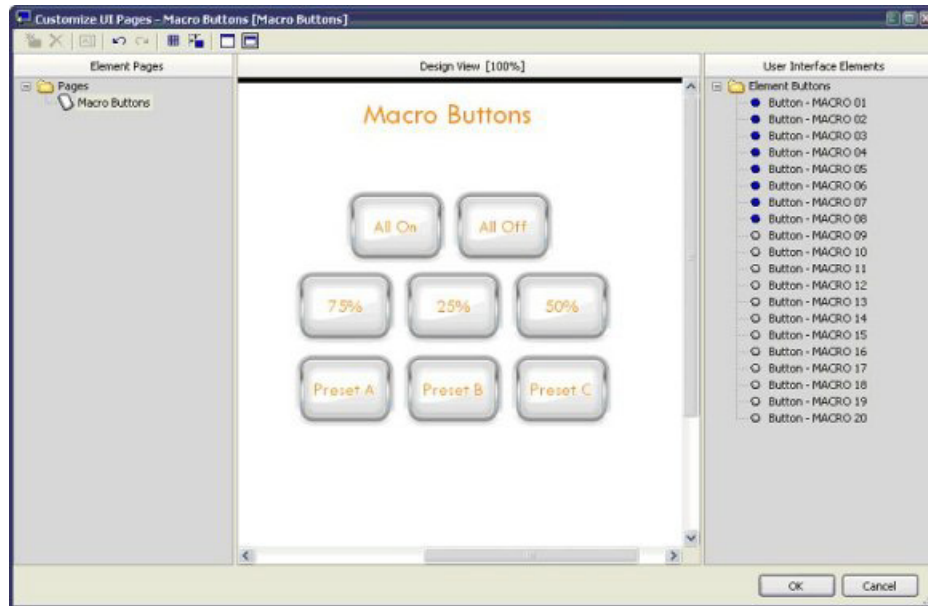


FIG. 203 Example Macro Pages (Customize UI Pages dialog)

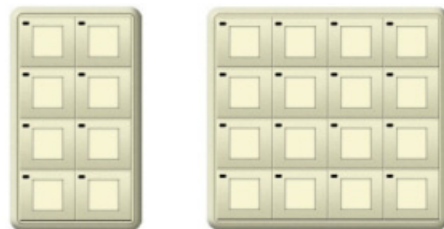
Defining the UI - Keypads

Keypad UI Diagram

For every Keypad added to the system, a separate UI tab is added to the Diagram Area. Each UI tab consists of a Keypad UI Diagram - the graphic representation of the buttons on the keypad. Click on any button on the UI diagram to select it for editing, via the button properties in the Properties window.

UI Diagram - Keypads With Labelled Buttons

Mio Modero Prestige S/D Keypads use a UI diagram that represents the buttons that provide the user with control functionality (FIG. 204).



Mio Modero Prestige S

Mio Modero Prestige D

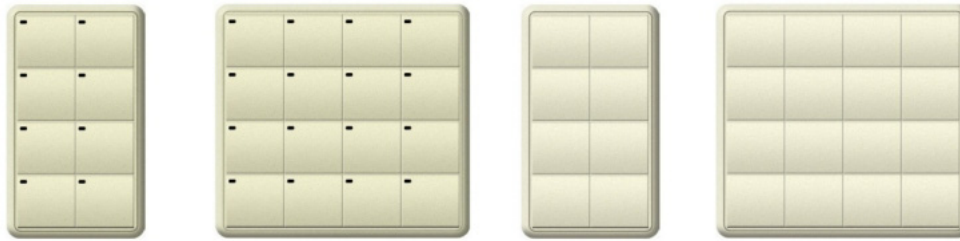
FIG. 204 Keypad UI - Mio Modero Prestige S/D.jpg

This UI Diagram type is used for the following Keypads:

- **Mio Modero Prestige S:** Single-gang keypad with labeled buttons and LED feedback.
- **Mio Modero Prestige D:** Double-gang keypad with labeled buttons and LED feedback.

UI Diagram - Keypads With Custom Engraved Buttons

Mio Modero Classic S/D, and Elite S/D Keypads also use a UI diagram that represents the buttons. These keypads use custom-engraving to label the buttons. Use button properties to specify the engraving text, font and font scale (FIG. 205).



Mio Modero Classic S Mio Modero Classic D Mio Modero Elite S Mio Modero Elite D

FIG. 205 Keypad UI - Engraved Buttons

This UI Diagram type is used for the following Keypads:

- **Mio Modero Classic S:** Single-gang keypad with engravable buttons and LED feedback.
- **Mio Modero Classic D:** Double-gang keypad with engravable buttons and LED feedback.
- **Mio Modero Elite S:** Single-gang keypad with engravable backlit buttons.
- **Mio Modero Elite D:** Double-gang keypad with engravable backlit buttons.



NOTE

For Keypads that do not feature an LCD display, the UI consists channel codes assigned to each button.

UI Diagram - Keypads With Custom Engraved Buttons and LCD Display

Mio Modero Elite SL/DL Keypads use a similar UI diagram to represents the buttons that provide the user with control functionality. These keypads use custom-engraving and also feature a customizable LCD display (FIG. 206).



Mio Modero Elite SL Mio Modero Elite DL Mio Modero Attache

FIG. 206 Keypad UI - Engraved Buttons and LCD Display

This UI Diagram type is used for the following Keypads:

- **Mio Modero Elite SL:** Single-gang keypad with engravable backlit buttons and LCD.
- **Mio Modero Elite DL:** Double-gang keypad with engravable backlit buttons and LCD.
- **Mio Modero Attache:** Wireless IR keypad, table-top



NOTE

For Keypads that feature an LCD display, the UI also includes items displayed on the LCD display.

UI Diagram - MIO-DMS Keypads

Mio Modero DMS/Pinnacle Keypads feature a customizable LCD display and buttons (DMS) or Slider (DMS-P) (FIG. 207):



FIG. 207 Keypad UI - MIO-DMS Keypads

Because these keypads utilize a dynamic menu (on a LCD display) and either a set of 8 buttons (MIO-DMS) or a Slider (MIO-DMS-P), the UI diagram looks and acts essentially the same as for Touch Panels and R-4 remotes (FIG. 208).

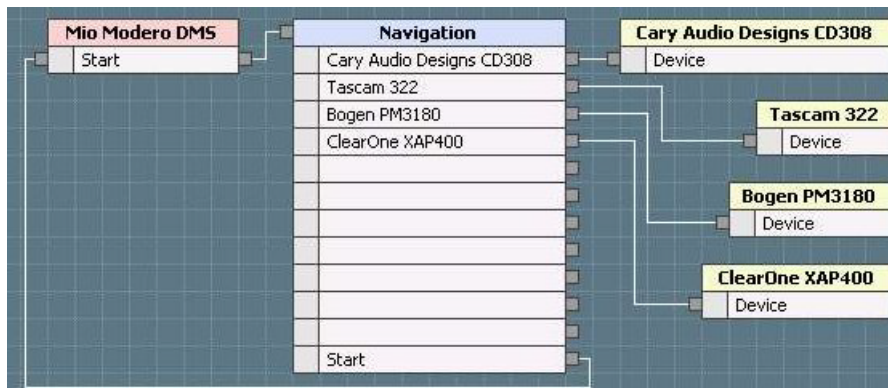


FIG. 208 UI Diagram - MIO-DMS Keypads

This UI Diagram type is used for the following Keypads:

- **Mio Modero DMS:** Dynamic menu select keypad with 8 buttons.
- **Mio Modero DMS P:** Dynamic menu select keypad with Slider.

DMS Keypads utilize Mode and Navigation elements that have 12 Item slots. Use these 12 Item slots to connect to devices to Navigation (Nav) elements, Nav elements to Mode elements, or Nav elements to other Nav elements (FIG. 209).

Mode	Navigation	[text]	[text]
TV	TV	Play	Macro 1
Projector	Projector	Stop	Macro 2
VCR	VCR	Pause	Macro 3
DVD	DVD	FFWD	Macro 4
DVR	DVR	Rewind	Macro 5
DSS	DSS	More	Macro 6
		MAIN	MAIN

FIG. 209 Sample DMS pages

- Refer to the Defining the UI - Touch Panels topic for details on adding and connecting UI elements in a panel-type UI diagram.

- Program the Mio Modero DMS Keypads with the KeypadBuilder application. Refer to the KeypadBuilder Instruction Manual and online help for details.
- Refer to the Mio Modero DMS & Mio Modero DMS Pinnacle Operation/Reference Guide for detailed installation and programming information.

Defining the UI - Keypads

For every keypad added to the system, a Keypad UI diagram is created, with a graphical representation of the buttons (and LCD display when applicable) on the keypad. Click on any button on the Keypad UI diagram to select it for editing. The selected button's properties are displayed in the Properties window.

The type of each Keypad in the System determines the type of UI diagram used to define navigation. Click on a Keypad UI tab to view the UI diagram, where you can add, edit and view button layout, menu actions, button label text and assign channel codes on each button.

To define the UI for Keypads, use the Button Properties fields in the Properties Window to assign a Button Name, specify the Text to be engraved, and view the Channel Code assigned to each button:

1. Click on a button in the Keypad UI diagram. This action displays the properties for the selected button in the Properties window.
For keypads that feature a LCD menu (including the Mio Modero Elite SL and DL), there is the additional (read-only) **Menu Action** property.
2. Enter a text label for the selected button in the **Button Name** field of the *Device Properties* window. The button name is for use within VA only, and is intended to assist in developing unique descriptive names. This is not the text that will be engraved on the button (see *Engraving Text* below).
3. Enter the text that you want to have engraved on the selected button in the **Engraving Text** field. To enter text, click inside the text field and type directly into the field. Alternatively, click on the browse button (...) to access the *Enter Text* dialog - enter the desired text and click **OK** to save.



NOTE

In addition to the 10 character limit in the KeypadBuilder application, the maximum number of characters allowed is based on font choice as well as size and specific characters used.

Use the **Engraving - Show Bounding Box** option to determine whether your text will fit within the engraving boundaries of the button.

4. Select the font to use for the engraved text from the **Engraving Font** drop-down menu (AMX Icon 2 (for symbols), Arial, Arial Narrow or Arial Unicode MS).
 - The AMX Icon 2 font provides various control-oriented icons that can be engraved on the buttons.
 - The VA Engraving module supports the fonts included in the supported OS (System) languages. You must have the language loaded on your OS and then use Arial Unicode MS to render the text on the button.
 - Specify the size of the text from the **Engraving Scale** drop-down menu. Select a scale factor to apply to the engraved text on the selected button (default = 1.0, or 100%). Click inside the text field to enable Up and Down arrows to scale the selected button text up or down, in .1 (or 10%) increments.

Keypad Buttons

Keypads rely on buttons to allow the end-user to control system devices.

Click on any button on the Keypad UI diagram to select it for editing, via the button properties in the Properties window (FIG. 210).

Keypad Properties	
Name	Mio Modero Elite S
Comments	
Category	Keypad
Model Number	Mio Modero Elite S
Device Number	128
Color	Almond
FG Number	FG5796-01AL
MSRP	\$650
Button Properties	
Button Name	Scene 1
Channel Code	1
Engraving Text	Scene 1
Engraving Font	Arial Unicode MS
Engraving Scale	1.0

FIG. 210 Properties Window - Keypad Button selected

Keypad UI Diagram - Button Layout

Click on any button on the Keypad UI diagram to select it for editing. The selected button's properties are displayed in the Properties window. The labels displays are toggled via options in the Keypad Menu (Show Button Numbers, Show Menu Actions, Show Button Name).

FIG. 211 indicates the layout for buttons in the Keypad diagram for regular and LCD buttons (Button Numbers (Channel Codes), Button Names, Menu Actions (if applicable) and Engraved Text, if applicable).

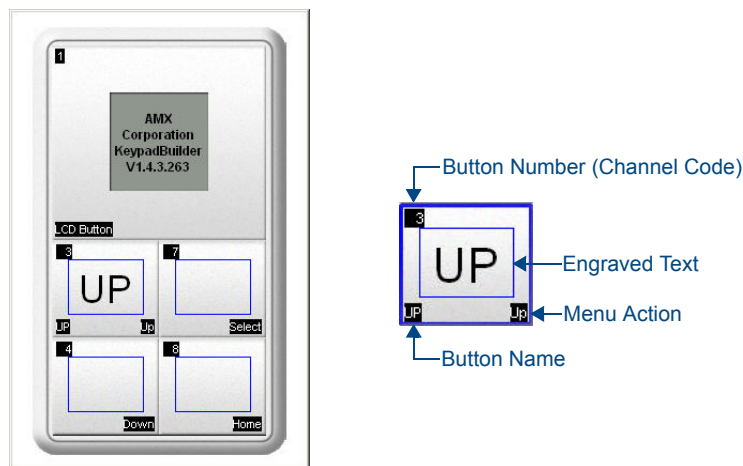


FIG. 211 Keypad UI Diagram (Show Button Numbers, Show Menu Actions, Show Button Names options enabled)

- Button Numbers (Channel Codes)
- Button Names, Menu Actions (if applicable)
- Engraved Text (if applicable)



NOTE

Menu Actions only apply to Keypads equipped with an LCD display.

Setting Keypad Button Properties

When you select a button in a Keypad UI diagram, the following additional Keypad Button Properties fields appear in the Properties window:

Keypad Button Properties	
• Button Name:	See page 137.
• Menu Action:	This read-only field displays the Menu Action value for the selected button. This field is displayed only if a LCD-equipped Keypad is selected.
• Channel Code:	This field displays the selected button's Channel Code assignment. <ul style="list-style-type: none"> • The channel code is the same as the button number and is read-only. • The Channel Code represents communication out of the keypad to the master controller.
• Engraving Text:	See page 138.
• Engraving Font:	See page 138.
• Engraving Scale:	See page 138.

Combining Buttons

Use the Combine Button option in the Keypad menu (or in the Keypad Toolbar) to combine two adjacent keypad buttons into a single button that spans the width of the two original buttons.



NOTE

Combine Buttons can only be used on buttons that are horizontally adjacent to each other, and only combines two buttons.

1. Select **Keypad > Combine Buttons** to enable the function.
2. Identify the two buttons that you want to combine, and click the button on the left.
3. This action applies the button information from the selected button and assigns it to the button directly to the right of it, thus treating two buttons as one.

The combined buttons are also indicated in the Keypad image in the UI tab (FIG. 212):

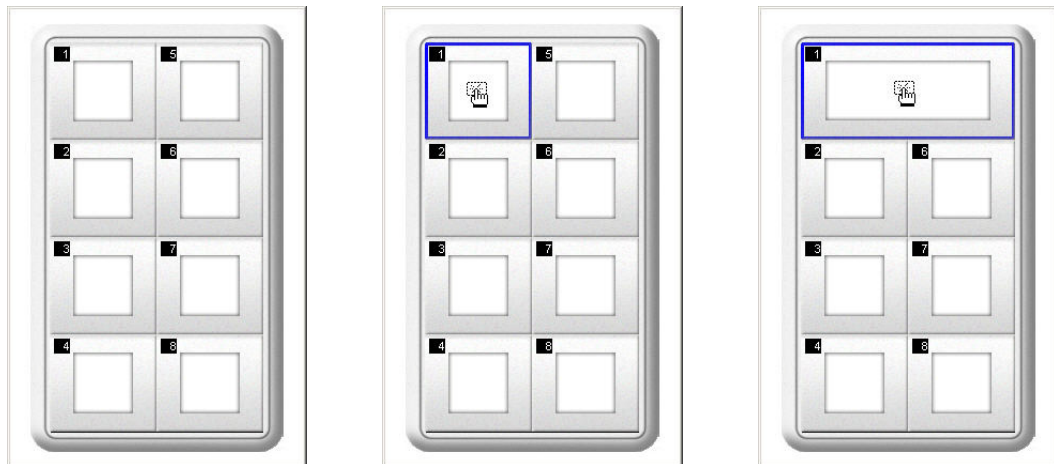


FIG. 212 Combining Buttons



NOTE

Combining buttons adds double buttons to your custom engraving order.

Uncombining Buttons

To uncombine a button, select the button again (with Combine Buttons still enabled). In this case, the button on the right retains the information.

Engraving - Show Bounding Box

Use the **Keypad > Engraving - Show Bounding Box** option to display the printable area on each button.

All characters must fit within the bounding box in order to print properly.

- In addition to the 10 character limit in the KeypadBuilder application, the maximum number of characters allowed is based on font choice as well as size and specific characters used.
- If your characters do not fit completely inside the bounding box, the characters are displayed in red as a warning (FIG. 213):

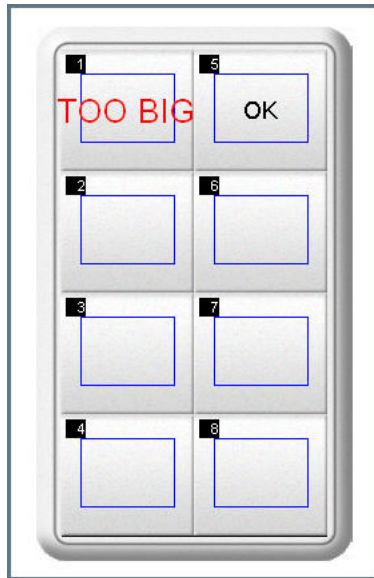


FIG. 213 Engraving - Show Bounding Box

Exporting Keypad Button Engraving Templates as DXF Files

Once you have specified the text that you want to have engraved on each of the buttons on the keypad, you can export the button engraving template as a DXF file.



NOTE

DXF files are generally compatible with CAD graphics programs.

1. Select a Keypad UI tab for a keypad that has button engraved text indicated.
2. Select **Keypad > Engraving - Export DXF File** (or click the Toolbar button) to open the *Export DXF File* dialog.
3. Specify the filename and target directory for the exported DXF file.
4. Click **Export**. The system prompts you when the process is complete.

Keypad LCD Display Menus

Several Keypads (including the Mio Modero Elite SL, Elite DL and Attache) feature a LCD screen that displays a fixed menu (FIG. 214).

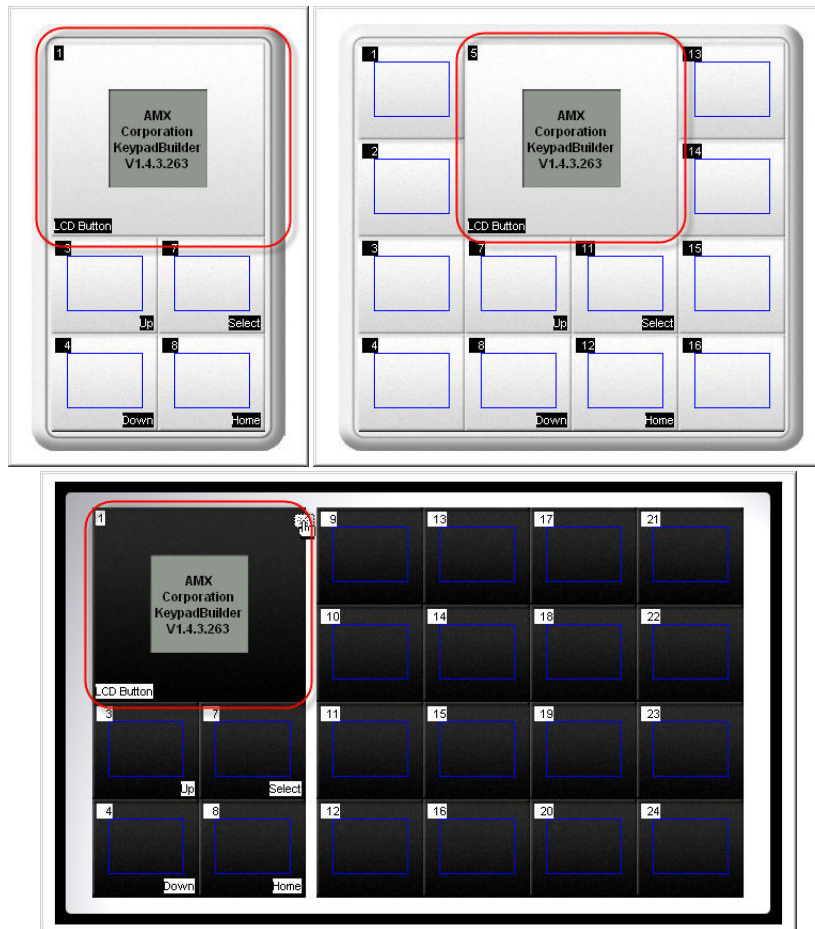


FIG. 214 Keypads with LCD Displays

There are two main concepts involved in configuring the LCD menu:

- **Main Menu** - The Main Menu displays a listing of the devices that the end-user can control via this Keypad.
- **Sub Menus** - For each device listed in the Main Menu, there is a device-specific Sub Menu that provides specific controls for the selected device. Sub menus also typically provide a way for the end-user to return from the sub-menu to the Main Menu.

Use the options in the *Keypad Fixed Menu Editor* dialog to edit the contents of the LCD menu.

Adding Devices to the Main Menu

To control a device via a Keypad, you must first add each controlled device to the Main Menu on the LCD Display:

1. Open the Keypad UI tab for an LCD display-equipped Keypad to display the Keypad UI diagram.
2. Select **Keypad > Edit LCD Menu** (or click the Toolbar button) to open the *Keypad Fixed Menu Editor* dialog. Initially, the dialog indicates the **[Add Menu Item]** option, highlighted in the Main Menu window (FIG. 215).

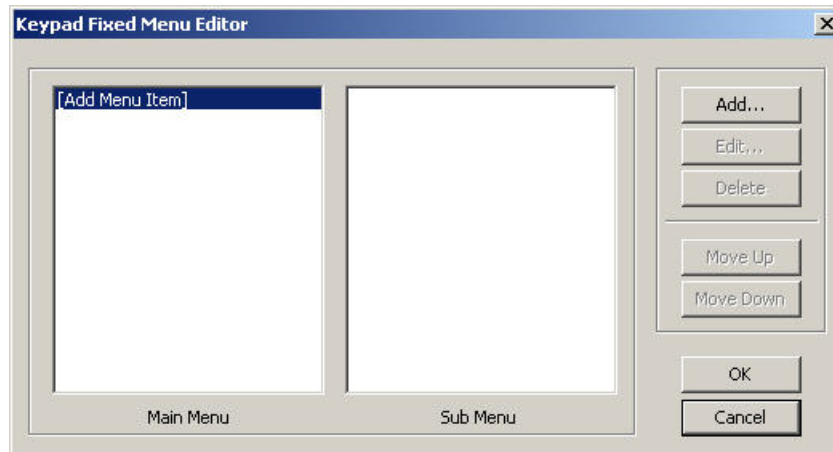


FIG. 215 Keypad Fixed Menu Editor dialog

3. Click the **Add** button to open the *Add Main Menu Item* dialog (FIG. 216).

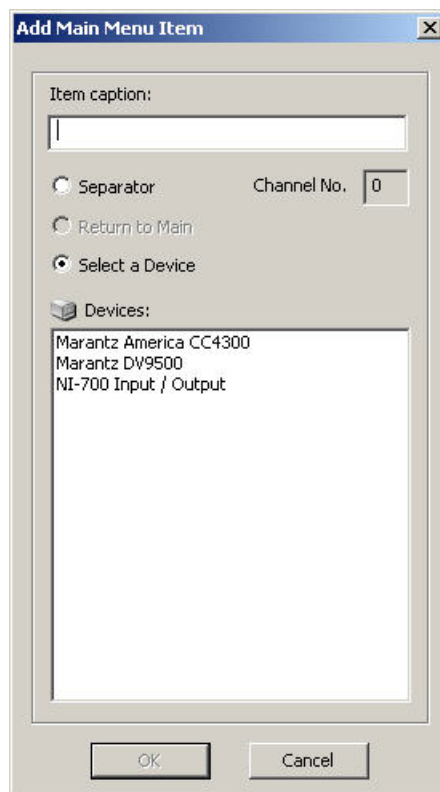


FIG. 216 Add Main Menu Item dialog

4. Click on the **Select a Device** radio button.
5. Select a device in the *Devices* list. The selected device's name (based on the Manufacturer and Model) is automatically added to the *Item Caption* text field. You can edit this text if necessary, in the **Item Caption** field.
6. Click **OK** to add the device to the Main Menu.

At this point, you can either create a sub menu for this device (by adding Events to the device's sub menu), or add more devices to the Main Menu.

Adding Separator Lines to the Main Menu

Consider using separators to drop a horizontal line between items on the Main Menu, to separate devices or device types. To add a separator, click on **[Add Menu Item]** in the Main Menu window (of the *Keypad Fixed Menu Editor* dialog):

1. Click **Add** to open the *Add Main Menu Item* dialog (FIG. 217).



FIG. 217 Add Main Menu Item dialog (Separator selected)

2. Select the **Separator** radio button (note that a horizontal line is indicated in the *Item Caption* field).
3. Click **OK**.

Once you have added the devices that you want to provide control for to the Main Menu, you need to create a device-specific sub menu for each device. The device sub menu provides specific controls for each device to the end-user.

Adding Events to a Device Sub Menu

Once you have added the devices that you want to provide control for to the Main Menu, you need to create a device-specific sub menu for each device. The device sub menu provides specific controls for each device to the end-user. This accomplished by adding Events to each device's Sub Menu:

Events represent the various control functions supported by each device. Examples include Power, Play, Setup, etc. Add Events to the sub menu for each device to provide controls for the selected device to the end-user.

If you are not already in the Keypad Fixed Menu Editor dialog, open the Keypad's UI tab and select **Keypad > Edit LCD Menu** (or click the Toolbar button).

Assuming you have already added at least one device to the Main Menu, select a device in the Main Menu window to enable the **[Add Menu Item]** option to the Sub Menu window.

1. Click on **[Add Menu Item]** in the *Sub Menu* window.
2. Click on the **Add** button to open the *Add Sub Menu Item* dialog.
3. Select an event from the *Events* list. The selected event's name is automatically added to the **Item Caption** text field. You can edit this text if necessary.
4. Click **OK** to add the event to the Sub Menu.

Repeat this process to add all of the events that you want to control from this keypad.

Generating KeypadBuilder Project Files

To generate KeypadBuilder Project (.KPB) Files for keypads (as well as MIO R-1, R-2 and R-3 Remotes):

1. With a Keypad UI tab selected, select Keypad > Generate KeypadBuilder Project (or click the Toolbar button).

This selection opens the Generate KeypadBuilder Project dialog, where you can edit the name and target directory for the resulting KPB project file.

By default, the KPB file is named as follows:

VA Project Name - Keypad Name.KPB

2. Edit the file name and target directory as desired, and click Save to generate the KPB project file.
 - Once it has been created, this project file can be opened and edited in the KeypadBuilder application (available for free download from www.amx.com). Select the Open Project In KeypadBuilder option to automatically open the resulting file once it is generated.
 - Refer to the KeypadBuilder on-line help for details.

Defining the UI - Remote Controllers

MIO R-1, R-2 and R-3 remotes use buttons to allow the end-user to make selections (similar to Keypads), while MIO R-4 remotes feature a color LCD touch screen (which is more similar to touch panels).



FIG. 218 Remote Controllers

As a result, the approach to defining UI navigation for remotes depends entirely on which type of remote you are working with.

Once you have added a remote to the System Diagram, a UI tab is created for each remote.

UI Diagram - MIO R-1, R-2 and R-3 Remotes

For every MIO R-1, R-2 and R-3 remote added to the system, a separate UI tab is added to the Diagram Area. Each UI tab consists of a UI Diagram - the graphic representation of the buttons on the remote.

The UI Diagram for these remotes is similar to Keypad UI diagrams - click on any button on the Remote UI diagram to select it for editing. The selected button's properties are displayed in the Properties window.

An example MIO R-1/R-2/R-3 UI diagram is shown below (FIG. 219):



FIG. 219 UI diagram - MIO R-1/R-2/R-3 Remotes

Note that when you select a UI tab for MIO R-1, R-2 and R-3 remotes, the *Remote Toolbar* is displayed.

UI Diagram - MIO R-4 Remotes

For every MIO R-4 Remote added to the system, a separate UI tab is added to the Diagram Area. Each UI tab consists of a UI Diagram - the graphic representation of the elements in the remote's Panel GUI, and their navigation layout. This is where you can add and connect UI Elements to establish a flow from one area of the UI to another.

The UI Diagram for MIO R-4 remotes is similar to Touch Panel UI diagrams - click on any UI Element on the R-4 UI diagram to select it for editing. The selected UI Element's properties are displayed in the Properties window.

An example MIO R-4 UI diagram is shown below (FIG. 220):

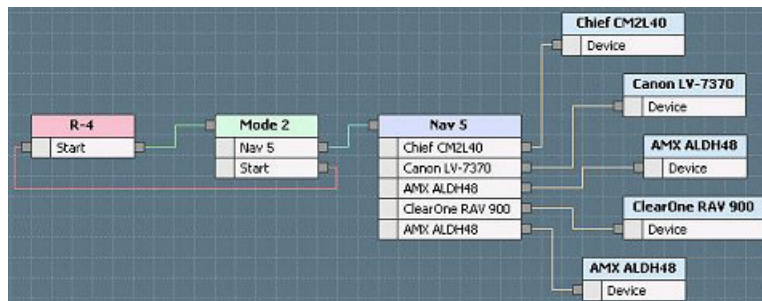


FIG. 220 UI diagram - MIO R-4 Remotes

- Right-click on any UI element to access the UI Diagram context menu.
- Use the Preview UI option to preview a selected element in a UI Diagram.
- Note that each UI element in the UI Diagram represents a separate page on the panel. FIG. 221 shows an example Device UI element for a DVD player:



FIG. 221 R-4 UI Preview

Use the options in the *Customize UI Pages* dialog to add/remove buttons and edit button text on the panel pages.

Defining the UI - MIO R-1, R-2 and R-3 Remotes

MIO R-1, R-2 and R-3 remotes use buttons to allow the end-user to make selections (similar to Keypads). To define the UI for MIO R-1, R-2 and R-3 remotes, use the Button Properties fields in the Properties Window to assign a Device Mode, Button Name and specify the Text to be engraved on each button:

1. Click on a button in the Remote UI diagram. This action displays the properties for the selected button in the Device Properties window.
2. Enter a text label for the selected button in the **Button Name** field of the Properties window. The button name is for use within VA only, and is intended to assist in developing unique descriptive names. This is not the text that will be engraved on the button (see Engraving Text below).
3. Enter the text that you want to have engraved on the selected button in the **Engraving Text** field. To enter text, click inside the text field and type directly into the field. Alternatively, click on the browse button (...) to access the *Enter Text* dialog - enter the desired text and click **OK** to save.



NOTE

In addition to the 10 character limit in the KeypadBuilder application, the maximum number of characters allowed is based on font choice as well as size and specific characters used.

4. Use the **Engraving - Show Bounding Box** option to determine whether your text will fit within the engraving boundaries of the button.
4. Select the font to use for the engraved text from the Engraving Font drop-down menu (AMX Icon 2 (for symbols), Arial, Arial Narrow or Arial Unicode MS).
 - The AMX Icon 2 font provides various control-oriented icons that can be engraved on the buttons.
 - The VA Engraving module supports the fonts included in the supported OS (System) languages. You must have the language loaded on your OS and then use Arial Unicode MS to render the text on the button.
5. Select a scale factor to apply to the engraved text on the selected button (default = 1.0, or 100%). Click inside the text field to enable Up and Down arrows to scale the selected button text up or down, in .1 (or 10%) increments.

Remote Button Properties

AMX Mio R-1, R-2 and R-3 remotes feature six customizable buttons to allow the end-user to control system devices. Click on any button on the Remote UI diagram to select it for editing, via the button properties in the Properties window (FIG. 222).

Properties	
Remote Properties	
Name	R-3
Comments	
Category	Remote
Model Number	R-3
Device Number	10002
Option	MIO-R3
FG Number	FG148-03
MSRP	\$1,200
Button Properties	
Button Name	
Device Mode	none
Engraving Text	
Engraving Font	Arial Unicode MS
Engraving Scale	1.0

FIG. 222 Properties Window - Remote Button Selected

When you select a button in a Remote UI diagram (MIO R-1, R-2 and R-3 remotes only), the following Remote Button Properties fields appear in the Properties window:

Remote Button Properties	
• Button Name	See page 137.
• Device Mode	See page 137.
• Engraving Text	See page 138.
• Engraving Font	See page 138.
• Engraving Scale	See page 138.

Exporting the Remote Button Engraving Template as a DXF File

Once you have specified the text that you want to have engraved on each of the buttons on the Remote, you can export the button engraving template as a DXF file.



NOTE

DXF files are generally compatible with CAD graphics programs.

1. Select a Remote UI tab for a keypad that has button engraved text indicated.
2. Select **Remote > Engraving - Export DXF File** (or click the Toolbar button) to open the *Export DXF File* dialog.
3. Specify the filename and target directory for the exported DXF file.
4. Click **Export**. The system prompts you when the process is complete.

Defining the UI - MIO R-4 Remotes

Since MIO R-4 remotes utilize a panel, the process of defining navigation is similar to that for touch panels. Once you have added a MIO R-4 remote to the System Diagram, a MIO R-4 UI tab is created for that remote. This is where you will create a UI diagram that defines the layout and navigation of the panel pages and buttons that provide the GUI for the end-user.

- Note that when you select a R-4 UI tab, the options in the Toolbox change to support UI design, and the Touch Panel Toolbar is displayed.
- Select and apply a UI Template before starting the UI design. Without a template, there are no UI elements available to select from.

Initially the UI diagram indicates the R-4 (as the Start Device element), and the controlled devices in the system. Note that each device in the system is represented with its own UI element. In the context of the Panel UI tab, these elements represent separate pages in the UI design, not the physical devices. Each device has its own page, where you will define the button that provides access to device functions.

The basics of defining the R-4's UI include:

- 1. Adding UI Elements to the UI diagram** - drag-and-drop UI Elements from the Toolbox onto the diagram. See the *Adding UI Elements To The UI Diagram* section on page 126.
- 2. Connect the UI Elements** - draw connection lines to establish the flow between the pages and UI Elements. See the *Connecting Elements In The UI Diagram* section on page 127.
- 3. Set the UI Element Properties** - View and edit properties (including Name, Comments, Category, Device Port Number and more) for each UI element. See the *UI Element Properties* section on page 131.

Creating Device Macros (Using CodeBuilder)

Overview

Use the CodeBuilder dialog to define macros for buttons associated with third-party (controlled) devices in your system.

A macro is a series of commands and procedures that are carried out in response to a single button event. Macros are typically used in control systems to allow the end-user to trigger several events from a single Touch Panel button. For example, a macro could trigger a lighting scene, cause a projection screen to be lowered, power up a DVD changer and other associated A/V equipment and set a particular volume level, all from a single button event.

There are three types of Button Event handlers supported by CodeBuilder, and you can assign macros to all three:

- **Push** - Specifies the actions that should be performed when a button is pressed. By default, Push events are used by all events.
- **Release** - Specifies the actions that should be performed when a button is released (after a Push).
- **Hold** - Specifies the actions that should be performed when a button is pressed and held for a minimum length of time.

The *Hold Duration* (the minimum time required for a Hold button event) is specified in the *Button Event Options* dialog (in 1/10 second increments).

By default, the minimum time required for a Hold button event is 5 seconds (Hold Duration = 50).

Defining Device Macros

To Define Device Macros for UI Buttons:

1. Select a third-party device (in either the System Diagram or the System Tree) and select **Device > CodeBuilder** from the context menu. The CodeBuilder command is also available in the Device menu. This invokes the *CodeBuilder* dialog.
2. In the *User Interface Buttons* tab, select a button. This is the button that you want to use to trigger the macro (FIG. 223).

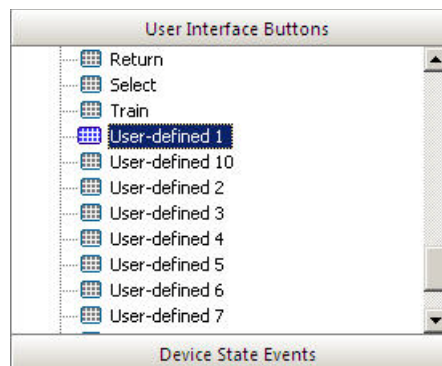


FIG. 223 CodeBuilder - User Interface Buttons tab - User Defined1 Selected

3. Select **Code > Button Event Options** (or click the Toolbar button) to open the Button Event Options dialog.
4. Select the Event Handler(s) to use with this button event (*Push*, *Release* and *Hold*).
 - At least one handler must be used with each event.
 - By default, the **Push** handler is selected (FIG. 224):



FIG. 224 Button Event Options dialog - Push Handler selected

- Click **OK** to save your changes and close the dialog.

5. In the Event window, there is a tab for each Event Handler that was selected in the *Button Event Options* dialog (FIG. 225):

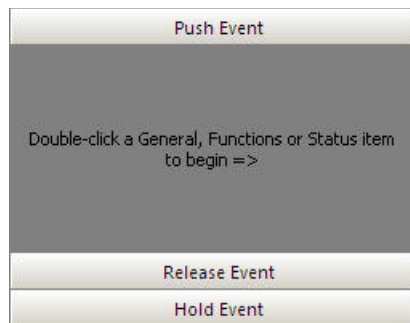


FIG. 225 CodeBuilder - Event window

These tabs allow you to build macros specific to each event handler type associated with the selected UI button.

6. Double-click on an element in the *General*, *Function* or *Status* tabs to add it to the bottom of the macro steps in the Event window. Then, click and drag to reposition the step in the macro as desired (FIG. 226).

- Click the **General** tab to select from the general-purpose macros available (including *If-Else-EndIf*, *Delay*, *DoPush Event* and *Comment*).
- Click the **Functions** tab to view and select from a list of functions available for each third-party device in the system (click any device name to expand its functions list). By default, the Functions tab allows access to all devices in the system, to allow you to create macros that involve multiple devices. Use the *Filter Functions* and *Filter Status* options to show only the currently selected device.

Many Functions have selectable parameters. You can specify parameters either via the drop-down menu on the macro step (in the Event window), or by toggling the *Show Friendly Names of Functions* option and selecting the specific Function/Parameter directly in the Functions tab.

- Click the **Status** tab to view and select from a list of status-related functions available for each third-party device in the system (click any device name to expand its status-related functions list). By default, the Status tab allows access to all devices in the system, to allow you to create macros that involve multiple devices. Use the *Filter Functions* and *Filter Status* options to show only the currently selected device.
- Click on the **Properties** tab to define and select variables to add to the macro. See *Working With Variables* section on page 188 for details.

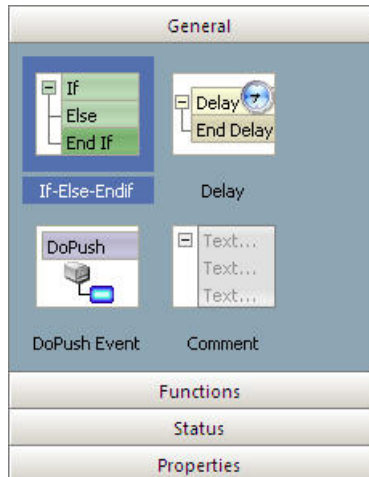


FIG. 226 CodeBuilder - Event window

7. Click **OK** to save your changes and close the *CodeBuilder* dialog.

Adding General-Purpose Macros

In the CodeBuilder dialog, with a button selected in the User Interface Button tab (or External Buttons tab):


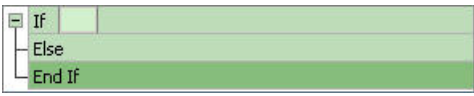
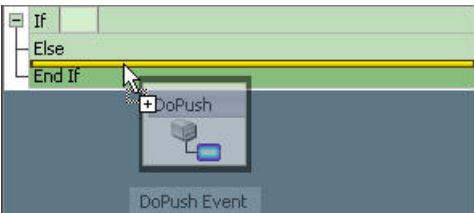
1. Select the *Push Event*, *Release Event* or *Hold Event* tab (in the Event window) to specify the Button Event type to which this macro will be applied.
2. Open the **General** tab.
3. Double-click on one of the general-purpose macros to add the representative macro block to the Event Window:

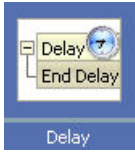
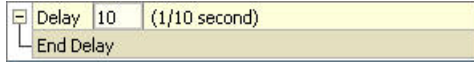
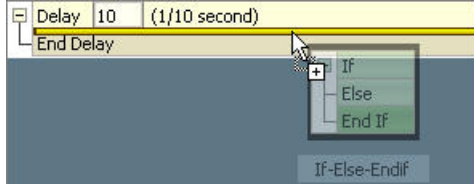


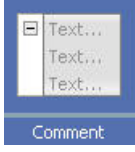
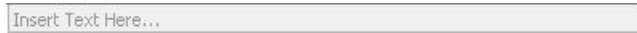


NOTE

The first macro is added to the top of the Event window. Each macro after that is added to the bottom of the list. The order of events in the current macro will follow the order indicated in the Event window. Click-and drag to move items around in the list to specify order.

General Purpose Macros

<p>If_else-Endif</p>  <p style="text-align: center; font-size: small;">If-Else-Endif</p>	<p>Double-click to add an If_else-Endif block to the Event window:</p>  <p>Click in the If field to select "NOT" from the drop-down, if desired.</p> <p>Other construct blocks or variables can be added within the If_else-Endif construct, by dragging them from the General, Functions, Status and Properties tabs, and dropping them in-between the <i>If</i>, <i>Else</i>, and <i>End If</i> lines in this block:</p>  <p>See Also</p> <ul style="list-style-type: none"> <i>Variable Replacement in IF-ELSE Statements</i> section on page 195 <i>Creating an IF Conditional with a Variable</i> section on page 196 <i>Compound IF-ELSE With Variables</i> section on page 197
--	---

<p>Delay</p> 	<p>Double-click to add a Delay block (Wait construct) to the Event window:</p>  <p>Click in the Delay field to enter a delay time (in 1/10 second) other than default setting of 10 (.1 second).</p> <p>Other construct blocks or variables can be added within the Delay construct, by dragging them from the General, Functions, Status and Properties tabs, and dropping them in-between the <i>Delay</i>, and <i>EndDelay</i> lines in this block:</p>  <p>See Also</p> <ul style="list-style-type: none"> • <i>Variable Replacement In Delay Macros</i> section on page 198
<p>DoPush Event</p> 	<p>Double-click to add a DoPush Event block (User Interface Button -> Push Event) to the Event window:</p>  <p>Click in the DoPush field to select the UI Element or Device for which this Push Event will apply. The list presented in this drop-down menu represents the UI Elements and Devices present in the currently active System.</p> <p>Click in the field to the right of the DoPush field to select a specific DoPush function. The list presented in this drop-down menu represents the specific functions available for the selected UI Element or Device:</p> <ul style="list-style-type: none"> • If a UI Element is selected, this list presents the UI items available. For example, if the "Mode 2" (two items) UI Element is selected in the DoPush field, then the items available here are "Item 1" and "Item 2". • If a Device is selected, this list presents the functions available for that device. For example, if a DVD Player is selected, then the items available here are a listing of functions supported by that DVD Player (i.e. "AB Repeat, Angle, Audio, Back, Cancel, etc.).
<p>Comment</p> 	<p>Double-click to add a Comment block (user text to describe functionality) to the Event window:</p>  <p>Double-click inside this text field to open the <i>Edit Comment</i> dialog. Enter the comment text in this dialog, and click OK to close the dialog and add the comment text to the <i>Event Window</i>.</p>

Adding Device Functions




To add device functions to a specific device, select the device in the System Diagram or in a UI Diagram and launch *CodeBuilder* (**Device > CodeBuilder**, or select CodeBuilder from the System Diagram context menu or UI Diagram context menu).

In the *CodeBuilder* dialog, with a button selected in the User Interface Button tab (or External Buttons tab):

1. Select the *Push Event*, *Release Event* or *Hold Event* tab (in the Event window) to specify the Button Event type to which this macro will be applied.
2. Open the *Functions* tab. By default, the Functions tab provides a list of all Devices in the currently active System. To filter the list to show only the selected Device, click the Filter Functions button in the Functions tab toolbar (FIG. 227):



FIG. 227 Function tab Toolbar

Function tab Toolbar	
<p>Filter Functions</p> 	<p>This option filters the device list in the Functions tab to show functions of only the device targeted by CodeBuilder.</p> <p>By default, Filter Functions is off (shows functions for all the devices in the system).</p>
<p>Show Friendly Names</p> 	<p>This option allows CodeBuilder to show functions in a "friendlier" manor, to depict specific device functionality.</p> <p>When this option is turned off (the default setting), the Functions tab displays all SNAPI/Duet functions for each device.</p>
<p>Show Function Information</p> 	<p>This option toggles the display of parameter information within the Functions tab.</p> <p>When enabled, this window displays a list of all parameters used by the selected function. In cases where two or more functions with the same name are listed in the status tree, the Function Information window describes the parameter difference between each function.</p> <p>Default = <i>enabled</i>.</p>

- Click the plus-sign next to any device in the *Function* tab to expand the view to show all supported functions for that device. Select a function to view information for that function (FIG. 228):

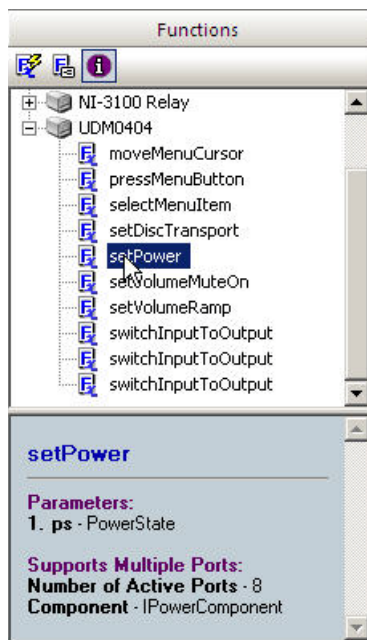


FIG. 228 CodeBuilder - Functions tab

- Double-click on one of the *Functions* macros to add the representative macro block to the Event Window (FIG. 229):

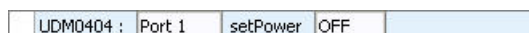


FIG. 229 Macro Block added to the Event Window



NOTE

The first macro is added to the top of the Event window. Each macro after that is added to the bottom of the list. The order of events in the current macro will follow the order indicated in the Event window. Click-and drag to move items around in the list to specify order.

- Use the fields in the Function block to specify various function-specific parameters. For example, the **setPower** macro for the UDM-0404 provides drop-down menus to allow to specify a Port, and a power setting for this function (FIG. 230):



FIG. 230 Editing the Function Macro Block

Adding Status Functions

To add device status functions to a specific device, select the device in the System Diagram or in a UI Diagram and launch *CodeBuilder* (**Device > CodeBuilder**, or select CodeBuilder from the System Diagram context menu or UI Diagram context menu).

In the *CodeBuilder* dialog, with a button selected in the User Interface Button tab (or External Buttons tab):

1. Select the *Push Event*, *Release Event* or *Hold Event* tab (in the Event window) to specify the Button Event type to which this macro will be applied.
2. Open the **Status** tab. By default, the Status tab provides a list of all Devices in the currently active System. To filter the list to show only the selected Device, click the **Filter Status** button in the Status tab toolbar.
3. Click the plus-sign next to any device in the Status tab to expand the view to show all supported functions for that device. Select a function to view information for that function (FIG. 231):

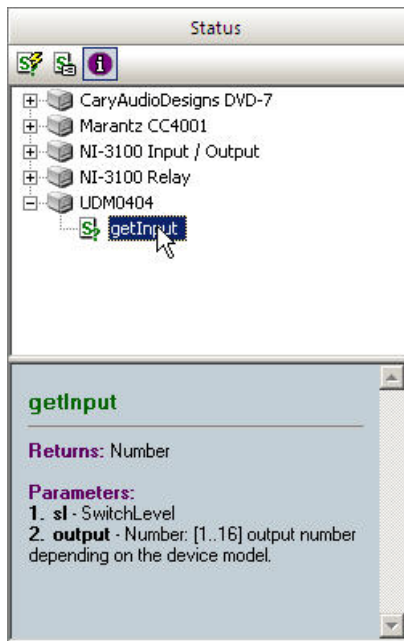


FIG. 231 CodeBuilder - Status tab

4. Double-click on one of the Status macros to add the representative macro block to the *Event Window* (FIG. 232):

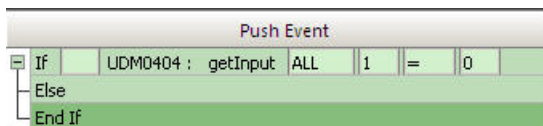


FIG. 232 Editing the Status Macro Block



NOTE

The first macro is added to the top of the Event window. Each macro after that is added to the bottom of the list. The order of events in the current macro will follow the order indicated in the Event window. Click-and drag to move items around in the list to specify order.

- Use the fields in the Status block to specify various function-specific parameters. For example, the getInput status macro for the UDM-0404 provides drop-down menus to allow to specify an output number, and an input number connected for this function:
 Note that information on each field in the Status block is provided in the CodeBuilder dialog Status Bar along the bottom of the dialog (FIG. 233):

Range = [1..16] output number depending on the device model.

FIG. 233 CodeBuilder dialog Status Bar

Defining Custom Macro UI Buttons

Any Duet module-controlled or IR-controlled device added to the system that has User Interface Button events that are programmable via *CodeBuilder* also has a set of ten user-defined events that can be programmed as per-device macro buttons.

These are available from within the list of User Interface Buttons in CodeBuilder as 'User-defined n' (FIG. 234):

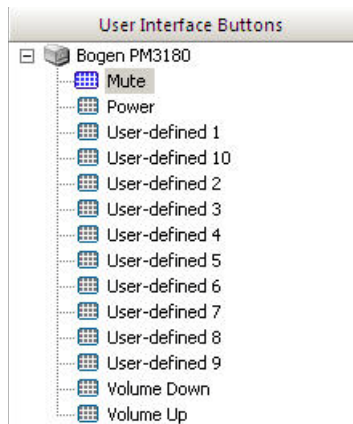


FIG. 234 CodeBuilder - User Interface Buttons

These user-defined macro buttons are programmable just as any other event in CodeBuilder, and may also be assigned UI-specific programming if CodeBuilder is launched while a UI Diagram is active.

To add a custom macro button in CodeBuilder:

- Click on one of the User-Defined buttons in the *User Interface Buttons* window.
- Double click on a General, Functions or Status item to add it to the *Event* window.
- Define the Device Macros for this custom button in the same way as for other UI buttons.

Likewise, a set of user-defined buttons are available from within the *Customize UI Pages* dialog in the *Device Buttons* list as 'User-defined n' (FIG. 235):

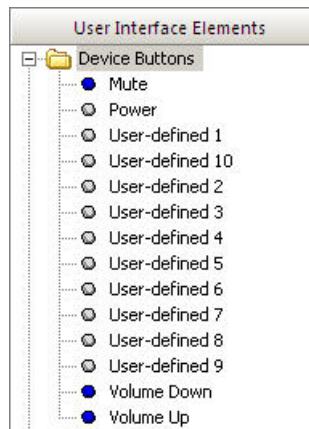


FIG. 235 Customize UI Pages dialog - Device Buttons list

Customize these buttons as desired, relative to the custom Macro functionality defined in *CodeBuilder*.

UI Buttons - Code Blocks

CodeBuilder displays all UI Buttons, including those with pre-defined device Code Blocks. Code Blocks are pre-defined segments of NetLinx code that handle the primary programming for a given event / UI button. UI buttons that have pre-defined Code Blocks associated with them are indicated in the User Interface Buttons tab with a yellow alert icon (FIG. 236):

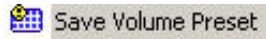


FIG. 236 User Interface Buttons Tab - Yellow Alert Icon

Further, a prompt is displayed in the Event Window when a Code Block is selected (FIG. 237):

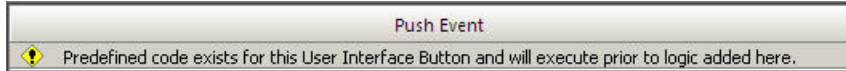


FIG. 237 Event Window - Predefined Code Prompt.

- VA allows you to augment Code Block UI buttons and events, the same as other "non-Code Block" buttons and events.
- Code Block actions as well as those manually added via CodeBuilder execute with the Code Block actions executing first.

CodeBuilder - Adding Comments To Button Events

Use the Comments option in the General tab to add a multi-line block of text to a button event:

1. Double-click or drag-and-drop the **Comment** option from the *General* tab into the Event Window (FIG. 238):

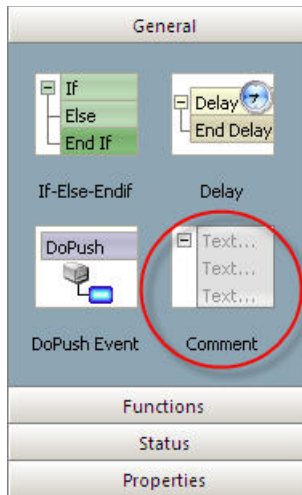


FIG. 238 CodeBuilder - Adding a Comment

2. This adds an empty *Comment* line to the macro.
3. Double-click on the Comment line to access the *Edit Comment* dialog.
4. Enter as much comment text as desired.
 - The format is straight ASCII text.
 - Empty lines are discarded.
 - When you click **OK**, the Comment block in the Event Window expands/contracts to fit the text entered. A comment containing more than one line appears as a single block, and can be collapsed/expanded (just like an "If" block).
 - A comment functions as an individual block in Code Builder regardless of how many lines are present. Other items cannot be moved inside a comment block since it functions as a single block.
 - The only way to get a separate block of comment is to add another comment.
5. Press **OK** to close this dialog.



NOTE

Comments are carried over, and appear (as Comments) in the generated code as well.

Editing Comments

1. Double-click on an existing Comment in the Event Window to invoke the *Edit Comment* dialog, in order to edit the comment text.
2. Click **OK** to save changes.

CodeBuilder: UI-Centric Programming

The UI-Centric Programming View of the *CodeBuilder* dialog features additional UI-Centric programming functionality, which allows you to program device events specifically for the selected UI device (the device represented in the active UI Diagram), as opposed to using the typical system-wide programming.

There are two ways of placing CodeBuilder into the UI-Centric Programming View:

1. With a User Interface button selected, select **UI-Specific Event Programming** in CodeBuilder's Code menu (or click the Toolbar button) to enter into UI-Centric programming for the selected button.
2. Select **Code > UI-Specific Event Programming**.

The title of the CodeBuilder dialog reflects the context of the CodeBuilder session, in the form of "CodeBuilder - deviceName on touchPanelName".

In this view, the CodeBuilder dialog - Buttons/Device States Window (on the left side) uses an extra state icon to reflect which events have been overridden to be UI-centric and which are system-wide (FIG. 239):

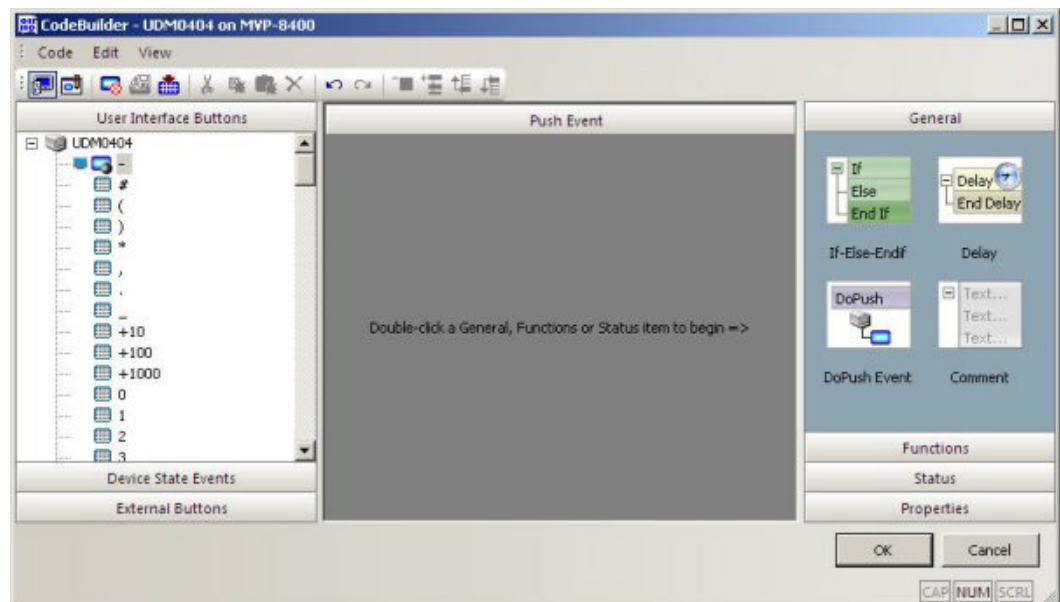


FIG. 239 CodeBuilder: UI-Centric Programming View



NOTE

CodeBuilder presents the option to switch the selected Event from system-wide to UI-centric programming via the *UI-Specific Event Programming* option in the Code menu, Toolbar, or the Events tree context menu.

When switching an Event to UI-centric programming, you are given the option to start with the default programming, current programming, or no programming, in the UI-Specific Event Programming dialog.

When switching an Event back to system-wide programming, any current UI-centric programming for that Event will be lost. Changes made to Events that are not marked as UI-centric will behave as VA currently does, with the modifications being made to the system-wide programming for the given device.

Similarly, when CodeBuilder is invoked for a device from the System Diagram, no extra functionality is available for UI-centric programming. All changes are made against the system-wide programming for the given device.

UI-Centric Programming - Generated `BUTTON_EVENT` code

The `BUTTON_EVENT` code generated for any Events that have UI-centric programming uses a `SELECT...ACTIVE` construct in order to determine what code to execute. For example, assuming the following addresses and array have been declared for control of a DVD player by three separate touch panels (all currently generated by VA):

```
dvTP1_DISC1 = 10001:11:0
dvTP2_DISC1 = 10002:11:0
dvTP3_DISC1 = 10003:11:0
...
VOLATILE DEV dvTP_DISC1[] = {dvTP1_DISC1, dvTP2_DISC1, dvTP3_DISC1}
```

Touch panel 1 will use system-wide programming for the Play event; while both touch panels 2 and 3 will use UI-centric programming.

The `BUTTON_EVENT` handler will be generated as follows in the `DISC1.axi` include file for the DVD player:

```
BUTTON_EVENT[dvTP_DISC1, BTN_PLAY]
{
    PUSH:
    {
        STACK_VAR DEV dvCurrent
        dvCurrent = dvTP_DISC1[GET_LAST(dvTP_DISC1)]
        SELECT
        {
            ACTIVE (dvCurrent = dvTP2_DISC1):
            {
                // UI-centric programming for touch panel 2
            }
            ACTIVE (dvCurrent = dvTP3_DISC1):
            {
                // UI-centric programming for touch panel 3
            }
            ACTIVE (1):
            {
                // system-wide programming for all other touch panels
            }
        }
    }
}
```

This code compares the device that triggered the event against those that were defined with UI-centric programming, executes the appropriate code if the UI-centric was used, or executes the default system-wide code if not.

External Button Programming

When CodeBuilder is invoked for a device from a UI Diagram (i.e., touch panel, R-4 remote, DMS keypad), and the UI device has external buttons associated with it, an additional tab for **External Buttons** is available in the Events bar on the left side (FIG. 240):

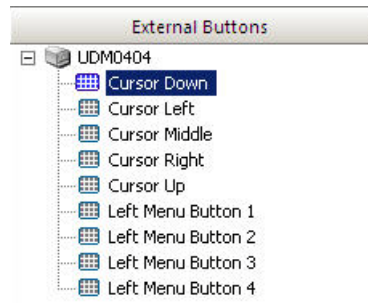


FIG. 240 CodeBuilder - External Buttons Tab

This section displays a list of events for the R-4's external buttons. Only those buttons that have channel codes assigned to them in the UI template will appear. The names of the events depend upon the button's channel code:

- If the channel code is a G4API code that is defined for the Duet device class of the selected device, its G4API name will be used.
- If the channel code is not defined in the G4API for the Duet device class of the selected device, the name given to the button in the UI template will be used.

Only those external buttons whose channel codes are not defined in the G4API for the Duet device class of the selected device can be programmed. Their handlers are defined just as any other would from within CodeBuilder.

External buttons that have G4API codes defined for the Duet device class of the selected device will still appear in the list, for completeness, but are not programmable, as their events will already appear in the User Interface Buttons section. Buttons that overlap the G4API for a given device are denoted with a red circle with a slash through it. The note *'Programming for this event can be defined in the User Interface Buttons section'* is displayed in the Handler area when these buttons are selected.



NOTE

External buttons on MIO R-4 remotes are handled on a device-by-device basis (see MIO R-4 External Button Programming for details).

MIO R-4 External Button Programming

When Code Builder is invoked for a device from a R-4 UI Diagram, an additional tab for External Buttons is available in the Events bar on the left side (FIG. 241):

This section displays a list of events for the R-4's external buttons. Only those buttons that have channel codes assigned to them in the UI template will appear. The names of the events depend upon the button's channel code:

- If the channel code is a G4API code that is defined for the Duet device class of the selected device, its G4API name will be used.
- If the channel code is not defined in the G4API for the Duet device class of the selected device, the name given to the button in the UI template will be used.

Only those external buttons whose channel codes are not defined in the G4API for the Duet device class of the selected device can be programmed. Their handlers are defined just as any other would from within CodeBuilder.

External buttons that have G4API codes defined for the Duet device class of the selected device will still appear in the list, for completeness, but are not programmable, as their events will already appear in the User Interface Buttons section. Buttons that overlap the G4API for a given device are denoted with a red circle with a slash through it (see *Button - VOLUME DOWN*, *Button - VOLUME MUTE* and *Button - VOLUME UP* above). The note *'Programming for this event can be defined in the User Interface Buttons section'* is displayed in the Handler area when these buttons are selected.

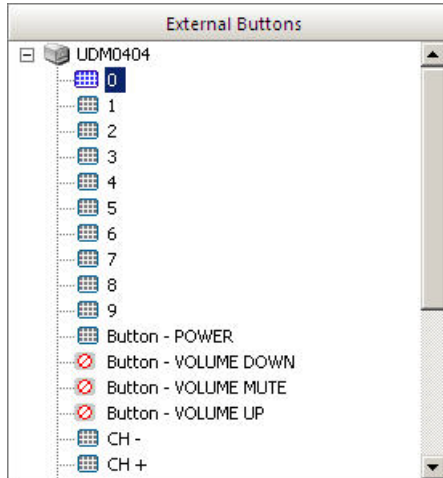


FIG. 241 CodeBuilder - External Buttons Tab (R-4 Remotes)

External buttons on MIO R-4 remotes are handled on a device-by-device basis. This means that the external button programming must be done individually for each controlled device:

1. In the R-4 UI Diagram, select a controlled device and select **Device > CodeBuilder** (or select **CodeBuilder** from the UI Diagram context menu).
2. Use the *External Buttons* tab to program the R-4's external buttons *for the selected device only*.
3. Repeat this process for each controlled device.



NOTE

For the MIO R-4, there is no way to globally set what a button should do (e.g., set volume buttons to always do one thing no matter the device); to achieve this, the external buttons have to be programmed to do the same thing on each device in the system.

External Button Programming - NetLinx Source Code Generation

VA will generate `BUTTON_EVENT` code for each external button that has programming associated with it. These will be generated into the code block include file for the device being programmed.

The device of the event will be address of the set of pages for the device being programmed on the specific user interface; not the entire array of user interfaces that control the device.

External buttons that use channel codes not in the G4API for the Duet device class of the selected device will use the numeric channel code defined in the UI template for the event channel:

```

BUTTON_EVENT [dvTP1_DISC1, 600]
{
    PUSH:
    {
        // Non-G4API external button programming for touch panel 1
    }
}
    
```



NOTE

In order for the UI templates to be compatible with this framework, any external buttons that template designers wish to make available for programming must be set to override the global external button settings and assigned either a G4API code that matches the intended functionality of the button, or a non-G4API code for "general purpose" external buttons.

Because each device in a UI template may be made up of multiple pages, VA will only use the codes from the "main" page to build the list of programmable external buttons.

- If the device is only made up of a single page, that page will be considered the "main" page.
- If the device is made up of multiple pages, the page flips attached to the device Info button will be used to determine which page is the "main" page.

Online/Offline Event Programming

For all system devices controlled by Duet modules, with the exception of devices containing I/O and Relay ports, VA supports Online and Offline as programmable events. When Code Builder is opened for such a device, the Device State Events tab is added to the dialog.

Upon selection of one of these events, you can add programming steps to its handler, just like any of the User Interface Buttons events.

However, you are not allowed to add or remove handlers, as these events do not follow the same Push/Hold/Release scheme as the 'User Interface Buttons' events do.

VA will generate the Online and Offline events in the Include file (.AXI) for the target device as the following NetLinx CodeBlock:

```
DATA_EVENT [vdvDevice]
{
  ONLINE:
  {
    [generated statements] ...
  }
  OFFLINE:
  {
    [generated statements] ...
  }
}
```

Where **vdvDevice** is the VA-assigned Duet virtual device number.

In addition, any statement that would have generated as a NetLinx TO construct from a Push handler will generate as an equivalent PULSE construct when used in the Online or Offline events.

This is a requirement of the NetLinx language, as TO can only be used from within a Push handler, and will effectively perform the same operation as if the user pressed a UI button, held it for the default pulse time (0.5 seconds), and then released the button.

I/O Event Programming

For all AMX system devices that contain I/O control ports (e.g., Central Controllers, Expansion devices, etc.), VA supports programming of the I/O channels as “buttons”, via the CodeBuilder dialog.

The events are listed in the User Interface Buttons tab and are named ‘I/O n’, where n is from 1 to the number of I/O ports contained on the device.

They may be programmed just as any other User Interface Buttons event, including the ability to define any or all of the available Push, Hold, and Release handlers.

- The *Push* handler is executed when the I/O channel goes from off to on,
- The *Hold* handler is executed when it remains on for a specified duration
- The *Release* handler is executed when it goes from on to off.

VA will generate the NetLinx code for these events in the Include file (.AXI) for the target I/O device as the following NetLinx CodeBlock:

```
BUTTON_EVENT [dvDevice, ioChannel]:
{
  PUSH:
  {
    [generated statements] ...
  }
  HOLD [holdTime]:
  {
    [generated statements] ...
  }
  RELEASE:
  {
    [generated statements] ...
  }
}
```

Where:

- **dvDevice** is the physical device address of the I/O ports, and not the Duet virtual device address that is used to control the I/O ports via Duet module;
- **ioChannel** is the number of the I/O port (1 to the number of I/O ports contained on the device).

Working With Variables

VA provides basic variable support via CodeBuilder.

- Each variable represents a place to store data that can change at runtime.
- CodeBuilder variables can be one of four basic types: String, Number, Boolean or Decimal (see Variable Data Types).
- Variables are created and managed in the **Properties** tab of the *CodeBuilder* dialog (FIG. 242):

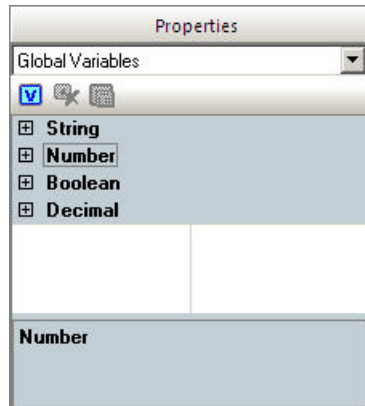


FIG. 242 CodeBuilder - Properties Tab

The Properties tab presents all known variables in a list categorized by data type: String, Number, Boolean and Decimal. Each variable entry is composed of three properties:

- **Name** - Alphanumeric text to identify a variable. The name shows up in the CodeBuilder Event Handler when it is used in a macro step.
- **Description** - User defined description of the variable.
- **Value** - The initial value set for the variable when it is created. The default value for string is empty; the default value for number is 0; and the default value for floating point is 0.0.

Variable support in CodeBuilder includes the following:

- Assigning a literal value to a variable
- Assigning one variable to another
- Assigning the return value of a status function to a variable
- Using variables as function parameter values
- Comparing a variable to a literal value
- Comparing one variable to another
- Comparing a variable to a status function return value
- Using a variable as the time parameter for a Delay

All statement types as listed above are translated into syntactically correct NetLinx program source code during control system file generation.



NOTE

Variable manipulation (i.e., math or string processing) is not supported.

You can use CodeBuilder variables in place of any editable literal value in the Event Handler, including:

- function parameters of the same type.
- IF-ELSE statements: function parameters (left side of the comparison operators)
- IF-ELSE statements: comparison value (right side of the comparison operator)
- input for the Delay macro (General-Purpose macro) - integer variables only

CodeBuilder variables can be dropped on the Event Handler to be assigned values such as:

- a literal value,
- the value returned by a function (status),
- or another CodeBuilder variable.

CodeBuilder variables are global in context to a VA project. Variables defined in a particular CodeBuilder session can be accessed, manipulated, and even deleted by future CodeBuilder sessions of the same project in VA.

Defining Variables

To add variables to a macro in CodeBuilder, select the device in the System Diagram or in a UI Diagram and launch CodeBuilder (Device > CodeBuilder, or select CodeBuilder from the System Diagram context menu or UI Diagram context menu). Once one or more variables have been defined, they are available for use in any macro in the currently active System.

In the CodeBuilder dialog, with a button selected in the User Interface Button tab (or External Buttons tab):

1. Open the **Properties** tab.
2. Click the plus-sign next to any of the variable types in the Properties tab to expand the view to show all variables that have been defined per type (FIG. 243).

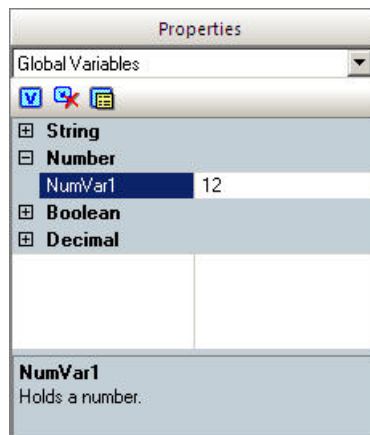


FIG. 243 CodeBuilder - Properties Tab

3. Double-click on one of the variables to add the representative variable block to the Event Window (FIG. 244):



FIG. 244 Variable Block added to the Event Window

Variable Data Types

The types of variables supported by VA encapsulate all of the supported simple data types used by Code Builder. Each variable data type represents a place to store data that can be set and/or referenced at runtime. The following table indicates which NetLinx data types are encapsulated by CodeBuilder variables.

Variable Data Types	
CodeBuilder Variable Data Types	NetLinx Data Types
• String	<ul style="list-style-type: none"> CHAR: 0-255 (8-bit), byte values and character strings WIDECHAR: 0-65535 (16-bit) wide character strings
• Number	<ul style="list-style-type: none"> INTEGER: 0-65535 (16-bit) SINTEGER: -32,767 to 32,767 (16-bit) SLONG: -2,147,483,647 to -2,147,483,647 (32-bit)
• Decimal	<ul style="list-style-type: none"> FLOAT: 1.17E-38 to 3.40E38 with 7 digits of precision (32-bit) DOUBLE: 2.22E-308 to 1.79E308 with 16 digits of precision (64-bit)
• Boolean	TRUE/FALSE, 1/0

The following types are *not* supported:

- TSE - Type Safe Enumeration, a class which groups together values of a common type.
- Complex Data Types

Variable Validation

Variables can be plugged into function parameters, assigned status function results, and can even be compared to one another.

For validation purposes, CodeBuilder forces you to use variables for like-typed parameters, values etc. For example, you are not allowed to drag a string on top of a parameter that takes a number.

CodeBuilder also validates parameters that have ranges. If you type in a value that does not match the required range, CodeBuilder will issue an error message. However, CodeBuilder does not validate the variable for a range - it can only validate the fact that the parameter is a number, string or decimal (therefore the variable must match).

CodeBuilder cannot fully validate a variable against a range since its contents are unknown at design time. Variables by definition have an initial value, but it can change in any CodeBuilder session (for example, by assignment to a status function). The only way to know for sure what a variable's value is at any point in time is

by checking the variable at run time. Since CodeBuilder is a "design time" tool and not a "runtime" tool, this is not possible utilizing CodeBuilder. Instead, CodeBuilder provides you with enough information to make an informed decision on how to use a variable correctly.

CodeBuilder - Adding a New Variable

In the CodeBuilder dialog (Properties tab):

1. Click the **Add Variable** toolbar button to open the *Add Variable* dialog.
2. Use the radio buttons in the **Type** area to choose a data type (*String*, *Number*, *Boolean* or *Decimal*).
3. Enter alphanumeric text for the **Name** and a **Description** (optional).
4. Enter an **Initial Value** for the variable.
 - Click **Add** to add the variable as defined, leaving this dialog open (to add more variables).
 - Click **Add** and **Exit** to add the variable as defined, and close this dialog.
 - Click **Exit** to close this dialog, without adding a variable.
5. The new variable will appear in alphabetical order under its data type category.

CodeBuilder - Editing A Variable

To change the name, description and/or value of an existing variable:

In the CodeBuilder dialog (Properties tab):

1. Select a variable.
2. Press the **Edit Variable** toolbar button to open the *Edit Variable* dialog.
3. Edit the *Name*, *Description* and *Initial Value* fields as desired; the variable will be renamed everywhere it is used.
Alternatively, you can change the *Initial Value* of a variable by double-clicking the value in the variable list.
4. Click **OK** to close the dialog.



NOTE

The variable Type cannot be changed.

CodeBuilder - Deleting A Variable

In the CodeBuilder dialog (Properties tab):

1. Select a variable.
2. Click the **Delete Variable** toolbar button.



NOTE

If the variable is used in any IF-ELSE-ENDIF statements, CodeBuilder will prompt you to verify that all the variable will be removed from all code. Click OK to proceed.

Variables - NetLinx Code Generation

The NetLinx code generated by VA includes complete support for any user-defined variables created and/or utilized via CodeBuilder.

Declarations, initializations and references to user-defined variables are translated to the correct NetLinx syntax when generated in output.

The following statements are true relating to the output of variables in NetLinx source code:

- All variables created and used in programming via the CodeBuilder interface will be declared as system-global VOLATILE variables, meaning they will not retain their value between control system reboots.
- All integer variables created by code generation (i.e. both user variables and system-generated variables) will be declared using the signed long (SLONG) type, to alleviate conflicts related to storage size and compiler warnings related to implicit type conversion and potential truncation.
- All decimal variables created by code generation (i.e. both user variables and system-generated variables) will be declared using the double precision floating point (DOUBLE) type, to alleviate conflicts related to storage size and compiler warnings related to implicit type conversion and potential truncation.
- All user variable declarations will appear in the DEFINE_VARIABLE section of the main.AXS file generated by VisualArchitect.
- According to NetLinx programming convention, variable names will be prefixed with characters similar to Hungarian Notation to indicate their type.
- User variables and system-generated global variables will be generated in the same section (i.e. mixed together) and grouped by data type.
- Variables will be initialized to the value they should have as designated by the user or by the system, where appropriate. If the user hasn't provided an initial value via CodeBuilder, the variable will be assigned to its default initial value.
- Detailed comments will be generated on the right-hand side of all variable declarations. Comments next to user-created variables will include the user's description of each variable (if the user provided one), while comments next to system-generated variables will include a description of the reason the variable has been declared.

- Variable names as specified by the user in CodeBuilder will be retained verbatim in generated output so that the user can readily recognize references to their own variables in generated output, if needed. If a naming conflict is encountered between a user variable name and a system-generated variable name, the code generator will alter only the name of the conflicting system-generated variable iteratively until a name is found that does not conflict with any other global variable name in the system.

The variable declarations section output will appear similar to the following example:



In the following example, individual variable comments have been removed for readability, but they will appear in generated output.

```
(*****)
(*          VARIABLE DEFINITIONS GO BELOW          *)
(*****)
DEFINE_VARIABLE
// Integer Variables
VOLATILE SLONG MyIntegervariable = 10
VOLATILE SLONG DelayCount = 500
VOLATILE SLONG s1VPROJ1ContrastLevel = 0
VOLATILE SLONG s1CAM1PanLevel = 0
VOLATILE SLONG s1CAM1TiltSpeedLevel = 0
// Floating Point (decimal) Variables
VOLATILE DOUBLE dLocalTemperature = 0.000000
VOLATILE DOUBLE dWEATHER1WeatherBarometerLevel = 0.000000
// String Variables
VOLATILE CHAR cWEATHER1WeatherScale[DUET_MAX_PARAM_LEN]
```

In the sample output above, the first two integer variables were created in CodeBuilder, while the remaining variables were automatically generated by VA to support other system control operations. Again, actual variable declaration output will have comments on the right-hand side that will include user comments and/or how the variables are used.

Variable Assignment Step

The variable assignment step consists of the following:

- Variable = Value
 where Variable is the name of the variable being assigned and Value is any one of the following: a literal value, a status function, or another variable.

There are three ways to create a variable assignment step:

1. Double-clicking a defined variable: creates a variable assignment step in the form variable = literal at the end of the currently selected Event Handler macro.
2. Left click dragging-and-dropping a defined variable between steps inserts a variable assignment step (again in the form variable = literal) at the desired location of the Event Handler list.
3. Right click dragging-and-dropping a defined variable between steps then choosing Insert Variable Assignment from the context menu inserts a variable assignment step (again in the form variable = literal) at the desired location of the Event Handler list.

Upon creation the literal will contain the default value found in the Variable definition tab (FIG. 245).

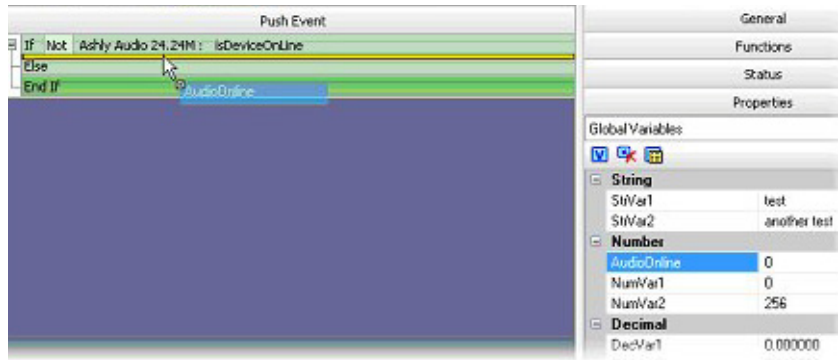


FIG. 245 Variable Assignment Step - Adding a Defined Variable to the Event Handlers List

After initial creation the variable assignment step can be changed in the following ways:

- Drag-and-Drop another Variable Onto a Literal
- Drag-and-Drop a Status Function Onto a Literal

Assigning Variables

The following examples show how a variable can be assigned:

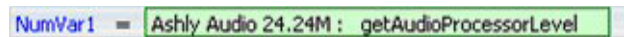
By literal:



By another variable:



By the result of a Status:



Drag-and-Drop Another Variable Onto a Literal

Dragging and dropping another variable on top of the literal assigns a variable to another variable. During the drag-and-drop operation, note the visual change for the literal when dragging the variable over the literal location (FIG. 246).

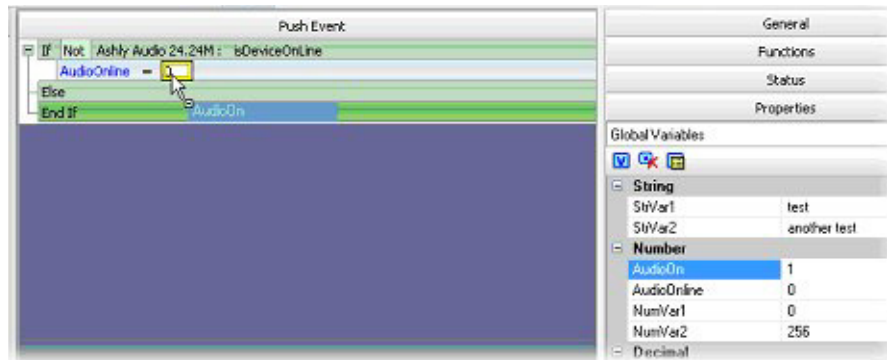


FIG. 246 Variable Assignment Step - Adding Another Variable Onto a Literal

The figure below illustrates the visual indication given, after the drag-and-drop of a Variable over a Literal (FIG. 247):

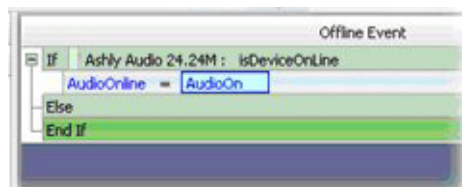


FIG. 247 Variable Assignment Step - Visual Indication after Drag and Drop



You can revert back to the literal value by double-clicking the variable "AudioOn".

Drag-and-Drop a Status Function Onto a Literal

Dragging and dropping a status function on top of the literal assigns the variable with the result of a status function. During the drag-and-drop operation you should see a visual change for the literal when dragging the status function over the literal location.

The following figure illustrates the visual indication given when dragging a status function over the literal in a variable assignment step (FIG. 248).

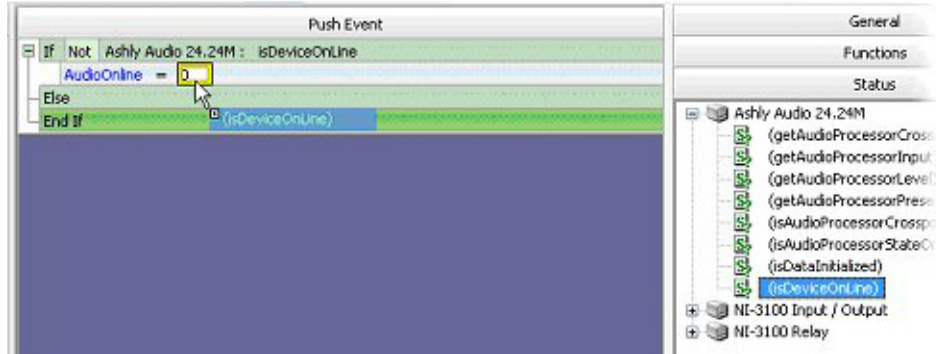


FIG. 248 Variable Assignment - Dragging A Status Function Over The Literal

The following figure illustrates the visual indication given, after the drag-and-drop of a Status function over a Literal (FIG. 249):

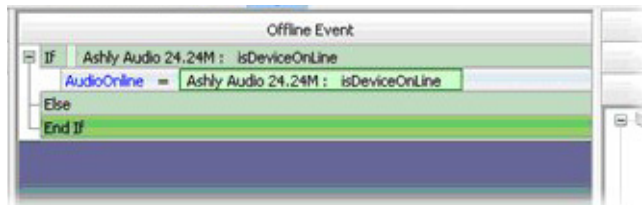


FIG. 249 Variable Assignment Step - Visual Indication after Drag and Drop Status Over Literal



You can revert back to the literal value by double-clicking on the status "Ashly Audio24.24M: isDeviceOnLine".

Note that after changing the value on the right-hand of the assignment to a variable or a status function, you can revert back to a literal by double-clicking the field on the right-hand side of the assignment and entering the forced data type.

Replacing Literals In Existing Steps With Variables

CodeBuilder supports replacement of literals with variables, and the opposite: the replacement of a variable with a literal of the correct data type.

You can change a literal by double-clicking the literal block and entering text in the expected format (number, string or decimal).

To replace a literal with a variable, drag-and-drop a variable on top of the literal. The only requirement is that both the literal value being replaced and the variable are the same data type. When dragging the variable, the UI should only high-light literal values of the same type.

At any time you can revert back to a literal value or replace it with another variable.

The following topics outline all the scenarios where variable replacement can be used.

Variable Replacement In Function Blocks

Function blocks can appear as a function call step. Functions can have one or more parameters. If the parameter is editable through the use of an edit box it can be replaced by a variable.

As you drag a variable onto the function call, parameters that allow replacement should visibly change when the mouse passes over them to indicate drop-acceptance (FIG. 250):

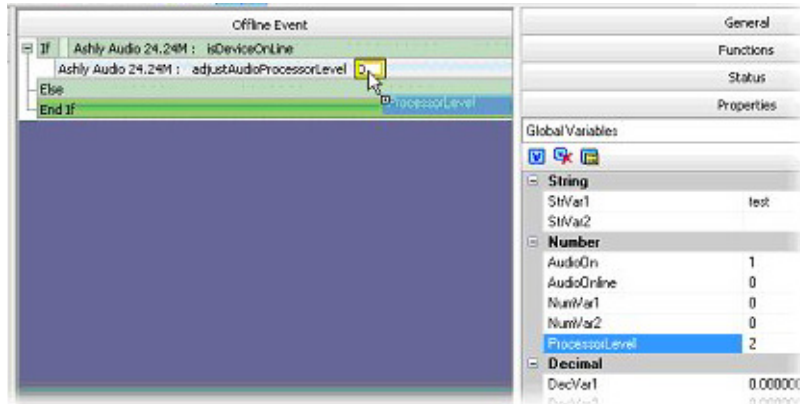


FIG. 250 Variable Replacement In Function Blocks

Once you drop a variable onto a parameter the parameter block changes to look like a variable block (FIG. 251):

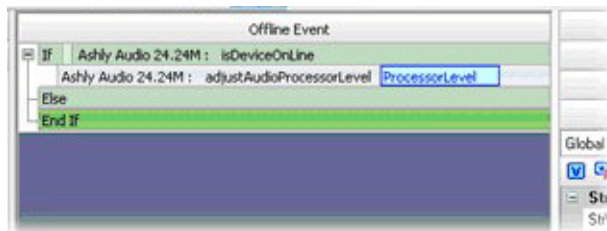


FIG. 251 Variable Replacement In Function Blocks - Visual Indication after Drag and Drop



NOTE

You can revert back to a literal value by double-clicking the variable "ProcessorLevel" and typing in a number. The text "ProcessorLevel" is replaced with the literal value.

Variable Replacement in IF-ELSE Statements

IF-ELSE statements provide a way to test conditions and perform actions based on the result of those tests. CodeBuilder supports variable replacement on either side of the conditional "=", whether testing the result of a function to the contents of a variable, or replacing function parameter(s) with variables.

As you drag a variable onto the IF-ELSE statement, parameters that allow replacement visibly change when the mouse passes over them to indicate drop-acceptance (FIG. 252):

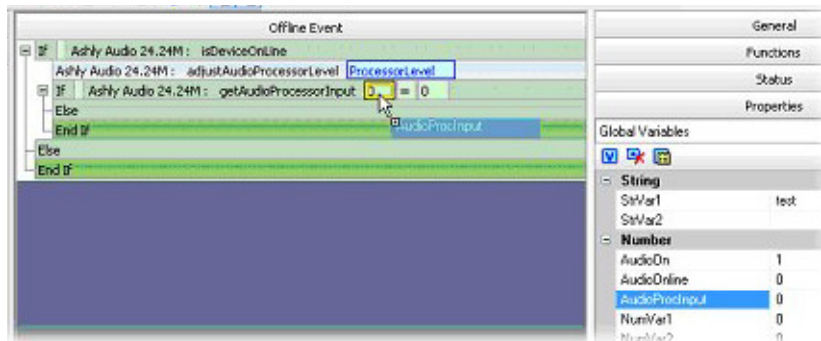


FIG. 252 Variable Replacement in IF-ELSE Statements

When you drop a variable onto a parameter the parameter block changes to look like a variable block (FIG. 253):

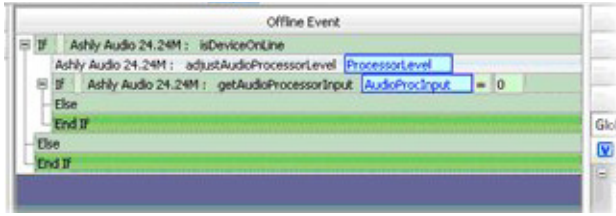


FIG. 253 Variable Replacement in IF-ELSE Statements - Visual Indication after Drag and Drop

Creating an IF Conditional with a Variable

By selecting the right mouse button on a variable and dragging and then dropping the variable between steps you will be presented with a menu with two choices: Insert Variable Assignment and Insert Variable Condition (FIG. 254):

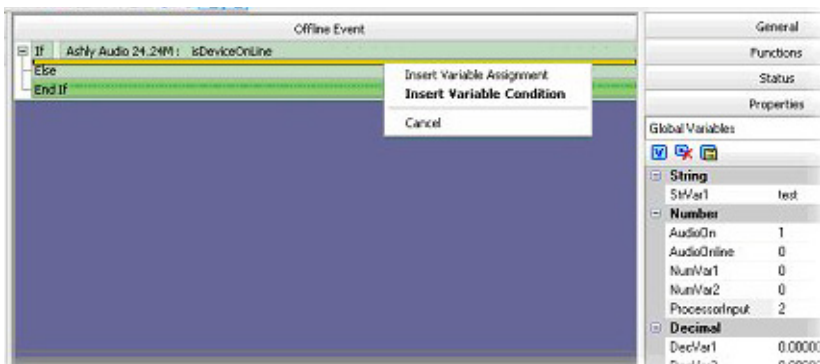


FIG. 254 Creating an IF Conditional with a Variable

Insert Variable Assignment will be defaulted, and if chosen an IF-ELSE-END block will be created with the variable:



NOTE

You can also create an IF-ELSE step with a variable by first creating an empty If step and then drag-and-drop a variable onto the IF-ELSE block.

- The variable name will appear on the left-hand-side of the conditional operator and an editable literal value will appear on the right-hand-side of the conditional operator.
- If the variable is a number, an integer literal value is expected on the right-hand of the equals sign and so on with the other types.

As you drag a variable onto the empty IF-ELSE step, CodeBuilder indicates that the variable can be added (FIG. 255):

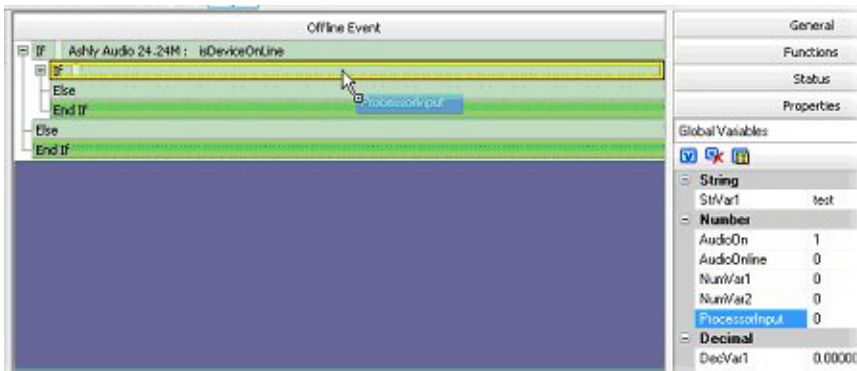


FIG. 255 Creating an IF Conditional with a Variable - Adding a Variable To An Empty IF-ELSE Step

When you drop a variable onto an empty IF-ELSE step, CodeBuilder identifies the variable (FIG. 256):

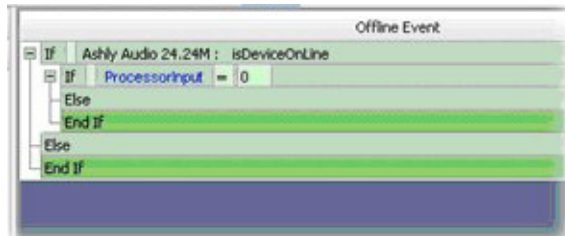


FIG. 256 Creating an IF Conditional with a Variable - CodeBuilder Identifies The Variable

- You can enter a literal value by double-clicking the literal, or you can drag-and-drop another variable on top of the literal to compare two variables (FIG. 257):

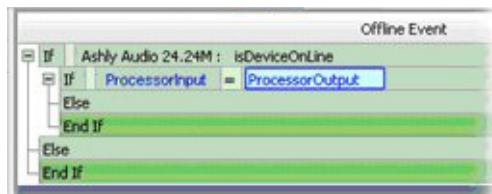


FIG. 257 Creating an IF Conditional with a Variable - Entering a Literal Value

- You can also drag-and-drop a status function onto the literal to compare a variable to the result of a status function (FIG. 258):

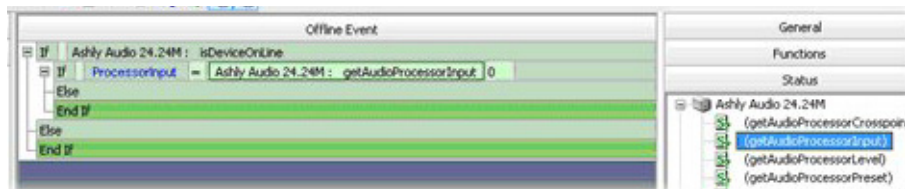


FIG. 258 Creating an IF Conditional with a Variable - Entering a Status Function

- Double-click on the right side of the condition to change the function status or variable back to a literal (similar to a variable assignment statement).

Compound IF-ELSE With Variables

Like the status function, CodeBuilder also supports compound IF-ELSE steps for variable drag-and-drop operations (FIG. 259):

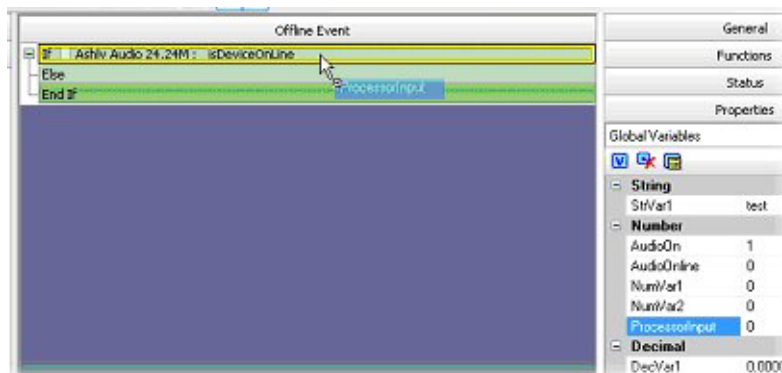


FIG. 259 Compound IF-ELSE With Variables

FIG. 260 illustrates the visual indication given after the drag-and-drop (of compound IF-ELSE steps over a Literal):

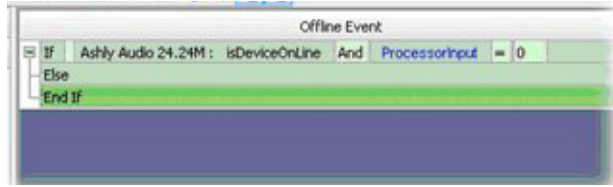


FIG. 260 Compound IF-ELSE With Variables - Visual Indication after Drag-and-Drop

Variable Replacement In Delay Macros

Variable replacement for Delay macros works just like variable replacement for function call macros (FIG. 261):

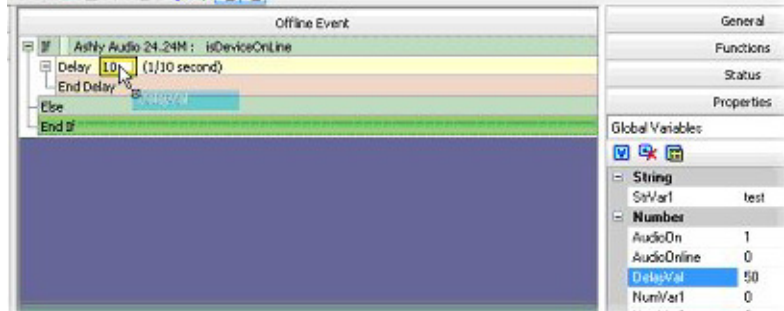


FIG. 261 Variable Replacement In Delay Macros

The figure below illustrates the visual indication given after the drag-and-drop of Delay macros over a Literal (FIG. 262):

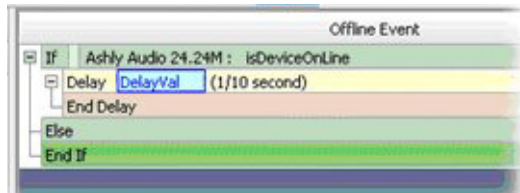


FIG. 262 Variable Replacement In Delay Macros - Visual INdication After Drag-and-Drop



NOTE

You can revert back to a literal value by double-clicking "DelayVal" and entering numeric text. The entered literal will replace the variable name.

Finishing the Project

Overview

After creating a system, there are a few steps involved in finishing the project:

1. Review the Project Properties (see the *Working With Projects* section on page 21).
2. Save the Project (see the *Saving VA Project Files* section on page 28).
3. Generate and Transfer System Files (see *Generating And Transferring System Files* on page 199).
4. Generate the System Report (see *System Report* on page 202).

Optionally, there are a few other steps that can be taken:

1. Exporting Diagram Images (see *Exporting Diagram Images* on page 206).
2. Printing the Diagrams (see *Printing The Diagrams* on page 207).

Generating And Transferring System Files

Once your VA project is complete, you are ready to generate and transfer the system files required by the Central Controller to make the system work.



NOTE

The *FileTransfer2* application (available for free download from www.amx.com) is required to perform transfers.

1. Select **System > Generate and Transfer System Files** (or click the Toolbar button) to access the *Generate & Transfer System Files* dialog (FIG. 263).

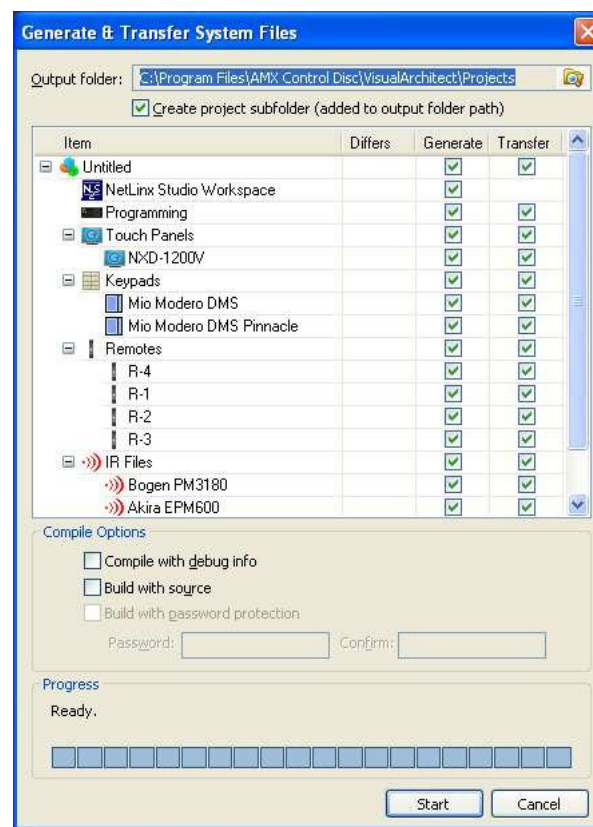


FIG. 263 Generate & Transfer System Files dialog

This dialog displays a list of all System files in the active Project, with options (check boxes) to generate and transfer each file in the list.

2. Select an Output Folder for Generated System files, via the **Output folder** field at the top of this dialog. Click the Browse button to locate and select a target folder in the *Browse For Folder* dialog. Click the **Create project subfolder** (added to output folder path) option to allow VA to create a new subfolder for generated System files, within the folder selected in the *Output folder* field.
3. Click the select/de-select the **Generate** and **Transfer** check boxes for the System files in the list to specify whether to Generate and/or Transfer each System file in the list. By default, all items are selected for both Generate and Transfer.
Click the top check box in the Generate and Transfer columns to automatically select or de-select all System files in the list.
4. Select a **Compile** option:
 - Select **Compile With Debug Info** to include variable symbol information in the compiled file. This allows the debugger to identify and validate variable symbols in the code. You must compile with debug info in order to debug NetLinx files.
 - Select **Build With Source** to compile the source code with the executable code so that you may later retrieve the source code from the device you send the compiled code to. If Build with Source is disabled, only the executable code is sent when the file is transferred to the master (default = disabled).
 - Select **Build With Password Protection** to apply a password to the Source file. Once applied, you cannot extract the source code from the Central Controller (via NetLinx Studio's Extract From SRC command) unless you provide the correct password. The password must be at least 6 characters in length (maximum of 20 characters, default = disabled).
5. Click **Start**.

The Progress bars indicate the status of the operation, and the program will alert you if there are any problems or issues with the system files during the process.

Notes:

- You can also generate the KeypadBuilder project (KPB) file via the Generate KeypadBuilder Project option in the Keypad menu.
- You can also generate the TPDesign4 project (TP4) file via the Generate TPDesign4 Project option in the Touch Panel menu.
- You can also generate the System Report (HTML) file via the System Report option in the System menu.



NetLinx Studio is available for free download from www.amx.com, and comes with its own online help and documentation.

Generating the System Report

Select **System > System Report** (or click the Toolbar button) to access the *System Report* dialog (FIG. 264).

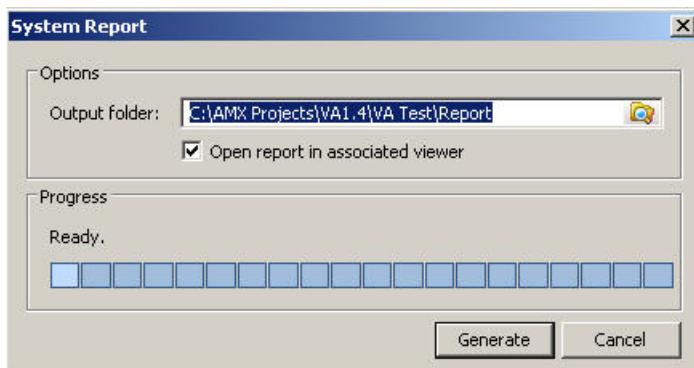


FIG. 264 System Report dialog

Use this dialog to specify an output folder for the System Report (HTML) file for this project:

1. Specify an **Output Folder**: Enter the directory path for the target directory for the System Report, or click the folder icon to browse for the target directory.
2. Select the **Open Report in Associated Viewer** option to automatically open the System Report, using the program associated with HTML files (typically Internet Explorer) when the report is generated.
3. Click **Generate** to generate the System Report.

The resulting HTML file is placed in the specified output folder.

- The System Report filename is based on the System Name associated with the project. For example: "SystemName - VARreport.HTML"
- The System Report is a detailed summary of all devices in the system and their connection information, in the form of an HTML file.

There are two ways to approach generating the system report:

1. Select **System > System Report** - This selection opens the *System Report* dialog, where you can specify the target (Output) folder for the System Report file. In this case, the System Report file (alone) is generated and copied to the Output folder.
2. Select **System > Generate & Transfer System Files** - This selection opens the *Generate & Transfer System Files* dialog. Verify that the **Generate System Report** option is checked (this is the default setting). In this case, the System Report will be generated automatically along with all other System files, when the **Start** button in this dialog is clicked.

Generating The TPDesign4 Project (.TP4) File

1. With a Touch Panel UI Diagram open, select **Touch Panel > Generate TPDesign4 Project** (or click the Toolbar button).

This selection opens the *Generate TPDesign4 Project* dialog, where you can edit the name and target directory for the resulting TP4 project file (FIG. 265).

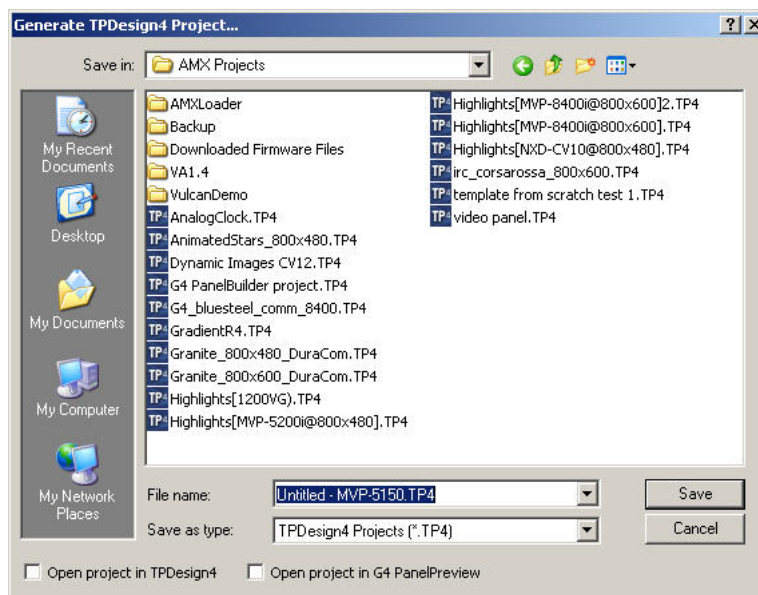


FIG. 265 Generate TPDesign4 Project dialog

By default, the TP4 file is named as follows:

VA Project Name - Touch Panel Name.TP4

2. Edit the file name and target directory as desired, and click Save to generate the TP4 project file.
 - Once it has been created, this project file can be opened and edited in the TPDesign4 application (available for free download from www.amx.com). Select the **Open Project In TPDesign4** option to automatically open the resulting file once it is generated.
 - Refer to the TPDesign4 on-line help for details.

Transfer Previously Generated System Files

1. Select **System > Generate and Transfer System Files** (or click the Toolbar button) to access the *Generate & Transfer System Files* dialog (see FIG. 263 on page 199):
2. Under *Actions*, select **Transfer Previously Generated System Files**.
3. Under *Transfer Options*, specify a **Transfer Folder** (source directory) that contains the system files that will be transferred. Click the browse icon to navigate to the desired folder in the *Browse for Folder* dialog.
4. Click **Start**.

The Progress bars indicate the status of the operation, and the program will alert you if there are any problems or issues with the system files during the process.

System Report

The System Report is a detailed summary of all devices in the system and their connection information, in the form of an HTML file. Scroll down to view the contents of the System Report. The contents of the System Report will depend on the devices in your system, but the main sections in every System Report include:

System Report - Cover Page

The front page of the System Report includes the date and time that the report was generated, along with basic project information (FIG. 266):

07/10/2006 - 12:21:09



Project:	Auditorium Level 1
Project Location:	C:\Program Files\AMX Control Disc\System Design Library\Auditoriums\Auditorium Level 1.VAP
Dealer Name:	AMX

FIG. 266 System Report - Title Page

- **Project** - This is the name of the Project, as entered in the Project Properties dialog.
- **Project Location** - This is the full directory path of the project.
- **Dealer Name** - This is the name of the Dealer, as entered in the Project Properties dialog.



Click on any item in the *Table of Contents* to jump to that heading in the report.

System Report - System Diagram

This is a printable version of the System Diagram for this project (FIG. 267).

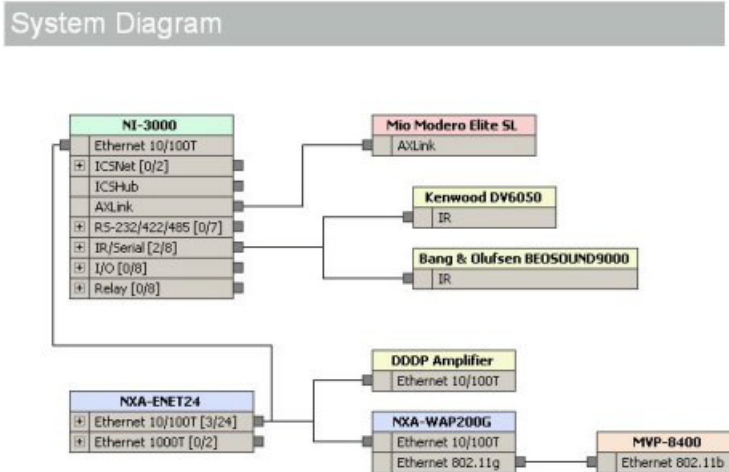


FIG. 267 System Report - System Diagram

System Report - Equipment List

This is a listing of every device in the system (FIG. 268).

<input checked="" type="checkbox"/>	Manufacturer	Model	Description	FG Number
<input type="checkbox"/>	AMX	Mio Modero Elite SL	Mio Modero Elite SL	FG5796-03AL
<input type="checkbox"/>	AMX	MVP-8400	MVP-8400	FG5965-02
<input type="checkbox"/>	AMX	NI-3000	NI-3000	FG2105-02
<input type="checkbox"/>	AMX	NXA-ENET24	NXA-ENET24	FG2178-60
<input type="checkbox"/>	AMX	NXA-WAP200G	NXA-WAP200G	FG2255-01
<input type="checkbox"/>	Bang & Olufsen	BEOSOUND9000	Bang & Olufsen BEOSOUND9000	
<input type="checkbox"/>	DDDP Device	DDDP Device	DDDP Amplifier	
<input type="checkbox"/>	Kenwood	DV6050	Kenwood DV6050	

FIG. 268 System Report - Equipment List

System Report - Accessory List

This is a listing of every accessory in the system (FIG. 269).

<input checked="" type="checkbox"/>	Model	Accessory Of	FG Number	Part Number	MSRP	Included	Additional
<input type="checkbox"/>	CC-USB	NXD-CV10	FG10-5965		\$20	-	1
<input type="checkbox"/>	NXA-AVB/Ethernet	NXD-CV10	FG2254-10		\$500	1	-
<input type="checkbox"/>	NXA-BEZ-10B-LA	NXD-CV10	FG2258-33		\$160	-	1
<input type="checkbox"/>	NXA-CFSP1GB	NXD-CV10	FG2116-39		\$1,998	-	1
<input type="checkbox"/>	NXA-RK10	NXD-CV10	FG2904-53		\$300	-	1
<input type="checkbox"/>	PSN4.4	NXD-CV10	FG423-45		\$150	-	1
<input type="checkbox"/>	PSN6.5	NXD-CV10	FG423-41		\$460	-	1

FIG. 269 System Report - Accessory List

System Report - Installation Checklist

Use the Installation Checklist as a guide to the installation process. Each item in the checklist should be completed before you continue (FIG. 270).

Installation Checklist	
<input type="checkbox"/>	Label all devices and cables during installation.
<input type="checkbox"/>	Make Connections as described under Wiring Connections
<input type="checkbox"/>	Address each device as specified under Installation Instructions
<input type="checkbox"/>	Compile and download the project using VisualArchitect
<input type="checkbox"/>	Reboot the master for the changes to take effect

FIG. 270 System Report - Installation Checklist

System Report - Wiring Connections

This section includes detailed wiring and connection information for each device in the system. Use the information in these sections to aid in the installation process. The subsections under Wiring Connections will depend on the devices in the system, and the types connections that exist between system devices.

System Report - Default Cable FG Information

VA provides FG numbers for device cables, whenever it is possible to discern which type of cable is required for each Equipment Connection in the project (FIG. 271).

Wiring Connections				
NetLinx Master Connections				
NI-3100				
<input checked="" type="checkbox"/>	Port Type	Port Number	Equipment Connection	Cable FG Number
<input type="checkbox"/>	RS-232	1	Tascam MDCCD1	10-702-04
<input type="checkbox"/>	RS-232	2	Tascam DVD6500	10-756-04

FIG. 271 System Report - Default Cable FG Information

Cable FG information is included in the Cable column in the ‘Wiring Connections’ section of the System Report.

- If there is only one compatible device cable for any given Equipment Connection, it will be listed in the System Report.
- If there are multiple compatible cables, all possible cables are listed in the System Report with instructions to contact Customer Service for assistance in choosing/creating the proper cable.

System Report - Installation Instructions

This section of the report provides a summary of the Device Addressing, plus several subsections that describe various aspects of configuring device addressing on the Central Controller and AMX devices (including "Master Addressing via Terminal - Telnet", "NetLinx Device Addressing via the Master's UI", "Modero Touch Panels Device Addressing", and more (FIG. 272).

Installation Instructions				
Device Addressing				
<input checked="" type="checkbox"/>	Description	Interface	DPS	IP Address:Host Name
<input type="checkbox"/>	Panasonic PW4540	IR	N/A	N/A
<input type="checkbox"/>	Tascam (TEAC) DVD6500	IR	N/A	N/A
<input type="checkbox"/>	Canon Realis_SX50	RS-232	N/A	N/A
<input type="checkbox"/>	WattStopper Miro	RS-232	N/A	N/A
<input type="checkbox"/>	NI-3100	Ethernet 10/100T	0:1:1	192.168.240.82
<input type="checkbox"/>	NXA-AVB/Ethernet		1:1:1	N/A
<input type="checkbox"/>	Mio Modero Classic S	AXLink	128:1:1	N/A
<input type="checkbox"/>	NXT-CV10	Ethernet 10/100T	10001:1:1	
<input type="checkbox"/>	NXD-CV10	Ethernet 10/100T	10002:1:1	

FIG. 272 System Report - Installation Instructions

System Report - General Information

This section lists general information about the project, including module information (FIG. 273).

General Information		
Device Modules		
Manufacturer	Model	Version
Canon	Realis_SX50	1.0.0
C:\Program Files\AMX Control Disc\VisualArchitect\NTG\Canon_Realis_SX50_Comm_v1_0_0.jar		
WattStopper	Miro	1.0.0
C:\Program Files\AMX Control Disc\VisualArchitect\NTG\WattStopper_Miro_Comm_dr1_0_0.jar		

Device IR Files		
Manufacturer	Model	Version
Panasonic	LSSQ0217	1
Tascam (TEAC)	RC6500J	1

FIG. 273 System Report - General Information

System Report - Troubleshooting and Support

This section contains troubleshooting information relating to many different aspects of the control system (FIG. 274).

Troubleshooting and Support
<p>AMX provides several useful Troubleshooting tools. In NetLinX systems you can use Terminal, Telnet, or the Master's browser-based UI. More information on these tools is available within both the Software Installation and AMX Technical Publications sections of the AMX website.</p>
Ethernet Cable Troubleshooting Tips
<p>Look for the following things when troubleshooting Ethernet:</p> <ul style="list-style-type: none"> • With 10Base-T & 100Base-T, verify the cable being used has the correct number of twists to meet the data grade specifications. • Electrical interference can be caused by tying the network cable together with monitor and power cords. Outside interference also can be caused by fluorescent lights, electric motors, and other electrical devices. • Make sure the connectors on both wired endpoints and wired links.

FIG. 274 System Report - Troubleshooting and Support

System Report - Contact Information

This section provides contact information for AMX technical support.

Exporting Diagram Images

You can export the System Diagram and any or all UI Diagrams as image files, via the *Export Diagram Images* option:

1. Select **System > Export Diagram Images** (or click the Toolbar button) to open the *Export Diagram Images* dialog (FIG. 275).

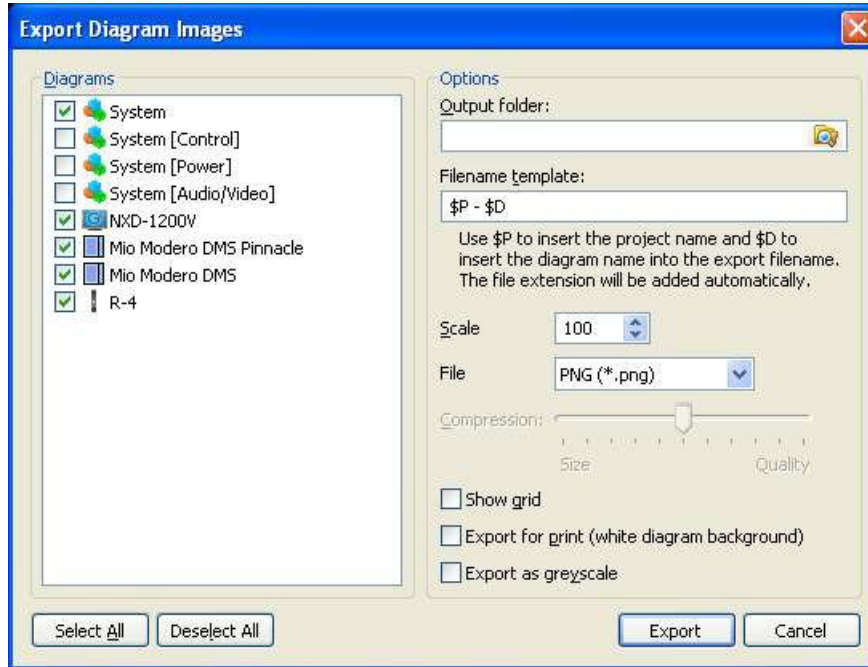


FIG. 275 Export Diagram Images dialog

There are several types of diagrams that can be exported via the options in this dialog:

- **System** - This option exports the entire System diagram (default = selected).
- **System (Control)** - This option exports only the Control connections in the System diagram (default = de-selected).
- **System (Power)** - This option exports only the Power connections in the System diagram (default = de-selected).
- **System Audio/Video** - This option exports only the A/V connections in the System diagram (default = de-selected).
- **UI diagrams** - Each option following the System (Audio/Video) option represents a UI device in the system.

2. To exclude any diagrams from being exported, uncheck the check box next to its listing in the Diagram area. Each diagram with a check mark will be exported as an individual image file of the selected file type.



NOTE

Use the **Select All** and **Deselect All** buttons to select/deselect all diagrams in the list.

3. Select an **Output Folder** for the file(s). By default, VA uses the folder that the project is saved to.
4. Specify a **Filename Template**:
 - Use **\$P** to insert the project name
 - Use **\$D** to insert the diagram name
 - The file extension (.BMP, .PNG or .JPG) is added automatically

5. Make additional export options as desired:
 - **Scale** - To scale the exported image(s) down, enter a percentage of the original size (default = 100/original size).
 - **File** - Select a file type for exported files (.BMP, .PNG or .JPG, default = JPG).
 - **Compression** - Specify the level of compression for exported images (JPG only). For high image quality (and larger file sizes) position the slider near the Quality side, for smaller file sizes (with lesser quality), position the slider in the Size side.
 - **Show grid** - Check this option to include the diagram grid in the exported image(s).
 - **Export For Print** (white diagram background) - This option applies a white background (for best printing results).
 - **Export as greyscale** - Check to export the diagram(s) as greyscale images.

Printing The Diagrams

You can print the diagrams in the System Diagram and any or all UI tabs via the Print Diagrams option:

1. Select **System > Print Diagrams** (or click the Toolbar button) to open the *Print Diagrams* dialog (FIG. 276).

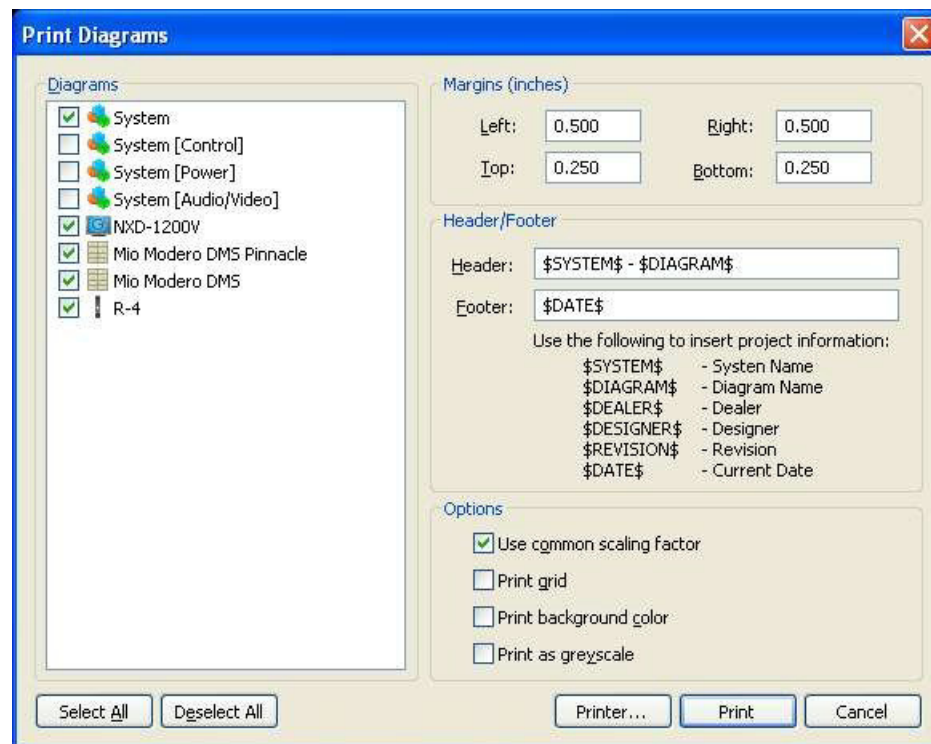


FIG. 276 Print Diagrams dialog

There are several types of diagrams that can be printed via the options in this dialog:

- **System**: This option prints the entire System diagram (default = selected).
- **System (Control)**: This option prints only the Control connections in the System diagram (default = de-selected).
- **System (Power)**: This option prints only the Power connections in the System diagram (default = de-selected).
- **System Audio/Video**: This option prints only the A/V connections in the System diagram (default = de-selected).
- **UI diagrams**: Each option following the System (Audio/Video) option represents a UI device in the system (default = selected).

2. To exclude any diagrams from being printed, uncheck the check box next to its listing in the Diagram area. Each diagram with a check mark will be exported as an individual image file of the selected file type.



Use the **Select All** and **Deselect All** buttons to select/deselect all diagrams in the list.

3. Specify the **Margins** for the printout: Enter the space you want to allocate as margins on the printed page (in inches) in these fields. The default margin settings are:
 - Left = 0.5"
 - Right = 0.5"
 - Top = 0.25"
 - Bottom = 0.25"
4. Specify a **Header / Footer** for the printouts:
 - Use \$\$SYSTEM\$ to insert the system name
 - Use \$DIAGRAM\$ to insert the diagram name
 - Use \$DEALER\$ to insert the dealer name
 - Use \$DESIGNER\$ to insert the designer name
 - Use \$REVISION\$ to insert the revision name or number
 - Use \$DATE\$ to insert the current date
5. Make additional print options as desired:
 - **Use common scaling factor** - This option resizes all print images to the same scale to fit the page (default = enabled).
 - **Print grid** - Check this option to include the diagram grid in the printout(s).
 - **Print background color** - Check this option to include the background color in the printout(s). By default, this option is disabled - diagrams are printed with a white background.
 - **Print as greyscale** - Check to print the diagram(s) in greyscale.

VA Generated System Files

When you select to generate system files, via the options in the *Generate & Transfer System Files* dialog (see FIG. 263 on page 199), VA generates several files and folders.

The result of a Generate & Transfer System Files, or Generate System Files operation is the following set of folders and system files:

VA-Generated Folders

- **Include** folder - contains any Include (.AXI) files required by the system.
- **IR** folder - contains all IR (.IRL) files required by the devices in the system.
- **Module** folder - contains all Duet module (.JAR) files required by the devices in the system.
- **Other** folder - contains any system files other than the VA-generated files.
- **Report** folder - contains the System Report and support files for this project ("projectname-VAReport.html").
- **Source** folder - contains the Master Source Code file (.AXS) required by the Central Controller.
- **User Interface** folder - contains all Touch Panel (.TP4) and keypad (.KPB) user-interface files. There is one UI file generated for each UI device in the system.

VA-Generated Files

There are several individual files generated that are not copied into any of the VA-generated directories. There are only a few that are of interest:

- **.APW** - this is the project workspace file for the project. APW files can be opened in NetLinx Studio. Workspace files allow you to edit any of the system files within NetLinx Studio. Refer to the NetLinx Studio on-line help for information on Workspace files.
- **CodeGen.log** - this is a detailed log file of the file generation process. This is a text file, and can be opened in any text editor (i.e. Notepad).



NOTE

Depending on the equipment included in your system, some of these files may not appear (for example, if your system does not include any keypads, there would not be a KPB file generated).

Custom Include Files

There are two custom Include (.AXI) files generated when you generate a VA project:

- **Custom.AXI** - The "Custom.AXI" include file is used for making any custom programming changes for the system. When you generate your control system, it will reside in the Project's Include sub-folder.
- **CustomDefs.AXI** - The "CustomDefs.AXI" file (also in the Project's Include sub-folder) allows programmers to create custom definitions that override AMX defaults.



NOTE

If a Custom.AXI and/or CustomDefs.AXI file is not already present in the Include folder, VA will provide newly initialized AXIs. However, if there is a Custom.AXI and/or CustomDefs.AXI file present in the Include folder, it will be used in the Project, and will not be overwritten.

Making Your Project Portable

In some situations you may need to prepare your VA Project so that it can be opened on a PC that does not have VA installed.

In this example, you would use the NetLinx Studio 2 application to transfer the System files generated in VA.

To make your VA project portable:

1. In VisualArchitect, use the **Generate System Files** option in the *Generate & Transfer System Files* dialog to generate the system files for your VA project (without initiating the transfer process).
One of the files that is generated with this option is a NetLinx Studio Workspace (.APW) file. This is the file that you will open in NetLinx Studio 2.
2. Launch NetLinx Studio 2, and select **File > Open Workspace** to access the *Open Workspace* dialog.
3. In the *Open Workspace* dialog, locate and open the .APW file created for this project by VA.
This file can be found in the root of the project subfolder, in the Output Folder specified in the **Generate** options of the *Generate & Transfer System Files* dialog.
4. In Studio's workspace view, right-click the *Include* folder and select "**Add Existing Include File...**" from the context menu. This opens the *Add Existing Include File* dialog. In this dialog:
 - a. Browse to **C:\Program Files\Common Files\AMXShare\AXIs**.
 - b. Select the *SNAPI.axi*, *G4API.axi*, and *MioRemoteAPI.axi* files and click **Open** to add them to the project.



NOTE

NetLinx Studio will ask you if you want to open each of the selected files for editing before they are added, which is unnecessary in this case. Click **No** to add the three files to the project without opening them.

5. In NetLinx Studio, select **Project > Export Workspace To Go** to access the *Export Workspace Files To Go* dialog (FIG. 277):

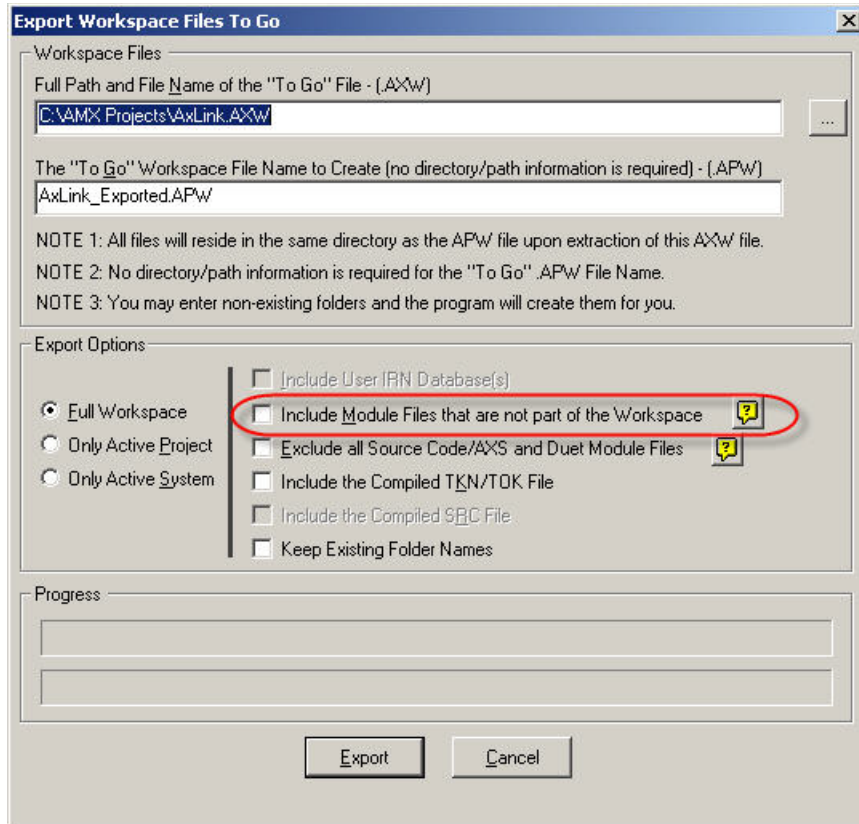


FIG. 277 Export Workspace Files To Go dialog (NetLinX Studio)

6. Set the Workspace Files options:
 - a. Verify (or edit if necessary) the full path and file name of the exported "To Go" (.AXW) file. AXW files preserve all relative file path information for the Projects, Systems and System files contained in the Workspace, making them ideal for distribution to remote sites.
 - b. Verify (or edit if necessary) the file name of the NetLinX Studio Workspace (.APW) file that will be created.
7. Check the **Include Module Files that are not part of the Workspace** option.



Verify that the **Keep Existing Folder Names** option is unchecked.

8. Click on **Export** to export the Workspace file (including all module files) to the specified "To Go" (.AXW) file name and target directory.
9. Select **Project > Import From Exported AXW File** to access the *Select a AXW File For Extraction* dialog (FIG. 278):

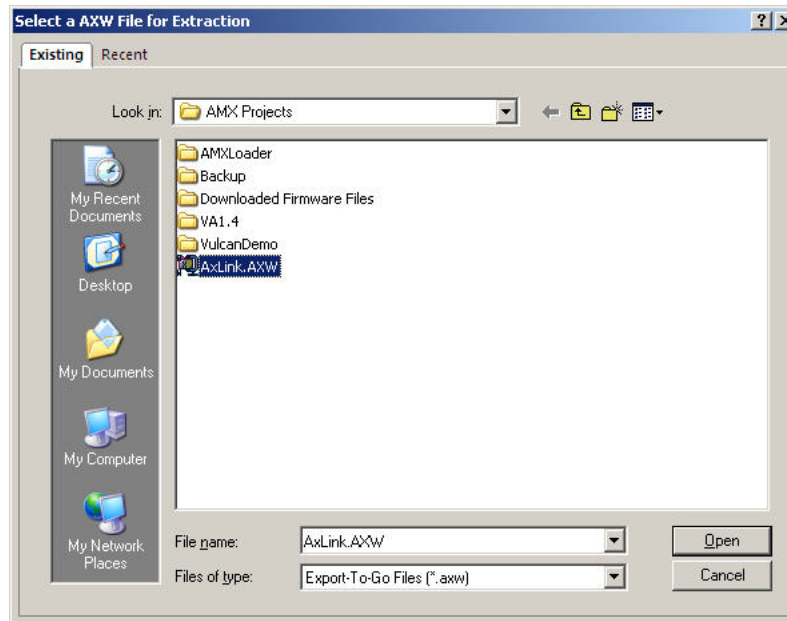


FIG. 278 Select a AXW File For Extraction dialog (NetLinx Studio)

10. Locate and select the "To Go" (.AXW) file you just created for this project, and click Open.
 - a. When you open a AXW file, NetLinx Studio will prompt you to specify a target directory to extract the files contained in the AXW file to in the *Import From AXW File* dialog (FIG. 279):

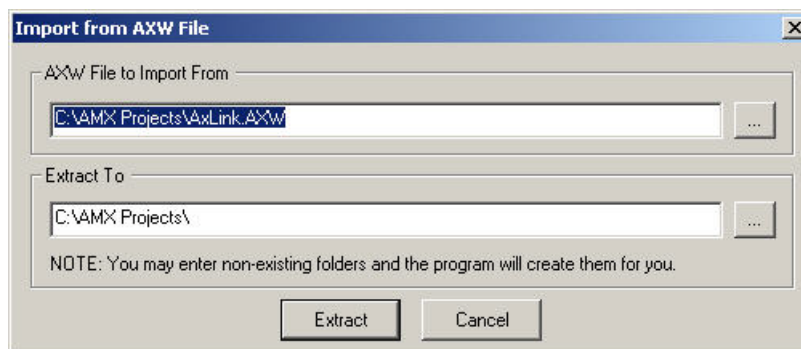


FIG. 279 Select a AXW File For Extraction dialog (NetLinx Studio)

- b. Click on **Extract**. NetLinx Studio may prompt you to verify new directories, if any were indicated in the Extract To field (in the *Import From AXW File* dialog).
 - c. Click **OK**, and NetLinx Studio will indicate when the AXW File Extraction is complete (FIG. 280).



FIG. 280 AXW File Extraction Complete dialog (NetLinx Studio)

- d. Click **OK**.
 - e. Once NetLinx Studio has opened the AXW file, VA prompts you close the current workspace (select *Yes* or *No*).

Working with Presets (.MXD and .PXD) Files

AMX Preset Editor is a stand-alone application that allows you to add CD and DVD discs to a Media Library, and create Media Preset Files (for CDs & DVDs) and Station Preset Files (for TV Channels/Radio Stations) that can then be added to your VA Project.

- Preset Editor is packaged as a integrated utility with VisualArchitect.
- To launch Preset Editor from VisualArchitect, select File > Preset Editor.

Alternatively, you can launch Preset Editor from the Start menu (without having to launch VA): Select Programs > AMX Control Disc > VisualArchitect > Preset Editor.

There are two basic types of Preset files that can be created and managed with Preset Editor:

- A Media Preset file (*.MXD) contains a list of CDs and/or DVDs that correspond to a disc or slot number (for CD/DVD changers with a number of slots, each slot can contain a CD or DVD).
- A Station Preset file (*.PXD) contains a list of station presets. Each preset corresponds to a radio or television channel. Presets work basically like buttons on the face of a receiver - each one jumps to the channel it represents.



NOTE

Refer to the Preset Editor online help and Instruction Manual for details on using Preset Editor, including instructions on configuring FreeCDDB options to identify media.

Presets and Media Content Database Files

If your VA Project includes Preset (.PXD) and/or Media (.MXD) Content Database files (created in ContentDatabaseEditor), these files will need to be sent to the Central Controller via FTP.

Use any FTP client application (for example "SmartFTP"), FTP any ,PXD and ,MXD files to the root directory of the Central Controller that this project will be loaded on.



NOTE

You will need to provide the IP Address of the Central Controller in the FTP Client application.

Media Preset Files (CDs and DVDs)

Media Preset files (.MXD) contain a list of CDs and/or DVDs that corresponds to disc or slot numbers, for CD/DVD changers/players that have multiple slots (each one containing a CD or DVD). Media Preset files are used in VisualArchitect projects to represent content loaded on multi-slot CD/DVD changers/players.

Before a CD or DVD can be added to a Media Preset file, it must first be added to the Media Library. Once a CD or DVD is present in the Media library, it is available to be added to one or more Media Preset files.

Channel Preset Files (TV Channels and Radio Stations)

Channel Preset files (.PXD) contain a list of channel presets. Each preset corresponds to a radio station or television channel.

Channel Preset files are used in VA projects to represent channel presets for TV and radio receivers, and associate a channel or station with a button.

Attaching a Preset File to a VA Project

The process of attaching a preset file to a VisualArchitect (VA) project is simple. Assuming you have already created and saved at least one Preset (.MXD or .PXD) File:

1. In VA, select the (third-party) device to which you want to attach your Preset File.

Media Preset Files (.MXD) can only be attached to devices that are capable of playing back audio/video media (including CD/DVD changers). If a device is compatible with Media Preset Files, the Media Library File Path property is included (in the Properties window) when the device is selected (FIG. 281):

Properties	
Name	Tascam DVD6500
Comments	
Category	DVD Player / Changer
Manufacturer	Tascam
Model Number	DVD6500
Connection Type	RS-232
Duet Module	C:\Program Files\Com...
Media Library File Path	...

FIG. 281 Properties window - Media Library File path field

Channel Preset Files (.PXD) can only be attached to devices that are capable of selecting TV channels and/or radio stations (including receivers, TVs, etc.). If a device is compatible with Channel Preset Files, the Preset Library File Path property is included (in the Properties window) when the device is selected (FIG. 282):

Properties	
Name	Pioneer PRO-1130
Comments	
Category	TV
Manufacturer	Pioneer
Model Number	PRO-1130
Connection Type	RS-232
Duet Module	C:\Program Files\Com...
Preset Library File Path	...

FIG. 282 Properties window - Preset Library File path field

2. Use the **Media Library File Path** or **Preset Library File Path** property to select the Preset File that you want to attach to the selected device. Click the Browse (...) button in this field to access the *Open* dialog, where you can locate and select the desired Preset file.
3. Click **OK** to close the Open dialog and attach the selected file to the device.

The path and name of the attached Preset File is indicated in the *Media Library File Path* or *Preset Library File Path* field.

Troubleshooting

Overview

AMX provides several useful troubleshooting tools. In NetLinx systems you can use Terminal, Telnet, or the Central Controller's browser-based UI.

If VA Freezes During File Transfers

If VA appears to hang up during a file transfer operation, it is likely due to an incorrect System Number assignment.

- An incorrect System Number assignment will cause all transfers to time-out, giving the appearance of a freeze-up.
- The System Number is assigned as a device property for the Central Controller (default = 1).

The symptom is that FileTransfer2 indicates an error, but the Progress bars seem to indicate activity, and the *Cancel* button is disabled so there's no obvious way to terminate the transfers.

To "un-hang" VA in this situation:

1. Right-click on the File Transfer task bar icon, and select SHOW. This opens the FileTransfer2 application dialog.
2. Check the status of your transfers, and close FileTransfer2. Once FileTransfer2 shuts down, VA should be ready to use.
3. Check the System Number assignment for the Central Controller. By default, it is set to "1" (the system you are currently connected to).
4. Correct the system number assignment and save the project.
5. Press Ctrl+T to generate and transfer the system files.

If VA Fails to Connect To the NetLinx Master

If you receive an error indicating that VA has failed to connect to the Master (FIG. 283):

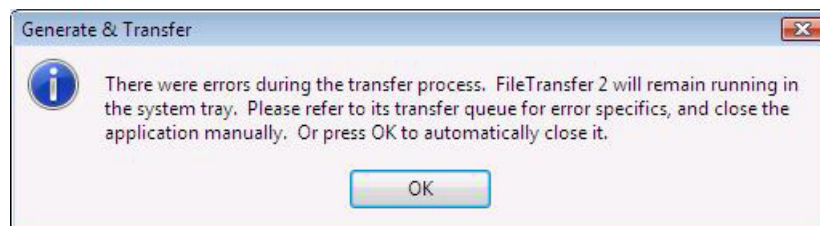


FIG. 283 Error Message - VA has failed to connect to the Master

- Setting the master's Ping For Availability property to False.
- Opening up both the inbound and outbound ICMP ports on your firewall (instructions vary depending on the firewall).

The problem has to do most likely with firewall settings on your PC.

If VA Won't Compile Your Project

There are a few things that could prevent VA from successfully compiling your project. If your project won't compile, check the following:

1. Do you have "Power User" (or "Administrator") access rights on the PC running VA?

Because the VA compiler writes to common areas of the registry, the User that is logged in on the PC cannot belong to the Restricted User group. Their User Account profile must be set to either "Power User" (or "Administrator").

To see what your access rights are on your PC, go to Start > Settings > Control Panel > User Accounts to open the User Accounts dialog.

In the Users tab, look for your User Name, and see which Group you are assigned to. If you see "Restricted User", then you'll have to contact your network administrator and have them change this setting.

2. Are there any apostrophes in either the Project Name, or in the file path of the directory that the project is compiled into?

Apostrophes anywhere in the file path for the project will prevent VA from compiling successfully.

For example, a Project named "Joe's VA Projects" will be problematic. Remove the apostrophe and re-save the project.

Likewise, an Output Folder (as specified in the Generate & Transfer System Files dialog) named "Joe's VA Projects" will also prevent a successful compile. Again, remove the apostrophe from the directory name and recompile.

Ethernet Cable Troubleshooting Tips

Look for the following things when troubleshooting Ethernet:

- With 10Base-T & 100Base-T, verify the cable being used has the correct number of twists to meet the data grade specifications.
- Electrical interference can be caused by tying the network cable together with monitor and power cords. Outside interference also can be caused by fluorescent lights, electric motors, and other electrical devices.
- Make sure the connectors are both pinned properly and crimped tightly.
- Check the cable lengths to make sure that distance specifications are not exceeded.
- If excess shielding on the coax cable is exposed, it may be inadvertently grounding out the connector.
- Check for missing terminator(s) with improper impedance ratings.

Troubleshooting - Device Discovery (DD) Devices

There are two error messages that might be received from the Central Controller under the following project conditions:

- The Project loaded on the Central Controller uses only Device Discovery devices (that is, there are 0 non-Device Discovery devices in the project).
- The Central Controller has not been loaded with code files that refer to non-Device Discovery devices.

In this situation the following errors are visible, if you have connected to the Central Controller via Telnet, and have messaging turned on (MSG ON):

Error Message:

DynamicDeviceDetector.retrieveUrlJar: missing filename in URL response

DynamicDeviceDetector.retrieveDriverDependencies: failed to retrieve dependencydevicesdkrt.jar

This message indicates that the following requires system file is missing from the Central Controller: "devicesdkrt.jar"

Error Message:

DynamicDeviceDetector.retrieveUrlJar: missing filename in URL response

DynamicDeviceDetector.retrieveDriverDependencies: failed to retrieve dependencysnapirouter.jar

This message indicates that the following requires system file is missing from the Central Controller:

"snapirouter.jar"

Solution:

Copy the missing files to the Central Controller, via the Controller's built-in web UI:

1. In your web browser (i.e.: Internet Explorer or compatible), enter the following URL:
http://masters-ip/ (example: **http://123.45.6.78/**), to access the Controller's built-in web interface.
2. Open the *Manage Other Devices* page: click on the **Manage Other Devices** link (from within the System Settings section of the Navigation frame).
3. In the *Manage Device Modules* section of this page, select the **Browse** button (next to *Select File To Upload*).

4. Locate and select the file:
devicesdkrt.jar.
By default, VA copies these files to the following directory:
Program Files\Common Files\AMXShare\Duet\Bundle
5. Select **Upload File**.
6. Select the **Browse** button (next to *Select File To Upload*).
7. Locate and select the file: **snapirouter.jar.**
8. Select **Upload File**.

RS-232 Control Troubleshooting

To verify that your code and/or hardware are sending strings:

1. Send a string by pressing a Touch Panel button to send a command.
2. Use either the Master's UI - NetLinx Diagnostics page (System Settings > Manage System > Diagnostics) or a Terminal emulator. You should see the TX (transmit) LED light to indicate transmission.
 - If you do not see the TX LED illuminate, you must first correct your code, or configure the hardware properly.
 - If your device does not use hardware handshaking, be sure handshaking is disabled on the port. Hardware handshaking can be disabled by sending an 'HSOFF' command to the device port.

RS-232 Control Troubleshooting - Cabling

Once you have a good indication from the TX LED:

1. Short pins 2 and 3 on the DB-9 or Phoenix connector on the port.
2. Send a command and watch the TX and RX (receive) LEDs. You should see both LEDs light when each command is sent.
 - If only the TX LED is lighting, the unit is not sending strings and you should send it in for repair.
 - If both LEDs light up, move on to the next step.
3. Connect the cable that is going to the controlled device on the port and disconnect it at the terminal (far) end.
4. Short the TX and RX pins together on the equipment end of the cable. This is usually pins 2 and 3, but verify with the cable specs to be sure. Again, you should see both TX and RX LEDs illuminate. If you do, remove the short and test again. The RX LED should no longer light. If it continues, this indicates there is a short between TX and RX in the cable. Repair and re-test. This test will verify the continuity of the TX and RX wires within the cable, but does not completely test the cable. The Ground conductor can only be tested using a meter.
5. Disconnect the cable at both ends and connect an ohmmeter to both the ground and RX pins.
6. Short these conductors at the terminal (far end) of the cable and watch the meter for continuity readings. Also verify there are no shorts between any of the conductors when the ends are disconnected.

AMX tries diligently to verify cable specs, but sometimes there are changes in equipment. It is not unusual that TX and RX wires must be reversed to get the proper polarity. Try reversing these wires, but replace them to the normal position if that does not help.

RS-232 Control Troubleshooting - Settings

- Once the cabling has been verified, the communication specifications must then be confirmed. These specifications include: baud rate, parity, data bits, stop bits, and flow control.
- Some AMX devices use DIP switches to configure baud, data, and stop bits (ex: Mio Moderos) whereas some use software configuration. Confirm the setting by double checking the switch positions.
- Cycle the switches to be sure they are firmly secured to their correct position. For software configured ports, re-send the configuration commands.
- Confirm with the equipment manual, what the default settings are for the controlled device. Some devices can be changed, so be sure the default setting have not been altered.

- You can test the actual output of the RS-232 port by connecting the port to a computer COM port and using a Terminal Emulator to display the transmitted string to the screen.

For example, the Axcnt3 port #1 can be connected to a laptop's COM1 port using a standard AMX programming cable (FG10-727). This would be wired as follows; pin 2to pin3; pin 3 to pin2; and pin 5 to pin 5.

- Send a string from the Axcnt3 to the terminal program in Hyper Terminal (configured at the correct settings for the controlled device). Does the string display on screen? Is the information the same as your code is sending?

If the string is received as you see it in the code, the system is working properly.

- You may need to change the display mode in the terminal program. In the Studio terminal, you can right click in the display area and choose Display from the menu. Select to display as ASCII, Decimal, or Hexadecimal, depending on how you would like to view the strings.

RS-232 Control Troubleshooting - The Controlled Device

Although not every process can be described, some aspects of verification are commonplace. You must verify the following information by either reviewing the corresponding device's manual, or contacting the manufacturer for details:

- Baud rates are set to their default values (If it can be altered, verify current settings).
- Cable pin specification are the same as the actual cable.
- Make certain the COM port is enabled.
- Check unit address (match this with the address in code).
- Try sending strings from within Terminal.
- If the manufacturer provides control software, see if that works with the target device.

RS-232 Control Troubleshooting - Technique

Terminal SEND commands can aid you in finding problems. While connected to the Master program port (within Terminal), you will find that you have two types of commands which allow you to troubleshoot: SEND_STRING and SEND_COMMAND.

- The SEND_STRING command will send the string that follows out of the noted port. The syntax is: SEND_STRING <#>,"<String>" Where <#> equals the device number (You cannot use the device name in Terminal). "<String>" equals the string you want to send.
- The SEND_COMMAND commands are port configuration commands like the command to set the baud rate, parity, and data and stop bits.

SEND_COMMAND <#>, ""SET BAUD 9600, N,8,1""

Or the command to turn on hardware handshaking: SEND_COMMAND <#>, "" HSON""

RS-232 Control Troubleshooting - Terminal PASS Mode

In Terminal, while connected to the Central Controller's program port, you can type:

PASS <#>

Where <#> equals the device number. While you cannot use the device name in Terminal, remember to use D:P:S within NetLinx.

In this mode, whatever you type on the keyboard will be sent directly out the RS-232 port as you type it. Anything that is returned by the controlled device will then be displayed on your screen. Your keystrokes are not echoed on the screen in this mode. The port's setting dictates the baud rate, etc. This is very handy for ASCII based commands, but Decimal and Hex characters cannot be found on the keyboard.

Exit PASS mode by holding down the [Shift] key and pressing the + twice, then release the shift and press Escape [Esc] twice (Shift +, +, Esc, Esc).

RS-232 Control Troubleshooting - Flow Control

Flow control dictates whether any handshaking is used. There are three possibilities: none (the most common), hardware, and software.

Hardware handshaking involves the use of two additional conductors to send a 'Request to Send' (RTS) signal between the devices. RTS is an output signal to the far end device that states it is OK to send data. The 'Clear to Send' (CTS) connection is an input signal that receives the RTS from the far end.

When the RS-232 port is configured for hardware handshaking, no data is sent until the port receives a 'high' signal on the CTS pin from the RTS pin at the far end. Similarly, no data will be returned unless the RTS pin goes 'high', indicating it is able to receive data.

There is another level of hardware handshaking using DTR and DSR, or Data Set Ready and Data Terminal Ready. These are primarily used by modems to communicate with PCs. These modes are not used in AMX gear, and you will find no connections for these signals.

Software handshaking uses data signals over the data wiring. This method is quite rare, and you should contact Tech Support if you have any questions regarding it's use.

NetLinX Diagnostics

NetLinX Diagnostics Control Device / Emulate Device

In this diagnostic window of the UI, you can send commands or strings out to any NetLinX RS-232 port by selecting the appropriate options, typing device number and the string or command in the control window, and pressing the "Send" button. Enabling Emulation (via the Emulate radio box), you can send the strings back to the control port that are expected from the OEM controlled device. Enabling the Emulation also allows for Pushes to be sent.

The Control/Emulate page on the UI allows a user to either Control a device or Emulate a device. This is done by controlling a device's channels, levels, and sending both send commands and strings to the target device.

1. Click the **Manage System** link (from within the System Settings section of the Navigation frame).
2. Clicking on any of the Online Tree items opens menu items with the Control/Emulate button option available.
3. Click the **Control/Emulate** button to open the Control/Emulate dialog.
4. Click the **Update Status** button to query the Central Controller for the status of the currently entered level and channel.
5. Select either the **Control** or **Emulate** option:
 - To *Control* a device means that the program generates messages which appear to a specified device to have come from the Controller. The options in this frame allow you to specify the <D:P:S> combination for the device you want to control.
 - To *Emulate* a device means that the program generates messages which appear to the Controller to have come from a specified <D:P:S> combination (real or fictitious). The options in this frame allow you to specify the <D:P:S> combination for the device you want to emulate.

Selecting this option adds a Push button with the Channel Code section of this page.

6. Enter a **System Number**, **Device Number**, and **Port Number** into the appropriate fields.
 - These values correspond to the device you wish to control (real or fictitious).
 - The Device, Port, and System value ranges are 1 - 65535.
7. Within the Channel Code section, enter a valid Channel number to emulate Channel messages (i.e., Push/Release, CHON, and CHOFF) for the specified <D:P:S>.

The Channel number range is 1 - 65535.
8. Select the **On** or **Off** buttons to Emulate Channel ON (CHON) and Channel OFF (CHOFF) messages for the specified <D:P:S>.
9. Select the **Push** button to Emulate a push/release on the channel specified. You can click and hold down the Push button to see how the device/Controller responds to the push message.
10. Within the **Level Code** section, enter a valid Level number and Level data value for the specified <D:P:S> and press the Send button to transmit this data.
 - The Level number range is 1 - 65535.
 - The table below contains the valid Level data types and their ranges:

	Minimum Value	Maximum Value
CHAR	0	255
INTEGER	0	65535
SINTEGER	-32768	32767
LONG	0	429497295
SLONG	-2147483648	2147483647
FLOAT	-3.402823466e+38	3.402823466e+38

11. To Emulate sending a String or Command, type a String or Command within the corresponding field and press the Send button to transmit this data.

When entering a send command (in the context of this dialog) do not include the "send c" or "SEND_COMMAND" in the statement - only type what would normally occur within the quotes, but don't include the quotes either.

For example to send the "CALIBRATE" send command, simply type CALIBRATE (no quotes) rather than SEND_COMMAND < dev> "CALIBRATE".

- **String Expressions** start and end with double quotes (" "). Double quotes are not escaped, rather they are embedded within single quotes. String expressions may contain string literals, decimal numbers, ASCII characters and hexadecimal numbers (prepended with a \$), and are comma-delimited.
- **String Literals** start and end with single quotes ('). To escape a single quote, use "' (three single quotes).

Manage System - Diagnostics

This page allows an authorized user to setup and monitor diagnostic messages coming from and going to devices available on the Online Tree. This dialog also allows the user to watch the ICSP commands being sent to/from a device. There are several different types of asynchronous notifications that can be selected for a device:port:system (D:P:S) combination. Each notification type is represented by a column in the table.

All messages are displayed in the **Notifications** tab of the *Output Display* window in NetLinx Studio.

1. Click the **Manage System** link (from within the System Settings section of the Navigation frame).
2. Clicking on any of the Online Tree items opens menu items with the Diagnostics button option available.
3. Click the **Diagnostics** button to open the *Diagnostics* dialog.
4. Use the **Refresh Interval** drop-down to select from the following values: 2 seconds, 5 seconds, or 10 seconds. This refresh interval allows you to select how often your messages are updated.

Setting Up and Removing a Diagnostic Filter

Setup a diagnostic filter by scrolling down the page and clicking the **Modify** button below the first empty column. This action opens the *Device Configuration* dialog as a secondary popup window.

1. Configure a diagnostic filter using the parameters available within the *Diagnostic Configuration* dialog. The Diagnostic Configuration dialog allows you to select both the notifications you wish to receive and the target devices (within the Online Tree) for these notifications. There are several different types of asynchronous notifications that can be selected for a device:port:system (D:P:S) combination. Each notification type is represented by a column in the table.
2. Select an open Preset number entry from within *Presets* drop-down list.
3. Make all desired notification selections and press the **Store** button. Pressing this button opens a popup field labeled *Explorer User Prompt - Preset Name?* where you enter the name associated with this new Preset.
 - Press **OK** to return to the previous *Device Configuration* popup dialog.
 - Click **Cancel** to exit this popup and return to the previous dialog without making any changes.
4. Press the down arrow (adjacent to the *Preset* drop-down list) to display a listing of all currently available Presets. Select a previously configured Preset and press the **Recall** button to populate all available fields and radio buttons with the selections associated with this chosen Preset.



NOTE

This preset mechanism is done via cookies so it does not persist across multiple browsers/computers.

- Once you have made your modifications/selections within this dialog, press the **Update** button to save your changes and return to the *Diagnostics* dialog.

The Notification options available are described in the following table:

Notification Options	
Feature	Description
<ul style="list-style-type: none"> Update 	<p>Click this button once you have completed setting up your filter. The popup then closes and returns you to the Diagnostics window.</p> <p>Watch the bottom Incoming Message pane for messages to begin coming in from the target device(s).</p>
<ul style="list-style-type: none"> Remove 	<p>This list of up to 10 presets comes defaulted with Preset 0: All Devices, All Notifications</p> <ul style="list-style-type: none"> Store: Save the current notification selections to a Preset profile. Pressing this button opens a popup field labeled Explorer User Prompt - Preset Name? where you enter the name associated with this new Preset. Click OK to save both the Preset parameters and name, and then return to the Diagnostic Configuration dialog. Click Cancel to exit this popup and return to the previous dialog without making any changes. Recall: Allows a user to recall a previously existing Preset. This action then populates every field and radio button with the selections associated with the chosen Preset. This preset mechanism is done via cookies so it does not persist across multiple browsers/computers. <p><i>Note: A Preset MUST be Recalled before clicking the Update button. If you do not press this button, none of the fields or checkboxes are modified or selected. In essence, all options become disabled. Note: The All Devices entry cannot be removed.</i></p> <p><i>Note: The only way to modify the information within a Diagnostic filter is to remove the assigned Preset, change the information, and assign a new Preset. Refer to step 5 of this section for more information.</i></p>
<ul style="list-style-type: none"> System/Device/Port 	<p>Device, Port, System: Use these fields to enter a device:port:system (D:P:S) combination for the device from which you want to enable notifications.</p> <p>The specified device then appear in the Device field within the <i>Diagnostic Configuration</i> dialog.</p> <p>A value of 0 for any option gives you all of the systems, devices, or ports.</p> <p>This dialog also allows you to store/recall presets.</p>

<ul style="list-style-type: none"> • NetLinx Notification Types 	<ul style="list-style-type: none"> • All Notifications: Enables (selects) every notification field. • Online/Offline Messages: Generates a message when there is a change in the target device's online/offline status. • Configuration Messages: Generates a message when there is a change in the target device's configuration. • Input Channel Changes: Generates a message when there is an input channel change (i.e. Push/Release) in the target device. • Output Channel Changes: Generates a message when there is an output channel change (i.e. CHON/CHOFF) in the target device. • Feedback Channel Changes: Generates a message when there is a feedback channel change in the target device. • Level Changes From Device: Generates a message when there is a level channel change from the target device. • Level Changes To Device: Generates a message when there is a level channel change to the target device. • String From Device: Generates a message when there is a string from the target device. • String To Device: Generates a message when there is a string sent to the target device. • Command From Device: Generates a message when there is a command from the target device. • Command To Device: Generates a message when there is a command to the target device. • Status Messages: Generates a message when there is a change in the target device's status. • Custom Events From Device: Generates a message there is a custom event occurring from the target device.
---	---

Remove a diagnostic filter by clicking the Modify button below it (from the Diagnostics dialog), then pressing the Remove button to delete this filter from the Diagnostics dialog.

Once a Preset is assigned to a specific Diagnostic filter "slot" (up to 8), its System:Device:Port fields are disabled, and can't be modified unless the Preset in that slot is removed and replicated with new information within these fields.

Modifying a Diagnostic Filter

To modify a Diagnostic filter's information (such as System/Device/Port):

1. Navigate to an empty Diagnostic filter slot and click the **Modify** button below the filter.
2. Select a previously unused Preset and store it with a new name.
3. Click the **Remove** button to remove this duplicate Preset from the specific filter slot.
4. Re-open the empty slot by clicking the **Modify** button, select the duplicated Preset and click **Recall**.
5. Change the necessary information (such as the System/Device/Port), then save it as the original Preset name, and click the **Update** button.
6. Use the **Incoming Message** field to view all the internal system diagnostic messages that are generated by a NetLinx master controller. This message field is a text box where you can select all the text within it and then copy/paste it for storage.

Web Update

Overview

The AMX WebUpdate program is a stand-alone application that communicates with the AMX website. WebUpdate allows a user to select from a list of available AMX Software programs to choose for updating, determines the latest version of the selected applications, returns a listing of available updates, allows a user to download the selected installation files, and upon request, launches the installation of those downloads.



NOTE

The WebUpdate application is not installed by NetLinx Studio, and must be installed separately. If not found, NetLinx Studio will prompt you to download the application from www.amx.com.

Refer to the WebUpdate on-line help for details and instructions.

Installing WebUpdate

1. Go to www.amx.com, and log in as a Dealer.
2. Select the **Tech Center** link at the top of the page (FIG. 284):



FIG. 284 www.amx.com - Tech Center link selected

3. In the *Tech Center* menu along the left side of the page, select, click on the **Application Files** link (FIG. 285):



FIG. 285 www.amx.com Tech Center - Application Files link selected

4. In the *Application Files* page, click on **WebUpdate** (FIG. 286):

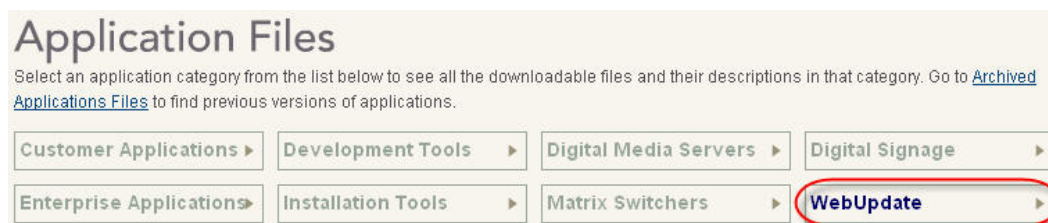


FIG. 286 Application Files page - WebUpdate selected

5. In the *WebUpdate* page, click on the download link (FIG. 287):



FIG. 287 WebUpdate download link

6. Read the *License Agreement*, and click **I Accept** to proceed.
7. In the *Save As* dialog, select a target directory for the **WebUpdateSetup.exe** file (FIG. 288):

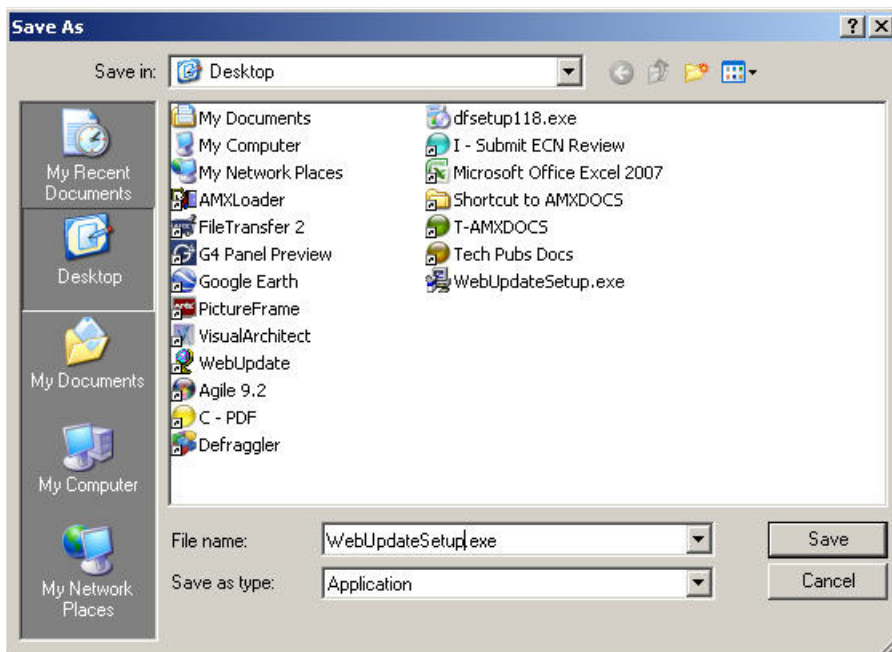


FIG. 288 Saving WebUpdateSetup.exe

8. Click **Save**.
9. Double-click on the **WebUpdateSetup.exe** file to install WebUpdate.
10. The program will prompt you to restart your PC for changes to take effect. Save your work and restart your PC.

Once installed, select **Help > WebUpdate** to launch the WebUpdate application. WebUpdate will check for updates and ask you to select which update(s) to download and install.

WebUpdate User Interface Templates

To download User Interface Template Families via WebUpdate:

1. Click **Help > WebUpdate User Interface Templates** to open the *AMX.com Template Library* dialog.
 - The Template Families available to download are indicated in the main window.
 - By default, the Show Only New Templates option is selected. De-select this option to show all UI Template Families available to download.
2. Click on a Template Family to view the selected *Template Family Properties* (read-only).
3. Click the double-arrow icon on a Template Family icon to display thumbnail images of all templates contained (click **Expand All** to expand all Template Families - FIG. 289):

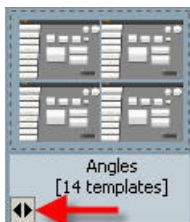


FIG. 289 Expanding a Template Family

4. Click to select individual Templates (ctrl+click for multi-select), or click **Select All** to specify which Templates within the Template Family to include in the download.
5. Click **Install** to download and install the selected Templates.
6. The progress of the Download/Install operation is indicated in the Progress bar (FIG. 290):

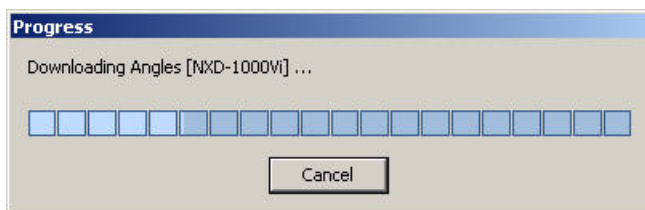


FIG. 290 Progress bar

If VA discovers that you are downloading a Template that is already present in VA, the Replace Template dialog prompts you to either replace the template, or abort the download/install operation.

7. VA indicates the results of the operation (FIG. 291):



FIG. 291 Templates Successfully Installed

8. Click **OK**. The new Template(s) are now available for selection.

WebUpdate Duet Modules

To download Duet Modules via WebUpdate:

1. Click **Help > WebUpdate User Interface Templates** to open the *WebUpdate Duet Module* dialog.
2. Click in side the checkboxes (in the *Download* column) for each Module to select the Duet Modules that you want to download and install.
By default, all Modules are selected. Use the **Select All** and **Select None** to facilitate the selection process, as there may be many Modules listed.
3. Click **Download** to initiate the download operation.
4. The progress of the Download/Install operation is indicated in the Progress bar (FIG. 292):

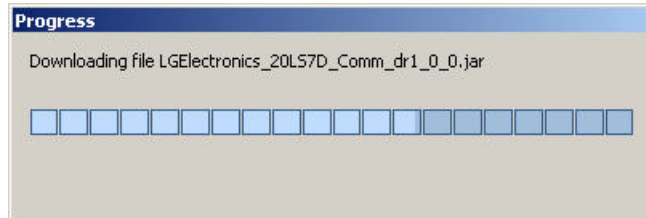


FIG. 292 Progress bar

5. VA indicates when the download is complete, and alerts you that the Database will be refreshed to install the new and updated Modules (FIG. 293):

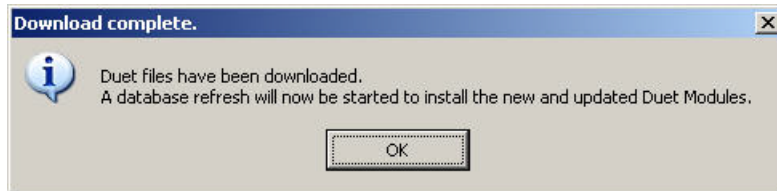


FIG. 293 Download Complete

6. Click **OK** to initiate the Database Refresh operation.



All Projects must be closed before the Database can be refreshed - close your Project if necessary.

WebUpdate System Design Libraries (SDL)

System Design Library (SDL) files represent pre-configured VA Project/Systems designed to accommodate various installation types.

SDLs are available for Dealers to download and install from www.amx.com (in the Markets section):

1. From the Help menu, select **WebUpdate System Design Libraries (SDL)**. If VA finds any SDL files, the *WebUpdate System Design Libraries* dialog opens.
2. Select the files you want to download by clicking the corresponding check box for each item.
3. Click **Download**.
4. Read the License Agreement, select **I Agree** and click **Next** to proceed.
5. The program alerts you once the SDL installation is complete (FIG. 294):

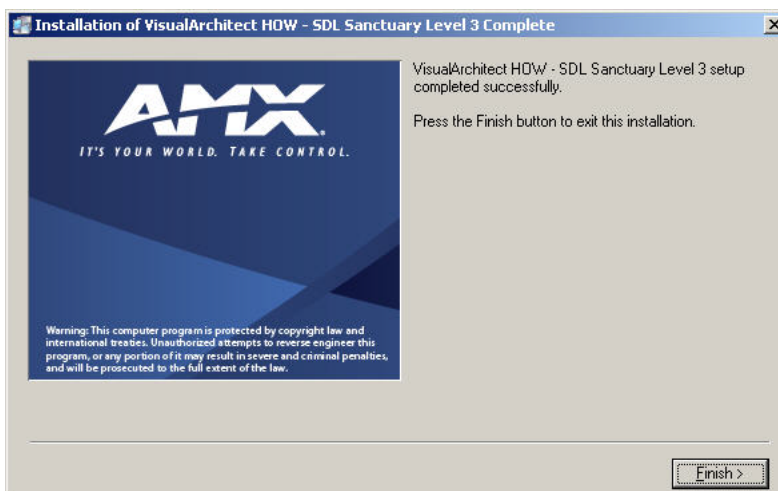


FIG. 294 SDL Installation Complete

6. Click **Finish** to proceed. This action invokes the *WebUpdate System Design Libraries Report* dialog (FIG. 295):

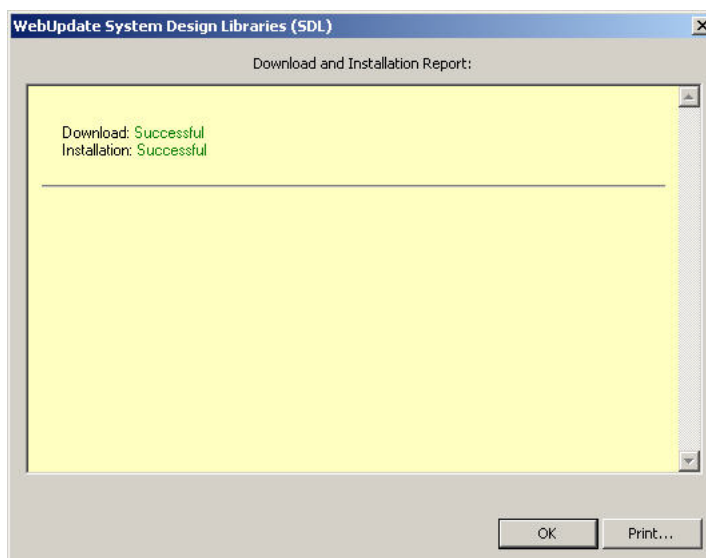


FIG. 295 WebUpdate System Design Libraries Report dialog

- Click **Print** to print the Download and Installation Report.
- Click **OK** to close this dialog.

Once installed, the SDL is available for selection via the *System Design Library* dialog (FIG. 296):

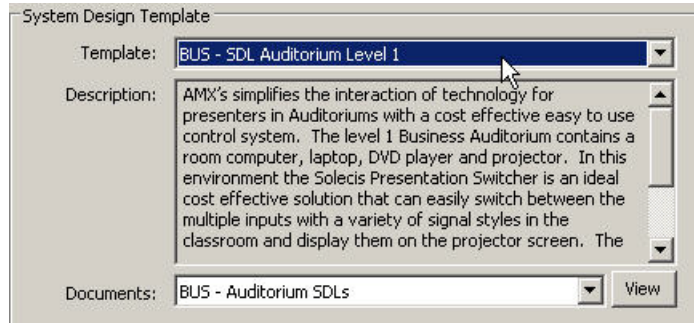


FIG. 296 System Design Library dialog

Appendices

AMX Icon 2 Character Map

Use the AMX Icon 2 font to use symbols instead of text for many standard transport and control functions, for use on engraved keypad buttons (FIG. 297).

































 Digit 1	Capital letter Y	 Lowercase b
 Digit 2		 Lowercase c
 Digit 3		 Lowercase e
 Digit 4		 Lowercase i
 Digit 5		 Lowercase m
 Digit 6		 Lowercase n
 Equals Sign		 Lowercase q
 Capital letter E		 Lowercase r
 Capital letter I		 Lowercase t
 Capital letter Q		 Lowercase u
 Capital letter R		 Lowercase v
 Capital letter T		 Lowercase w
 Capital letter U		 Lowercase x
 Capital letter W		 Lowercase y
 Capital letter X		 Lowercase z
 Capital letter Z		 Soft hyphen

FIG. 297 AMX Icon 2 Character Map

Extended ASCII Characters/Hex Table

100			101			102			103		
Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
128	80	Ç	160	A0	á	192	C0	?	224	E0	?
129	81	ü	161	A1	í	193	C1	?	225	E1	ß
130	82	é	162	A2	ó	194	C2	?	226	E2	?
131	83	â	163	A3	ú	195	C3	?	227	E3	?
132	84	ä	164	A4	ñ	196	C4	?	228	E4	?
133	85	à	165	A5	Ñ	197	C5	?	229	E5	?
134	86	â	166	A6	ª	198	C6	?	230	E6	µ
135	87	ç	167	A7	º	199	C7	?	231	E7	?
136	88	ê	168	A8	¿	200	C8	?	232	E8	?
137	89	ë	169	A9	?	201	C9	?	233	E9	?
138	8A	è	170	AA	¬	202	CA	?	234	EA	?
139	8B	ï	171	AB	½	203	CB	?	235	EB	?
140	8C	î	172	AC	¼	204	CC	?	236	EC	?
141	8D	ì	173	AD	¡	205	CD	?	237	ED	?
142	8E	Ä	174	AE	«	206	CE	?	238	EE	?
143	8F	Å	175	AF	»	207	CF	?	239	EF	?
144	90	É	176	B0	?	208	D0	?	240	F0	?
145	91	æ	177	B1	?	209	D1	?	241	F1	±
146	92	Æ	178	B2	?	210	D2	?	242	F2	?
147	93	ó	179	B3	?	211	D3	?	243	F3	?
148	94	ö	180	B4	?	212	D4	?	244	F4	?
149	95	ò	181	B5	?	213	D5	?	245	F5	?
150	96	ù	182	B6	?	214	D6	?	246	F6	+
151	97	ù	183	B7	?	215	D7	?	247	F7	?
152	98	ÿ	184	B8	?	216	D8	?	248	F8	°
153	99	Ö	185	B9	?	217	D9	?	249	F9	?
154	9A	Ü	186	BA	?	218	DA	?	250	FA	·
155	9B	ç	187	BB	?	219	DB	?	251	FB	?
156	9C	£	188	BC	?	220	DC	?	252	FC	^(n)
157	9D	¥	189	BD	?	221	DD	?	253	FD	²
158	9E	?	190	BE	?	222	DE	?	254	FE	?
159	9F	f	191	BF	?	223	DF	?	255	FF	?

AMX Power Calculator

Select **Help > Power Calculator** to open the AMX Power Calculator.xls worksheet file (FIG. 298).

The screenshot shows an Excel spreadsheet with columns A through I. Callouts provide instructions on how to use the spreadsheet:

- Callout 1:** "This section calculates the maximum length of a specific size of cable. Foot and total." (Points to cells A1-A2)
- Callout 2:** "This group of cells shows the total feet of cable of a particular size that can support the selected equipment." (Points to cells B1-B2)
- Callout 3:** "Check the 'HELP' tab for instructions on each area of this file." (Points to cell D1)
- Callout 4:** "This section calculates the voltage drop of a length of cable for a device or devices, based on current draw. Red means it exceeds the allowable voltage drop." (Points to cells E1-E2)
- Callout 5:** "Choose FOOT or METER measure" (Points to cell D2)
- Callout 6:** "Choose the measurement system you want here. Either 'FOOT' or 'METER' can be selected from the drop down menu." (Points to cell D3)
- Callout 7:** "This cell will show total current draw for all devices entered. System page has a total for all pages." (Points to cell B7)
- Callout 8:** "This group of cells shows the voltage drop for a selected cable length and device set. Enter the estimated cable length in the yellow box and read the voltage drop for the wire gauge at the right. Use a cable gauge that shows 'green'." (Points to cells F2-F3)
- Callout 9:** "Enter the quantity of equipment here. For determining system requirements enter all devices. To calculate cable length or voltage drop enter only those devices on the cable in question." (Points to cell A4)
- Callout 10:** "These columns show the calculations for the devices selected and totals at the bottom. The total current is carried to the top of the page and is totaled on the system page." (Points to cells D4-D5)
- Callout 11:** "Use the Tabs at the bottom to choose the category of equipment." (Points to cell A41)

Max Feet	Cable gauge for power conductors	ohms/ft	Drop/ft.	Cable Length	Voltage Drop	Voltage at Device
175.4	12 AWG 2 conductor	0.00171	0.00855	25	0.21	13.29
109.9	14 AWG 2 conductor	0.00273	0.01365		0.34	13.16
69.0	16 AWG 2 conductor	0.00429	0.02175		0.54	12.96
43.4	18 AWG 2 conductor	0.00686	0.0346		0.87	12.64
27.5	20 AWG 2 conductor	0.01089	0.0545		1.36	12.14
17.8	22 AWG 2 conductor	0.01738	0.0845		2.11	11.39
10.8	24 AWG 2 conductor	0.02727	0.1385		3.46	10.04

FIG. 298 AMX Power Calculator

This worksheet uses macros to calculate maximum wiring distances and voltage drop, based on cable size and distance. When opening the file, select **Enable Macros**.



You'll need to have a program loaded on your PC that can open XLS files (such as Microsoft® Excel) in order to use this worksheet.

NOTE

The AMX Power Calculator worksheet performs two main calculations:

- Calculates the maximum length of a specific size of cable for a device or devices. (Choose between Foot and Meter measurements.) You can also get the total current draw for this group of devices.
- Calculates the voltage drop of a length of cable for a device or devices, based on current draw.

Red means it exceeds the allowable voltage drop.

1. Select the tab (along the bottom of the screen) that contains the type of device(s) you are working with.
2. Under "QTY" in column A, enter a quantity for each device (listed under "Product Title" in column B). This number should represent the number of each device that will be in the system.

3. To calculate voltage drop, enter "Cable Length" (in column G).



NOTE

By default, length is calculated in feet. Click the drop-down menu (in column E) to change "FEET" to "METERS".

4. Press the TAB key (or click in any other cell) to enter the information and update the table with the various cable and voltage drop information that it provides:
 - **Max Cable Length** (Column C, Rows 4-10): This group of cells shows the total feet of cable of a particular size that can support the selected equipment.
 - **Total Current Draw** (Column A, Row 6): This cell shows the total current draw for all devices entered. The System tab shows the total for all pages.
 - **Voltage Drop** (Columns G, H, I - Rows 4-10): This group of cells shows the voltage drop for a selected cable length and device set. Enter the estimated cable length in the yellow box and read the voltage drop for the wire gauge at the right. Use a cable gauge that is shown in green.



NOTE

All current draw values are "Worst Case" or Max values as listed in AXPower.txt.



**Increase Your Revenue
through education + knowledge**

In the ever-changing AV industry, continual education is key to success. AMX University is dedicated to ensuring that you have the opportunity to gather the information and experience you need to deliver strong AMX solutions. Plus, AMX courses also help you earn CEDIA, NSCA, InfoComm, and AMX continuing education units (CEUs).

Visit AMX University online for 24/7/365 access to:

- *Schedules and registration for any AMX University course*
- *Travel and hotel information*
- *Your individual certification requirements and progress*