^RAF and ^RMF Embedded Codes / Escape Sequences

NOTE: *The %P, %U, %S, %H, %A, and %F values can be entered In a single string.*

^RAF and ^RMF Embedded Codes		
Parameter	**Embedded Code**	**Code Description**
protocol	`%P<0|1|2>`	Set protocol: Either HTTP (0) or FTP (1), or HTTPS(2) Notes: • *FTP is not supported at this time.* • *HTTPS (%P2) is supported in G5 panel firmware v1.4.9 and higher.*
user	`%U <user>`	Set Username for authentication.
password	`%S <password>`	Set Password for authentication.
host	`%H <host>`	Set Host Name (fully qualified DNS or IP address).
path	`%A <path>`	Set directory path. The path must be a valid HTTP URL minus the protocol, host, and filename. The only exception to this is the inclusion of special escape sequences and in the case of the FTP protocol, regular expressions.
file	`%F <file>`	The file or program that will return the resource. The file must be a valid HTTP URL minus the protocol, host, and path. The only exception to this is the inclusion of special escape sequences and in the case of the FTP protocol, regular expressions.
refresh	`%R <refresh 1-65535>`	The number of seconds between refreshes in which the resource is downloaded again. Refreshing a resource causes the button displaying that resource to refresh also. The default value is 0, which means to only download the resource once for each time it comes into view (or if preserve is set, only once period). *Note: For Motion JPEGs, the Refresh interval should always be 0.*
preserve	`%V <0-1>`	Set the value of the preserve flag. A value of 0 (the default) means the resource should be reloaded each time it comes into view. A value of 1 means the resource should be preserved in cache after the first time it is loaded, and not reloaded each time it comes into view. This value is ignored if the Refresh interval is greater than 0.
dynamo	`%D`	Enable/disable Fast Dynamo. Panel will attempt to accelerate this resource in hardware. *Note: Fast Dynamo is not yet supported.*
notification	`%C<on,off,once>`	Indicates whether a notification is required when a Dynamic Image is loaded/ refreshed. The string following the %C can be: 1. on - notifications are sent whenever the named dynamic image resource is loaded/refreshed. 2. off - notifications are not sent (default). 3. once - notifications are sent one time whenever the named dynamic image resource is loaded/refreshed. Notifications are not sent on subsequent loads/refreshes. If the %C code is not sent as part of a ^RAF command, the notifications are set to off. If the %C code is not sent as part of a ^RMF command, the notifications are not changed from the current setting.

URL	`%L <URL>`	Set the complete URL as a single value. URL is in the format set in RFC 2396.
		Code Block http://username:password@host:port/directory/file?query#fragment
		Note: The %P, %U, %S, %H, %A, and %F values can be entered In a single string. Note: If the URL is the first part of the resource data, then the %L is assumed and need not be included. See example below.
		Example:
		The following send commands are equivalent. All examples set the resource Image1 to a URL of http://server/folder1/image.jpg with a username of username, password of password, notifications on, and refresh time of 30 seconds:
		`SEND_COMMAND Panel,'^RMF-Image1,%Lhttp://username:password@server/folder1/image.jpg%Con%R30'`
		`SEND_COMMAND Panel,'^RMF-Image1,%P0%Uusername%Spassword%Hserver%Afolder1%Fimage.jpg%Con%R30'`
		`SEND_COMMAND Panel,'^RMF-Image1,http://username:password@server/folder1/image.jpg%Con%R30'`
		`SEND_COMMAND Panel,'^RMF-Image1,http://server/folder1/image.jpg%Con%R30%Uusername%Spassword'`

^RAF and ^RMF Escape Sequences			
Sequence	**Panel Information**	**Sequence**	**Panel Information**
`$DV`	Device Number	`$AP`	Address port
`$SY`	System Number	`$CC`	Channel code
`$IP`	IP Address	`$CP`	Channel port
`$HN`	Host Name	`$LC`	Level code
`$MC`	Mac Address	`$LP`	Level port
`$PX`	X resolution of current panel mode/file	`$BX`	X Resolution of Current button
`$PY`	Y resolution of current panel mode/file	`$BY`	Y Resolution of Current button
`$ST`	Current state	`$BN`	Name of Button
`$AC`	Address code		

Listview (Data Access) Commands

The Data Access commands described in the following table represent a set of Button (^) Send Commands that support the use of dynamic data for Listview buttons in NetLinx code. Note that the address range indicated in the syntax examples represents the address of the Listview button, and works the same as it does for all other (^) Button Send Commands.

Many Listview Send Commands take a boolean parameter. Any of the following values can be used:

Will resolve to true	Will resolve to false
true	false
TRUE	FALSE
on	off
ON	OFF
1	0
	(empty)

Terminology

The NetLinx Data Access Send Commands use the following terminology:

Netlinx Data Access Send Commands - Terminology	
Name	**Description**
DataFeed	A DataFeed is a descriptor with a unique name used to publish data records. A DataFeed can be created by a NetLinx program and then published to the NetLinx web server for external consumption by devices like the G5 touch panel for use with Listview buttons. DataFeeds can also be sourced from a server running the AMX XPort software.
DataRecord	A DataRecord represents a container of data fields and the index/ordinal position of the row in the recordset. A DataRecord may contain metadata and/or content fields.
DataField	SA DataField represents the value that stores the actual data elements. All raw data in the NetLinx data access APIs are stored and managed as values and (one or more) attributes.

Listview Commands	

^LVC	Listview Cache Configure - This command configures the image cache used by the Listview.
	• **Syntax**:
	`"'^LVC-<configuration_option=configuration_value>'"`
	• **Variables:** a comma separated list of one or more configuration parameters followed by an equal sign and the configuration setting.
	• **Configuration Options:**
	clear: Clear the current memory and disk cache used for Listview image loading. *mem_size*: The size of the memory cache, either as a percentage of the available application memory or as total size. Percentages are specified as floating point. Percentage values are 2% (0.02) to 20% (0.20) and totals are 16 to 256 MB. The default is 10%.(0.10) *disk_size*: The size of the disk cache. Valid values are 16 to 500 MB The default is 200.
	• **Example**:
	`SEND_COMMAND Panel,"'^LVC-clear'"`
	Clear the Listview cache.

^LVD	Set Listview Data Source - This command sets the data source to drive the Listview entries. Note that this command only configures the data source it does not actually cause the data to be fetched. The ^LVR refresh command (page 154) must be issued to load the data. • **Syntax**: `"'^LVD-<addr range>,<URL to data source or Dynamic Data Resource name>, <configuration_option=configuration_value>'"` • **Variable:** *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address. Data source URL/Dynamic Data Resource name (required): If the suffix of the URL is .csv or .CSV then the URL will be assumed to point to a csv file. Otherwise the type is assumed to be the XPort amxstandard.xml format. Supported URL schemes are HTTP, HTTPS, and FILE.

Data Source URL Notes:

HTTPS is supported in G5 panel firmware version v1.4.9 and higher.

HTTPS is not supported by TPDesign5 dynamic image resources at this time.

A file on the panel's local filesystem can be specified using the file:/// option. *There must be three forward slashes after 'file:'.*

An FTP URL scheme is not supported.

Refer to *Notes on Using Image URLs With Listview Buttons* on page 145 for additional details. *option list*: a optional comma separated list of one or more configuration parameters followed by an equal sign and the configuration setting.

- **Configuration Options:**

user - The user name to use for authenticating to the web server when retrieving the feed data source file. If specified when URL is a Dynamic Data Resource, this value will override the username inside the Dynamic Data Resource.

Note: For server authentication to occur, the Username (user) and Password (pass) must be included in the ^LVD command, and they must match the credentials required by the server. pass - The password to use for authenticating to the web server when retrieving the feed data source file. If specified when URL is a Dynamic Data Resource, this value will override the password inside the Dynamic Data Resource.

Note: For server authentication to occur, the Username (user) and Password (pass) must be included in the ^LVD command, and they must match the credentials required by the server. csv - a boolean indicating whether or not to parse the data source as a CSV file.

If not present, defaults to false.

has_headers - a boolean indicating that the first line of the CSV file has column headers which will be used to name the content fields for each data record.

If true it automatically implies that csv is also true.

If this option is not present then the default for a CSV file is false.

In the absence of headers, the content fields will be named using the following convention: column1, column2, column3... (CSV files only, since XML always has field names specified within the file).

- **Example**:

```
SEND_COMMAND Panel,"'^LVD-42,http://192.168.220.231/public/lv42data.csv,
has_headers=1'"
```

Configures the Listview button to use the CSV file at the URL as its data source. The first line of the CSV file should be parsed as field names and not as Listview entry record data.

^LVE

Set ListView custom event number - This command sets the custom event number reported by Listview refresh operations.

- **Syntax**:

```
"'^LVE-<addr range>,<Listview custom event number>'"
```

- **Variable:** *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address. event number: The custom event number to report Listview events. At this time, only refresh events are reported. A value of 0 turns off custom event reporting, A value > 0 assigns the value to the Listview custom event number for that address. The default value is 1401 (custom events reported).

When enabled, the custom event format reported is:

```
Custom Event Property   Value
   Port                    port command was received on
   ID                      address of the button
   Type                    button event number set by ^LVE
   Flag                    StartRefresh = 1; FinishRefresh = 2; Error = 0xffff
($FFFF);     Value 1                 If flag is StartRefresh (1) or FinishRefresh (2):
                                 InitRefresh = 0; (refresh by dynamic resource)
                                 ManualRefresh = 1; (refresh by send command
                                 TimedRefresh = 2; (refresh by timer)
If flag is Error:
                                 Error = -1; (some form of error, see custom.text for
description)                           InvalidUrl = -2; (URL is null, should
never happen)
                                 LoginFailed = -3; (could not authenticate to web
server).     Value 2                 data load id. Every data load is assigned a
unique id that                                          counts up from 0. This is
used to correlate StartRefresh/                             FinishRefresh/Error
events on particular addresses.
   Value 3                 When Custom.flag == FinishRefresh, this is the number of
records in list. Otherwise is 0.
   Text                    feed URL string, or error message if flag is Error
```

- **Example**:

```
SEND_COMMAND Panel,"'^LVE-42,1401'"
```

Configures the Listview widget to send Listview custom events on event 1401.

^LVF

Listview Filter - This command can be used to programmatically change the filter contents of the Listview widget. When the filter contents is changed, the filter will be applied to the current Listview data which can change the number of items displayed based on those that meet the filter sequence. The filter changes immediately, and the filter can be set or cleared with this command.

- **Syntax**:

```
"'^LVF-<addr range>,<filter character sequence>'"
```

- **Variable:** *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address.

filter character sequence: All characters including white space characters will be applied to the filter.

- **Example**:
  `SEND_COMMAND Panel,"'^LVF-42,amx'"`
  Sets the filter sequence to amx. Only items in the data set that contain the sequence amx will be displayed.
  `SEND_COMMAND Panel,"'^LVF-42,'"`
  Clears the filter sequence. All items in the data set can be viewed in the Listview.

^LVL

Listview Layout - This command sets the layout configuration to configure the visual representation of the Listview entries.

- **Syntax**:
  `"'^LVL-<vt addr range>,<layout_option=layout_value>'"`
- **Variables**:
  Variable text address range = 1 - 4000.
  A comma separated list of one or more layout configuration parameters followed by an equal sign and the configuration setting.
- **Layout Options**: *columns* - Number of columns parameter. An integer that represents the number of columns to display. The number must be at least 1 and a value that exceeds the minimum cell width will truncate to the maximum.
  Note: Valid tags for the columns parameter are columns=, nc=, and numcol=.
  comp - Component parameter. An integer that is a value which determines which graphical components are present in the cell. When the component values are bitwise or'd together, it creates the encoding for the cell components that are populated. If a configuration parameter is not in the current command, the last value for the configuration parameter is used.

Note: Valid tags for the comp parameter are c= and comp=.

Component Value	Description
1	The image (i) is used in the cell.
2	The primary text field (t1) is used in the cell.
4	The secondary text field (t2) is used in the cell

Not all variations of component values are valid. To have the secondary text field present, the primary text field must be preset as well.

Component Combinations	Description
0	Invalid. No component displayed.
1	The image (i) is the only component displayed.
2	The primary text field (t1) is the only component displayed.
3	The image (i) and the primary text field (t1) are displayed.
4	Secondary text (t2) only. Invalid. Secondary text (t2) cannot be displayed without the primary text (t1).
5	Secondary text (t2) and image (i). Invalid. Secondary text (t2) cannot be displayed without the primary text (t1).
6	The primary text (t1) and secondary text (t2) are displayed.
7	The image (i), primary text (t1), and secondary text (t2) are displayed

cellheight - An integer or percentage that sets the height of a cell. The value can be an integer >= the minimum cell height (48), or a percentage of the list height (5% up to 95%). To specify a percentage, append a '%' to the end of the value.
Note: Valid tags for the cellheight param are ch= and cellheight=.

layout - An integer that sets the layout configuration of each cell. *Note: valid tags for the layout parameter are l= and layout=.*

Layout Value	Description
1	Horizontal layout with image on the left and text(s) on the right. If multiple texts are selected then the texts are stacked vertically.
2	Horizontal layout with image on the right and text(s) on the left. If multiple texts are selected then the texts are stacked vertically.
3	Horizontal layout with text1 on the left, image in the center, and text2 on the right. If multiple texts are selected then the texts are stacked vertically.
4	Vertical layout with the image on the top and text(s) below the image. If multiple texts are selected then text1 is below the image and text2 is below text1.
5	Vertical layout with the image on the bottom and text(s) above the image. If multiple texts are selected then text1 is on top, text2 is below text1, and the image is below text2.
6	Vertical layout with text1 on top, the image below text1, and text2 below the image.

p1 - layout percentage 1. Sets the boundaries between cell components in different layouts. An integer between 10 and 90 that sets the boundary between components as a percentage of the cell dimension. The percentage can be specified as a number between 5-95 with an optional percentage sign '%' at the end. **p2** - layout percentage 2. Sets the boundaries between cell components in different layouts.An integer between 10 and 90 that sets the boundary between components as

Listview Commands	

	a percentage of the cell dimension. The percentage can be specified as a number between 5-95 with an optional percentage sign '%' at the end. **filter** - Enable or disable the search filter on the Listview. To enable set to 'true', 'on', or '1'. To disable set to 'false', 'off', or '0'.
	Note: Valid tags for the filter parameter are f= and filter=. **filterheight** - An integer or percentage that sets the height of the filter in the Listview. The value can be an integer >= the minimum filter height (24), or a percentage of the list height (5% to 25%). To specify a percentage, append a '%' to the end of the value.
	Note: Valid tags for the filterheight param is fh= and filterheight=. **alphascroll** - Enable or disable the alpha scroll on the Listview. To enable set to 'true', 'on', or '1'. To disable set to 'false', 'off', or '0'.
	Note: Valid tags for the alphascroll parameter are as= and alphascroll=.
	• **Examples:**
	`SEND_COMMAND Panel,"'^LVL-42, layout=1, comp=7, columns=1, cellheight=120, p1=40%, p2=66%'"`
	Sets the Listview configuration display an image and 2 text fields (comp=7), in a layout 1 configuration (layout=1 horizontal layout of the image on left and text1 and text2 to the right of the image). There is 1 column (columns=1) and the cell is 120 pixels high (h=120). The image width will be 40% of the cell width (p1=40%) with text1 and text2 having a width of 60% of the cell width. The height of text1 will be 66% of the cell height (p2=66%) with text2 height of 34% of the cell height.
	`SEND_COMMAND Panel,"'^LVL-42,l=4, c=3, ch=150, nc=4, p1=70'"`
	Sets the Listview configuration display an image and 1 text fields (c=4), in a layout 4 configuration (l=4 vertical layout of the image on top and text1 below the image). There are 4 columns (nc=4) and the cell is 150 pixels high (ch=150). The image height will be 70% of the cell height (p1=70) with text1 having a height of 30% of the cell height.
	`SEND_COMMAND Panel,"'^LVL-42,layout=3, comp=6, ch=100, numcol=1, p1=50'"`
	Sets the Listview configuration display 2 text fields (comp=6), in a layout 3 configuration (layout=2 horizontal layout of text1 on the left and text2 on the right). There is 1 column (numcol=1) and the cell is 100 pixels high (ch=100). The text1 width will be 50% of the cell width (p1=50) with text2 having a width of 50% of the cell width.
	`SEND_COMMAND Panel,"'^LVL-42,filter=1, fh=10%, as=false'"`
	Sets the Listview search filter enabled (filter=1), the search filter textview height to 10% of the Listview height (fh=10%), and disables the alphascroller on the Listview.

^LVM	Listview Map Fields - This command maps the fields from the data source to the display elements of a Listview entry. Each list entry corresponds to a record if the data came from the NetLinx data access API or XPort. If the data source is a csv file, then each list entry corresponds to a row in the file. A list entry can have up to two lines of text and a URL that points to an image. Each display element for a list entry has to be mapped to a field in the record. If no mapping is specified, then a default mapping is used which is simply to map the fields in order based on the screen layout of the list entry. So, if the list type was an image and two lines of text, the first content field in the record would be interpreted as the URL to the image, the next field would be the first line of text and the next field would be the second line of text. To override this default behavior, the ^LVM command should be used to specify the correct mapping.
	• **Syntax**:
	`"'^LVM-<addr range>,<display_element=field_expression|<display_element=field_expression>|...'"`
	• **Variable:** *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address.
	display element list: A pipe character "|" separated list of mapping expressions. A pipe is used because typical field expressions may use more common characters such as the comma or semicolon. Display Elements: t1 - the first text element t2 - the second text element i1 - the first image future display types may support more text and image elements which will follow the same convention: t3... i2...
	• **Field Expressions**:
	An expression that can be used to map field values to display elements. Any time a field name is used, it follows the form **${field_name}**. Other text characters can be used to construct a more complex string using multiple fields.
	• **Examples**:
	`SEND_COMMAND Panel,"'^LVM-42,i1=${image}'"`
	Configures the Listview widget to map an image field to the image display element. In this example, the Listview type is assumed to be a single image only.
	`SEND_COMMAND Panel,"'^LVM-42,i1=${image}\|t1=${lname}, ${fname}\|t2=${number}'"`
	The Listview widget is the type that has an image and two lines of text. The top line will consolidate two different fields in the form of last name, first name. The second line of text will be the phone number.
	`SEND_COMMAND Panel,"'^LVM-42,t1=${column2}, ${column1}\|t2=${column3}|i1=${column4}'"`
	This is the same example as the one above it but the source of the data

^LVN	Listview Navigate - This command can be used to move the Listview widget. Navigation commands will be range checked. The command will attempt to position the specified list entry on the top line of the Listview widget. When navigating at the end of the list, however, the widget will position the last item in the list on the bottom line and will not leave blank lines at the bottom. The only exception to this case will be when the Listview has fewer entries than the number of displayable entries. If the optional select boolean is present, and the navigation command used support the select option, the item at the destination will be selected and a item selected custom event will be initiated. • **Syntax**: `"'^LVN-<addr range>,<navigation_command>[,<boolean_select_param>]'"` • **Variables**: *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address. *navigation command. optional select boolean* **Navigation Commands**: **t** or **T** - move to the top of the list (supports an optional select boolean). **b** or **B** - move to the bottom of the list (supports an optional select boolean). **d** or **D** - page down (DOES NOT support the optional select boolean. A select boolean will be ignored if present). **n** - move to a specific list entry number at position n. n is a zero based index. (supports an optional select boolean).

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	(Note: If n is < 0 and select is true then the current selected item is deselected.) **u** or **U** - page up (DOES NOT support the optional select boolean. A select boolean will be ignored if present).
	• **Examples**:
	`SEND_COMMAND Panel,"'^LVN-42,B'"`
	Move to the bottom of the list.
	`SEND_COMMAND Panel,"'^LVN-42,d'"`
	Move the list down a page.
	`SEND_COMMAND Panel,"'^LVN-42,3,1'"`
	Move the list to position 3 in the list and select the item at position 3.

^LVR	Listview Refresh Data - This command has two different functions. If it is sent without any parameters, it causes the Listview widget to load data from its configured data source. If optional parameters are included with the command, then the automatic data refresh options are configured. The typical behavior for auto refresh is that the last modified time of the data source is tracked. At the refresh interval, the last modified time of the data source is compared against the stored value. If the data is newer, then it is reloaded and the Listview widget is refreshed with the updated data. If the data is unchanged, then it is not reloaded. The default for auto refresh is off.
	• **Syntax**:
	`"'^LVR-<addr range>[,<refresh_interval>,<force_reload>]'"`
	• **Variable:** *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address.
	refresh_interval - the optional interval (in seconds) at which to check for newer data. 0 (the default) means auto refresh is off. Minimum is 5 seconds. If not specified, the current refresh interval is retained.
	force_reload - the optional parameter to force the Listview to ignore and data file timestamps and to force a clear on image caches for refreshed Listview images. Not specified or 0 will not force a reload, 1 will force a reload of data file and images associated with data file.
	Note: This can cause the images in a Listview to flicker upon the reload. This is the expected behavior due to the images being reloaded from the server.
	• **Examples**:
	`SEND_COMMAND Panel,"'^LVR-42'"`
	Commands the Listview widget to load the data from the data source and populate the Listview display widget.
	`SEND_COMMAND Panel,"'^LVR-42,15'"`
	Commands the Listview widget to check for an updated data source every 15 seconds.
	`SEND_COMMAND Panel,"'^LVR-42,600,1'"`
	Commands the Listview widget to check for an updated data source every hour, and to force a reload of the data and the images.

^LVS	Listview Sort Data - This command sets the columns that are used for sorting of lists, as well as the type of sorting that is done. The multiple columns are allowed in the sort procedure. The order of the columns in the command determine the order of the sorting. The first column is the primary sorting data, the second would be used for sorting with rows of data that are equal in the primary columns, and so on for however many columns are used for sorting. If no columns are listed in the command, then the current sorting columns are used if they have been previously defined. The type of sort is an optional part of the command and follows the sort columns. Initially, there are four different sort types available. *None* (**n**) - No sorting is performed. *Ascending* (**a**) - Ascending sort using localized character weighting. *Descending* (**d**) - Descending sort using localized character weighting. *Override* (*****) - Override sort syntax portion of command determines sorting. The override sort syntax allows for complex SQLite ORDER BY syntax for sorting. When override is selected, the sort columns that were set in the command or previously are ignored and the entire sorting statement must be in the override sort syntax. The words ORDER BY should not be in the syntax. They are inserted by the firmware. • **Syntax**: `"'^LVS-<addr range>,<primary sort column name, secondary sort column name,..., final sort column name>[;<sort type>[;<override sort syntax>]]'"` • **Variables**: *address range*: Address codes of buttons to affect. A '.' between addresses includes the range, and & between addresses includes each address. *Sort columns* - comma separated list of sort columns in the order of sort priority. Sort columns can be specified using the ${column name} syntax that is used in the ^LVM command. Columns can be Content Fields or Metadata Fields in the controller Datafeed XML file generated by the controller. Metadata fields are prepended with "meta" in front of the "label" attribute of the field. *Sort Type* - A character indicating the sorting algorithm to use. 'a' - ascending 'd' - descending '*' - override. Sort command syntax must follow in the next part of the command. 'n' - none (default). Any character that is not a,d, or * will set sort to none. *Override sort syntax* - A SQLite ORDER BY statement to use as the sort.
^LVS (Cont.)	• **Examples**: `SEND_COMMAND Panel,"'^LVS-42, ${artist name},${title};a `" Commands the Listview widget to sort the data source by the artist name and then title in an ascending order. Equates to "artistname, title COLLATE LOCALIZED ASC" override syntax.

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	`SEND_COMMAND Panel,"'^LVS-42, ${artist name},${title};d '"`
	Commands the Listview widget to sort the data source by the artist name and then title in an descending order. Equates to "artistname COLLATE LOCALIZED DESC, title COLLATE LOCALIZED DESC" override syntax.
	`SEND_COMMAND Panel,"'^LVS-42,;n'"`
	Commands the Listview widget to not sort the current data.
	`SEND_COMMAND Panel,"'^LVS-150,${user name},${text};*;meta${Record timestamp} ASC'"`
	Commands the panel to sort by the meta data field Record timestamp in ASCENDING order. The username and test fields are ignored.
	`SEND_COMMAND Panel,"'^LVS-150,;*;meta${Record timestamp} ASC'"`
	Commands the panel to sort by the meta data field "Record timestamp" in ASCENDING order. The username and test columns are ignored.
	`SEND_COMMAND Panel,"'^LVS-150,;*;LENGTH(${description}),${description} ASC'"`
	Command the panel to sort by the number of characters in the description field, and then by the contents of the description field in ASCENDING order.

Note: *Refer to Appendix B: Using NetLinx to Define a Data Source (Listview Buttons) on page 182 for information on using NetLinx Code to define a data source for Listview buttons.*

Notes on Using Image URLs With Listview Buttons

Since a Listview button can retrieve images to display as part of the Listview, the column in the data table that sets the image URL will require the server's username and password be included as part of the image URL.

The following example represents the contents of a .CSV file that has image URLs as part of the data. The URL Path column has some URLs with using http and no authentication credentials, some using http and user/password credentials, and one using https and user/password credentials:

```
File Type,    No,      URL Path
      GIF,     1,      http://www.w3schools.com/images/compatible_chrome.gif
      GIF,     2,      http://www.w3schools.com/images/compatible_ie.gif
      GIF,     3,      http://www.w3schools.com/images/compatible_firefox.gif
      PNG,     4,      http://user:password@controller-ni3100/xsimple_green.png
      PNG,     5,      https://user:password@controller-nx1200/__AMX__Varia-mute-
off.png       PNG,     6,      http://user:password@controller-nx1200/__AMX__Varia-
mute-on.png
```

NOTE: *HTTPS is supported in G5 panel firmware version v1.4.9 and higher.*

NOTE: *HTTPS is not supported by TPDesign5 dynamic image resources at this time.*

VNC Commands

BVNC is handled via an external application and is displayed in a window. To enable a VNC connection to a remote device, a VNC App window must be created in the TPD project.

A single window can support connections to multiple destinations, though not simultaneously. Once a window is open, the parameters such as host, username, and password can be changed via send commands.

The following send commands are available to control VNC sessions. The application window name (from TPDesign5) is used as the key to update VNC parameters. If an existing window is open, the session should be logged out first before changing any parameters to avoid undefined behavior. Once all the parameters have been changed, then login to connect with the new parameters.

VNC Send Commands

^BVG

VNC Client Window update parameter command - Update parameter list.

- **Syntax**:
  `"'^BVG-<app window name>,<param list>'"`
- **Variables**:
  app window name: The name of the application window to act upon. *param list*: the key/value sets(s) for the VNC parametric. Key/value sets are comma separated.

Parameter Name	Description	Values	Default Value	Required	Type
colorModel	color depth of VNC window	C24bit, C256, C64, C8, C4, C2	C24bit	No	String
forceFull	Request for full-screen updates	true,false	false	No	Boolean
ipAddress	server name or IP address			Yes	String
password	Authentication password			No	String

VNC Send Commands						
	port	server port number		5900	Yes	Integer
	prefEncoding	Preferred server encoding	0 (Raw), 1 (Copy Rect Encoding), 2 (RRE Encoding), 4 (CoRRE Encoding), 5 (Hextile Encoding), 6 (Zlib Encoding), 7 (Tight Encoding), 16 (ZRLE Encoding)	7 (Tight Encoding)	No	String
	scaling	Scaling options	0 (fit to screen), 1 (one-to-one), 2 (zoom)	0 (fit to screen)	No	Integer
	useLocalCursor	Local mouse pointer (set to true if pointer is invisible)	true, false	false	No	Boolean
	Restart App	Restart application is already running	true, false	true	Yes	Boolean
	This command is a generic form of the remainder of the commands. Any parameter in the VNC App Parameter List from TPDesign can be updated with this command by including the Key/Value pair in the list. *Note: One limitation is that no commas may be used in any of the fields. Delimiters are not escaped at this time.* • **Example**: `SEND_COMMAND Panel,"'^BVG-VNCClient,ipAddress=192.168.200.25,port=5901, password=myNewPassword'"` Change the application window name VNCClient to connect to server IP 192.168.200.25, port 5901 with a password of *myNewPassword*.					

^BVL	VNC Client Window login command - Login/out of an existing session. For logon, if the window is not open, the window is opened and the session is connected using the current parameters. If the window is already open, then the session is updated to new/current parameters. Logoff will close the session and window.
	• **Syntax:**
	`"'^BVL-<appWindowName>,<1=logon|0=logoff>'"`
	• **Variables:**
	app window name: The name of the application window to act upon. *logon/logoff*: 1 to logon to server, 0 to logoff
	• **Example:**
	`SEND_COMMAND Panel,"'^BVL-VNCClient,0'"`
	Command the application window name VNCClient to logout/disconnect from the VNC server.					

^BVN	VNC Client Window Update server IP command - Update VNC server ip address/name for the application window.
	• **Syntax**:
	`"'^BVN-<appWindowName>,<vnc server ip address or name>'"`
	• **Variable:**
	app window name: The name of the application window to act upon.
	server name or ip: The server's DNS name or IP address.
	• **Examples**:
	`SEND_COMMAND Panel,"'^BVN-VNCClient,192.168.200.25'"`
	Command the application window name VNCClient to set the VNC server to 192.168.200.25.
	`SEND_COMMAND Panel,"'^BVN-VNCClient,vncserver'"`
	Command the application window name VNCClient to set the VNC server to the server with a DNS name of vncserver.					

^BVT	VNC Client Window Update server port - Update VNC server port for the application window.
	• **Syntax**:
	`"'^BVT-<appWindowName>,<server port>'"`
	• **Variables**:
	app window name: The name of the application window to act upon. *server port*: The server's port.
	• **Example**:
	`SEND_COMMAND Panel,"'^BVT-VNCClient,5901'"`
	Command the application window name VNCClient to set the VNC server port to 5901.					

Programming Numbers

Color Table										
Index No.	**Name**	**Red**	**Green**	**Blue**		**Index No.**	**Name**	**Red**	**Green**	**Blue**
0	Very Light Red	255	0	0		45	Medium Aqua	0	80	159
1	Light Red	223	0	0		46	Dark Aqua	0	64	127
2	Red	191	0	0		47	Very Dark Aqua	0	48	95
3	Medium Red	159	0	0		48	Very Light Blue	0	0	255
4	Dark Red	127	0	0		49	Light Blue	0	0	223
5	Very Dark Red	95	0	0		50	Blue	0	0	191
6	Very Light Orange	255	128	0		51	Medium Blue	0	0	159
7	Light Orange	223	112	0		52	Dark Blue	0	0	127
8	Orange	191	96	0		53	Very Dark Blue	0	0	95
9	Medium Orange	159	80	0		54	Very Light Purple	128	0	255
10	Dark Orange	127	64	0		55	Light Purple	112	0	223
11	Very Dark Orange	95	48	0		56	Purple	96	0	191
12	Very Light Yellow	255	255	0		57	Medium Purple	80	0	159
13	Light Yellow	223	223	0		58	Dark Purple	64	0	127
14	Yellow	191	191	0		59	Very Dark Purple	48	0	95
15	Medium Yellow	159	159	0		60	Very Light Magenta	255	0	255
16	Dark Yellow	127	127	0		61	Light Magenta	223	0	223
17	Very Dark Yellow	95	95	0		62	Magenta	191	0	191
18	Very Light Lime	128	255	0		63	Medium Magenta	159	0	159
19	Light Lime	112	223	0		64	Dark Magenta	127	0	127
20	Lime	96	191	0		65	Very Dark Magenta	95	0	95
21	Medium Lime	80	159	0		66	Very Light Pink	255	0	128
22	Dark Lime	64	127	0		67	Light Pink	223	0	112
23	Very Dark Lime	48	95	0		68	Pink	191	0	96
24	Very Light Green	0	255	0		69	Medium Pink	159	0	80
25	Light Green	0	223	0		70	Dark Pink	127	0	64
26	Green	0	191	0		71	Very Dark Pink	95	0	48

Color Table										
27	Medium Green	0	159	0		72	White	255	255	255
28	Dark Green	0	127	0		73	Grey1	238	238	238
29	Very Dark Green	0	95	0		74	Grey3	204	204	204
30	Very Light Mint	0	255	128		75	Grey5	170	170	170
31	Light Mint	0	223	112		76	Grey7	136	136	136
32	Mint	0	191	96		77	Grey9	102	102	102
33	Medium Mint	0	159	80		78	Grey4	187	187	187
34	Dark Mint	0	127	64		79	Grey6	153	153	153
35	Very Dark Mint	0	95	48		80	Grey8	119	119	119
36	Very Light Cyan	0	255	255		81	Grey10	85	85	85
37	Light Cyan	0	223	223		82	Grey12	51	51	51
38	Cyan	0	191	191		83	Grey13	34	34	34
39	Medium Cyan	0	159	159		84	Grey2	221	221	221
40	Dark Cyan	0	127	127		85	Grey11	68	68	68
41	Very Dark Cyan	0	95	95		86	Grey14	17	17	17
42	Very Light Aqua	0	128	255		87	Black	0	0	0
43	Light Aqua	0	112	223		255	TRANSPARENT	99	53	99
44	Aqua	0	96	191						

Justification Values

Button State Number Justification Value		
Justification	**Justification Value**	**Justification Parameters**
Absolute	0	0,<x offset,y offset>
top-left	1	none
top-middle	2	none
top-right	3	none
center-left	4	none
center-middle	5	none
center-right	6	none
bottom-left	7	none
bottom-center	8	none
bottom-right	9	none
scaled-to-fit	10	none
scale-maintain-aspect-ratio	11	none

Border Styles

Border Styles							
#	**Border Style**	**#**	**Border Style**	**#**	**Border Style**	**#**	**Border Style**
1	None	41	Diamond 65	81	Menu Btm Rounded 25	121	Menu Rt Rounded 45
2	AMX Elite -L	42	Diamond 75	82	Menu Btm Rounded 35	122	Menu Rt Rounded 55
3	AMX Elite -M	43	Diamond 85	83	Menu Btm Rounded 45	123	Menu Rt Rounded 65
4	AMX Elite -S	44	Diamond 95	84	Menu Btm Rounded 55	124	Menu Rt Rounded 75
5	Bevel -L	45	Diamond 105	85	Menu Btm Rounded 65	125	Menu Rt Rounded 85
6	Bevel -M	46	Diamond 115	86	Menu Btm Rounded 75	126	Menu Rt Rounded 95
7	Bevel -S	47	Diamond 125	87	Menu Btm Rounded 85	127	Menu Rt Rounded 105
8	Circle 15	48	Diamond 135	88	Menu Btm Rounded 95	128	Menu Rt Rounded 115
9	Circle 25	49	Diamond 145	89	Menu Btm Rounded 105	129	Menu Rt Rounded 125
10	Circle 35	50	Diamond 155	90	Menu Btm Rounded 115	130	Menu Rt Rounded 135
11	Circle 45	51	Diamond 165	91	Menu Btm Rounded 125	131	Menu Rt Rounded 145
12	Circle 55	52	Diamond 175	92	Menu Btm Rounded 135	132	Menu Rt Rounded 155
13	Circle 65	53	Diamond 185	93	Menu Btm Rounded 145	133	Menu Rt Rounded 165
14	Circle 75	54	Diamond 195	94	Menu Btm Rounded 155	134	Menu Rt Rounded 175
15	Circle 85	55	Double Bezel -L	95	Menu Btm Rounded 165	135	Menu Rt Rounded 185
16	Circle 95	56	Double Bezel -M	96	Menu Btm Rounded 175	136	Menu Rt Rounded 195
17	Circle 105	57	Double Bezel -S	97	Menu Btm Rounded 185	137	Menu Lt Rounded 15
18	Circle 115	58	Double Line	98	Menu Btm Rounded 195	138	Menu Lt Rounded 25
19	Circle 125	59	Fuzzy	99	Menu Top Rounded 15	139	Menu Lt Rounded 35
20	Circle 135	60	Glow -L	100	Menu Top Rounded 25	140	Menu Lt Rounded 45
21	Circle 145	61	Glow -M	101	Menu Top Rounded 35	141	Menu Lt Rounded 55

Border Styles							
22	Circle 155	62	Glow -S	102	Menu Top Rounded 45	142	Menu Lt Rounded 65
23	Circle 165	63	Help Down	103	Menu Top Rounded 55	143	Menu Lt Rounded 75
24	Circle 175	64	Neon Active -L	104	Menu Top Rounded 65	144	Menu Lt Rounded 85
25	Circle 185	65	Neon Active -S	105	Menu Top Rounded 75	145	Menu Lt Rounded 95
26	Circle 195	66	Neon Inactive -L	106	Menu Top Rounded 85	146	Menu Lt Rounded 105
27	Cursor Bottom	67	Neon Inactive -S	107	Menu Top Rounded 95	147	Menu Lt Rounded 115
28	Cursor Bottom w/hole	68	Oval H 60x30	108	Menu Top Rounded 105	148	Menu Lt Rounded 125
29	Cursor Top	69	Oval H 100x50	109	Menu Top Rounded 115	149	Menu Lt Rounded 135
30	Cursor Top w/hole	70	Oval H 150x75	110	Menu Top Rounded 125	150	Menu Lt Rounded 145
31	Cursor Left	71	Oval V 30x60	111	Menu Top Rounded 135	151	Menu Lt Rounded 155
32	Cursor Left w/hole	72	Oval V 50x100	112	Menu Top Rounded 145	152	Menu Lt Rounded 165
33	Cursor Right	73	Oval V 75x150	113	Menu Top Rounded 155	153	Menu Lt Rounded 175
34	Cursor Right w/hole	74	Oval V 100x200	114	Menu Top Rounded 165	154	Menu Lt Rounded 185
35	Custom Frame	75	Picture Frame	115	Menu Top Rounded 175	155	Menu Lt Rounded 195
36	Diamond 15	76	Quad Line	116	Menu Top Rounded 185		
37	Diamond 25	77	Single Line	117	Menu Top Rounded 195		
38	Diamond 35	78	Windows Style Popup	118	Menu Rt Rounded 15		
39	Diamond 45	79	Windows Style Popup (status bar)	119	Menu Rt Rounded 25		
40	Diamond 55	80	Menu Btm Rounded 15	120	Menu Rt Rounded 35		

ISO-8859-1 Character Encoding/Decoding table

ISO-8859-1 Character Encoding/Decoding					
	Character value (decimal)	**Character value (hex)**	**^TXT and ^UTF interchangeable**	**?TXT Response Flag in Backwards Compatibility Mode (^ENC-1 was sent)**	**?TXT Response Flag in default (UTF-8) Mode**
ASCII	0-127	0x00-0x7F	Yes	0 (Latin-1)	2 (UTF-8)
Latin-1 (Windows-1252 remap range)	128-159	0x80-0x9F	No	1 (Hex-quad)	2 (UTF-8)
Latin-1	160-255	0xA0-0xFF	No	0 (Latin-1)	2 (UTF-8)
Unicode	>255	>0xFF	No	1 (Hex-quad)	2 (UTF-8)

Resource Escape Codes

Resource Escape Codes			
Sequence	**Panel Information**	**Sequence**	**Panel Information**
$DV	Device number	$AP	Address port
$SY	System number	$CC	Channel code
$IP	IP address	$CP	Channel port
$HN	Host name	$LC	Level code

Resource Escape Codes			
$MC	MAC address	$LP	Level port
$PX	X resolution of current panel mode/file	$BX	X resolution of current button
$PY	Y resolution of current panel mode/file	$BY	Y resolution of current button
$ST	Current state	$BN	Name of button
$AC	Address code		

Virtual Keystroke Commands

Virtual Keystroke Commands					
Keycode	**Key**	**Keycode**	**Key**	**Keycode**	**Key**
1	Soft-L	74	;	147	Numpad 3
2	Soft-R	75	Apostrophe	148	Numpad 4
3	Home	76	/	149	Numpad 5
4	Back	77	@	150	Numpad 6
5	Call	78	Num	151	Numpad 7
6	End Call	79	Headset Hook	152	Numpad 8
7	0	80	Focus	153	Numpad 9
8	1	81	+	154	Numpad /
9	2	82	Menu	155	Numpad *
10	3	83	Notification	156	Numpad -
11	4	84	Search	157	Numpad +
12	5	85	Media Play/Pause	158	Numpad .
13	6	86	Media Stop	159	Numpad ,
14	7	87	Media Next	160	Numpad Enter
15	8	88	Media Prev	161	Numpad =
16	9	89	Media Rew	162	Numpad (
17	*	90	Media FF	163	Numpad)
18	#	91	Mute	164	Volume Mute
19	DPad-U	92	Page Up	165	Info
20	DPad-D	93	Page Down	166	Chan Up
21	DPad-L	94	Pict Symbols	167	Chan Down
22	DPad-R	95	Switch Charset	168	Zoom In
23	DPad-Center	96	Button A	169	Zoom Out
24	Vol Up	97	Button B	170	TV
25	Vol Dn	98	Button C	171	Window
26	Power	99	Button X	172	Guide
27	n/a	100	Button Y	173	DVR
28	Clear	101	Button Z	174	Bookmark
29	A	102	Button L1	175	Captions
30	B	103	Button R1	176	Settings
31	C	104	Button L2	177	TV Power
32	D	105	Button R2	178	TV Input
33	E	106	Button Thumb L	179	STB Power
34	F	107	Button Thumb R	180	STB Input
35	G	108	Button Start	181	AVR Power
36	H	109	Button Select	182	AVR Input
37	I	110	Button Mode	183	Prog Red
38	J	111	Escape	184	Prog Green
39	K	112	Forward Delete	185	Prog Yellow

Virtual Keystroke Commands					
40	L	113	Ctrl-L	186	Prog Blue
41	M	114	Ctrl-R	187	App Switch
42	N	115	Caps Lock	188	Button 1
43	O	116	Scroll Lock	189	Button 2
44	P	117	Meta L	190	Button 3
45	Q	118	Meta R	191	Button 4
46	R	119	Function	192	Button 5
47	S	120	SysReq / Print Screen	193	Button 6
48	T	121	Break	194	Button 7
49	U	122	Move Home	195	Button 8
50	V	123	Move End	196	Button 9
51	W	124	Insert	197	Button 10
52	X	125	Forward	198	Button 11
53	Y	126	Media Play	199	Button 12
54	Z	127	Media Pause	200	Button 13
55	,	128	Media Close	201	Button 14
56	.	129	Media Eject	202	Button 15
57	Alt-L	130	Media Record	203	Button 16
58	Alt-R	131	F1	204	Language Switch
59	Shift-L	132	F2	205	Manner Mode
60	Shift-R	133	F3	206	3D Mode
61	TAB	134	F4	207	Contacts
62	Space	135	F5	208	Calendar
63	Sym	136	F6	209	Music
64	Explorer	137	F7	210	Calculator
65	Envelope	138	F8	211	Zenkaku Hankaku
66	Enter	139	F9	212	Eisu
67	Delete	140	F10	213	Mhenkan
68	Grave	141	F11	214	Henkan
69	-	142	F12	215	Katakana Hiragana
70	_	143	Num Lock	216	Yen
71	[	144	Numpad 0	217	Ro
72	]	145	Numpad 1	218	Kana
73	\	146	Numpad 1	219	Assist

SSH Commands

Overview

The panel has a SSH server that listens for connections on port 22. The SSH server can be enabled and disabled in the Settings menu. To connect, the SSH client must provide a user and password. The user is “amx” and the password is the Configuration Password used in the Settings menu on the panel.

The SSH server provides a shell that allows for commands to be entered and also has an interactive menu for many commands.

SSH Commands	
help ?	Displays this help or help about a command **Syntax**: `*:help [command]` **Arguments**: `command` The command for which help is needed.

back	Displays this help or help about a command **Syntax**:
	`*:back [options]`
	Options:
	`--help`
	Display this help message

clear	Clears the console buffer. **Syntax**: `*:clear`

date	Gets/sets the current system date. An interactive menu is available when using the set proxy (i.e. “set date”).
	Syntax:
	`*:date [options] [date]` **Arguments**:
	`date`
	New date in format: YYYY-MM-DD **Options**:
	`--config, -c, --set`
	Set the system date.
	`--day, -d`
	Day of month (1-31, defaults to -1),
	`--help`
	Display this help message `--info, -?`
	Display the current date on screen.
	`--month, -m`
	Month (1-12, defaults to -1).
	`--verbose, -v`
	Display verbose date information.
	`--year, -y`
	Year (XXXX, defaults to -1).

debug	View/set debug level for ‘msg’ logging. An interactive menu is available when using the set proxy (i.e. “set debug”).
	Syntax:
	`*:debug [options] [action]` **Arguments**:
	action: enable or disable mode action to perform ‘enable’, ‘on’: enable debug mode.
	‘disable’,’off’: disable debug mode.
	Options:
	`--config, -c, --set`
	Set the debug level.
	`--disable, -d, --off, -F` Disable debug mode. `--enable, -e, --on, -N` Enable debug mode.
	`--help`
	Display this help message `--info, -?`
	Display the current debug level.

echo	Echoes or prints arguments to STDOUT. **Syntax**:

SSH Commands	

	`*:echo [options] [arguments]`
	Arguments: `arguments`
	Arguments to display separated by whitespaces. **Options**:
	`--help`
	Display this help message
	`--newline, -n`
	Do not print the trailing newline character.

logout exit quit	Terminate the command shell session. **Syntax**: `*:logout`

g5:cache	Cache command - dump or purge cache contents.
	Syntax:
	`G5:cache [options]`
	Options:
	`--help`
	Display this help message
	`-purge`
	Purge.
	`--verbose, -v, -vb`
	Verbose.

g5:config	Display configuration information for NetLinx and IP. **Syntax**: `g5:config [options]` **Options**: `--help` Display this help message --info, -i Return configuration info.

g5:profile g5:prof	Dumps profile configuration (all profiles if none specified) **Syntax**:
	`G5:profile [options]`
	Options:
	`--help`
	Display this help message
	`-name`
	Profile name to dump `-verbose, -v, -vb`
	verbosity (currently 1 or 2)

g5:sensor	Sensor commands.
	Syntax:
	`G5:sensor [options] sensor`
	Arguments: `sensor`
	Target sensor <motion|light> **Options**:
	`--help`
	Display this help message.
	`-calibrate, -c`
	Calibrate light sensor.
	`-enable, -e`
	Enable.
	`-thresh, -t`
	Threshold.

g5:settings	Display the panel settings.
	Syntax:
	`G5:settings [options] [category]`
	Arguments: `category`
	Settings category to display (all, status, sound, controller, config, sensors, ethernet) **Options**:
	`--help`
	Display this help message `--info, -?`
	Display the current settings.

g5:setup	Launch the panel settings utility.
	Syntax:
	`G5:setup [options]`
	Options:
	`--help`
	Display this help message

SSH Commands	

g5:touch	Touch panel overlay self test and diagnostics.
	Syntax:
	`G5:touch [options] [watchEnable]` **Arguments**:
	`watchEnable`
	Optional 'on'/'off' to enable/disable persistent diagnostics watching **Options**:
	`--help`
	Display this help message
	`--watchTime, -w`
	Time interval for watching overlay diagnostics in seconds (default is 1).

g5:version g5:ver	Display the G5 version.
	Syntax:
	`G5:version [options]`
	Options:
	`--help`
	Display this help message

g5:webu	Start a firmware update from a web server **Syntax**:
	`G5:webu [options] url` **Arguments**:
	`url`
	URL to the firmware kit file, including the http://server/kit-filename.
	Options:
	`--help`
	Display this help message

g5:window-stats
g5:ws
	Get the application window statistics.
	Syntax:
	`G5:window-stats [options] [package]` **Arguments**: `package`
	A package to filter on. **Options**:
	`--help`
	Display this help message.

get	Get information about a specific target provided as an argument. Acts on any command that has the --info option. **Syntax**:
	`*:get arguments`
	Arguments:
	`arguments`
	Command arguments to pass through.

history	Prints command history. **Syntax**: `*:history`

ip	Gets/sets the IP settings of the device. An interactive menu is available when using the set proxy (i.e. "set ip").
	Syntax:
	`*:ip [options]`
	Options:
	`--config, -c, --set`
	Configure the ip info interactively.
	`--dns1, -d1`
	The IP address of the primary DNS server.
	`--dns2, -d2`
	The IP address of the secondary DNS server.
	`--domain, -dn`
	The domain name for the network.
	`--gateway, -gw`
	The IP address of the gateway.
	`--help`
	Display this help message.
	`--hostname, -hn`
	The hostname for the device. (Alpha-numeric values and no spaces. Dashes are OK.) `--info, -?`
	Display the current IP settings.
	`--ipaddress, -ip`
	The static IP address for the device
	`--mode, -m`
	Set the connection mode. (DHCP, Static)
	`--reset, -r`
	Reset IP settings to factory default.

SSH Commands	
	`--subnetmask, -sm` The subnet mask address for the device

key	Issue a keystroke to the system.
	Syntax:
	`*:key [options] [keystroke]`
	Arguments:
	`keystroke: The keystroke to issue. (Multiple keystrokes may be included.)`
	Options:
	`--help`
	Display this help message `--info, -?`
	List available keystroke names

man	Displays this help or help about a command.
	Syntax:
	`*:man [command]`
	Arguments:
	`command`
	The command to get help for.

msg	Enable/disable diagnostics message logging. An interactive menu is available when using the set proxy (i.e. "set msg").
	Syntax:
	`*:msg [options] [instruction] [filters]` **Arguments**: `instruction`
	Diagnostics message command instruction.
	'once': display the diagnostics messages one time and exit
	'on': enable diagnostics messages
	'off': disable diagnostics messages
	'filter': sets optional log filters (provided by filters argument)
	'add': add optional log filters (provided by filters argument)
	'remove': removed optional log filters (provided by filters argument)
	'clear': clear optional log filters
	'delete': delete current log
	`filters`
	Optional log message filters (separated by spaces).
	Options:
	`--add-filter, -af`
	Add a filter to the current diagnostics log filters.
	`--clear-filter, -cf`
	Remove all filters from diagnostics logging.
	`--clear-history, -ch, -d`
	Delete the diagnostics log history.
	`--config, -c, --set`
	Enable/disable diagnostics message output.
	`--filter, -f`
	Optional log message filter.
	`--help`
	Display this help message `--info, -?`
	Display current diagnostic message output status.
	`--off, -F, --disable, --stop`
	Disable diagnostics message output.
	`--on, -N, --enable, --start`
	Enable diagnostics message output.
	`--remove-filter, -rf`
	Remove one or more filters form the current diagnostics log filter.
	`--show-filter, -sf`
	Display all existing filters applied to diagnostics logging.
	`--verbose, -v`
	Display verbose diagnostics message status information.

netlinx	Gets/sets the NetLinx ICSP connection settings. An interactive menu is available when using the set proxy (i.e. "set netlinx"). **Syntax**: `*:netlinx [options]`

SSH Commands	

	Options:
	`--clear-credentials, -cc`
	Clear the username and password settings. `--config, -c, --set`
	Set NetLinx (ICSP) connection settings. `--device, -d`
	Set the device number. `--help`
	Display this help message.
	`--info, -?`
	Display the current NetLinx settings. `--mode, -m`
	Set the connection mode (AUTO, URL, LISTEN). `--password, -pw`
	Set the password for secure mode. `--reset, -r`
	Reset NetLinx settings to factory default.
	`--system, -s`
	Set the system number. `--url, -u`
	Set the URL of the controller controller.
	`--username, -un`
	Set the username for secure mode.

ping	Test TCP/IP network connectivity with another IP address.
	Syntax:
	`*:ping [options] address` **Arguments:**
	`address`
	IP Address or URL. **Options:**
	`--help`
	Display this help message.
	`--retry-count, -c`
	Retry Count (number of packets). `--timeout, -w`

reboot	Reboot the device.
	Syntax:
	`*:reboot [options]`
	Options:
	`--help`
	Display this help message.
	`--silent, -s, -Y`
	Do not prompt for confirmation; proceed with reboot.

scope	Switch to an alternate command namespace scope. An interactive menu is available when using the set proxy (i.e. “set scope”).
	Syntax:
	*:scope [options] [namespace]
	Arguments: `namespace`
	The targeted namespace scope to switch to.
	Options:
	`--config, -c`
	Prompt the user to configure a new scope. `--help`
	Display this help message `--info, -?`
	Display the current scope.
	`--reset, -r`
	Reset the current scope to the default scope.

set	Set the configuration for a specific command provided as an argument. Acts on any command that has the --config option.
	Syntax:
	`*:set command`
	Arguments:
	`command`
	Command to set values and command arguments.

support	Support utility command. Allows capturing of system runtime status. **Syntax:** `*:support [options] [instruction] [params]` **Arguments:**

SSH Commands	

	`instruction`
	Support command instruction.
	'bug-report': Print bug report. Includes dump-log, dump-system, and kernel-msg.
	'dump-log': Print current logs.
	'dump-system': Print system data for running services.
	'kernel-msg': Print kernel messages.
	`params`
	Optional instruction parameters. See details on exact commands in OS docs.
	Options:
	`--help`
	Display this help message

temp	Report the device temperature in Celsius.
	Syntax:
	`*:temp [options] [monitor]` **Arguments:** `monitor`
	Optional 'on'/'off' to enable/disable continuous temperature monitoring.
	Options:
	`--help`
	Display this help message `--info, -?`
	Display current system temperature.
	`--interval, -w, -i`
	Time interval for continuous temperature monitoring in seconds (default is 5).
	`--off, -F, --disable, --stop`
	Disable continuous temperature monitoring.
	`--on, -N, --enable, --start`
	Enable continuous temperature monitoring.

time	Gets/sets the current system time. An interactive menu is available when using the set proxy (i.e. "set time").
	Syntax:
	*:time [options] [time] [ampm] **Arguments:**
	`time`
	New time in format: 00:00:00 `ampm`
	AM or PM (not needed if using 24 hour format).
	Options:
	`--am, -am`
	AM (used when setting time)
	`--config, -c, --set`
	Set the system time.
	`--help`
	Display this help message
	`--hour, -h`
	Hour (0-24, defaults to -1) `--info, -?`
	Display the current time on screen.
	`--millisecond, -ms`
	Millisecond (0-999,defaults to -1).
	`--minute, -m`
	Minute (0-59, defaults to -1)
	`--pm, -pm`
	PM (used when setting time)
	`--second, -s`
	Second (0-59, defaults to -1)
	`--verbose, -v`
	Display verbose time information.

Appendix A: Upgrading Firmware via NetLinx Studio

Overview

The latest firmware (*.kit) file for each panel is available to download from www.amx.com. To download firmware files, go to the catalog page for your panel type, and click the link under "Firmware Files" on the right side of the catalog page. The ZIP file that is downloaded via this link contains the firmware (*.kit) file that can be loaded on the panel, as well as release notes and any relevant programming instructions.

NetLinx Studio 4

The latest version (4.x) of the NetLinx Studio software program is available to download from www.amx.com:

1. Go to **Products > Integration Software > Development Tools** and click on NetLinx Studio to open the **NetLinx Studio** catalog page.
2. Click the *NetLinx Studio 4* link download the installation file (FIG. 156):

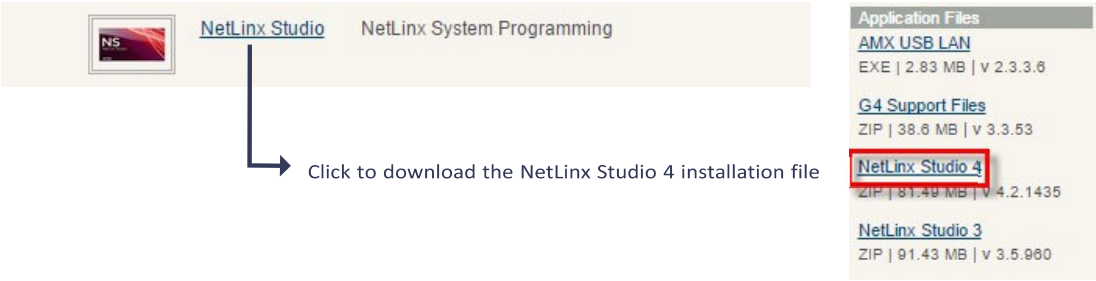


FIG. 156 NetLinx Studio v4 download links on www.amx.com

NOTE: *The following instructions assume that the G5 touch panel is connected and communicating with a NetLinx Controller, and that communication with the controller has been established in NetLinx Studio. Refer to NetLinx Studio online help and the NetLinx Studio 4 Instruction Manual for instructions on using NetLinx Studio.*

Upgrading Firmware via NetLinx Studio (v4 or Higher)

G5 touch panels use an Ethernet connection for programming, firmware updates, and touch panel file transfer via NetLinx Studio. If you have access to the panel's network, you may transfer files directly to the panel through NetLinx Studio.

NetLinx Studio features the ability to transfer G5 firmware files directly to a G5 touch panel via HTTP (via a stand-alone web server). This feature is provided to shorten the amount of time required for transferring a G5 *.kit file by removing the NetLinx Controller from the transfer path.

*.kit files for G5 panels contain a token to signify to NetLinx Studio that a web server file transfer can take place, as indicated in the file information window of the Send To NetLinx Device dialog:

Look for "`**** HTTP File Transfer Capable ****`" at the end of the file (see FIG. 159 on page 180).

When NetLinx Studio detects that the file is a G5 *.kit file, it will automatically attempt to send the file via HTTP (using the standalone web server that is started by NetLinx Studio).

1. In NetLinx Studio, open the *Online Tree* tab of the Workspace bar.
2. Under *System*, select a G5 panel for the firmware update (FIG. 157):

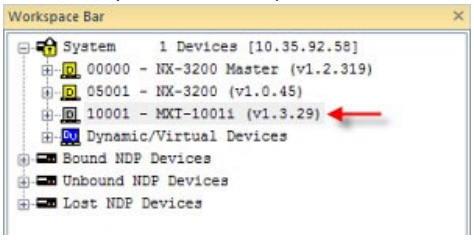


FIG. 157 NetLinx Studio Online Tree (MXT-1001 selected)

3. Right-Click on the G5 panel, and select **Firmware Transfer** from the context menu (FIG. 158):

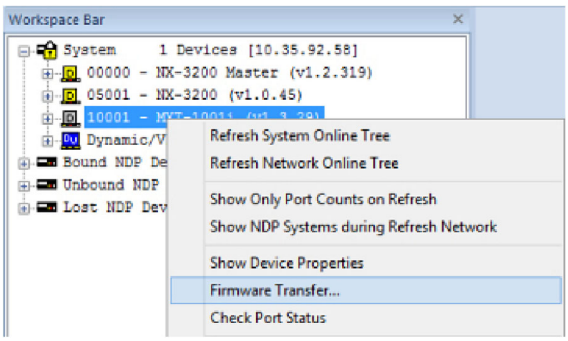


FIG. 158 NetLinx Studio Online context menu (Firmware Transfer selected) This

invokes the Send To *NetLinx Device* dialog.

4. Under Location. click the Browse (...) button to locate and select the directory containing the G5 firmware (*.kit) file that will be transferred, in the Browse For Folder dialog.
5. Click **OK** to close the Browse For Folder dialog and populate the Files window with a listing of *.kit files found in the selected folder.
6. In the Files window, click to select the G5 *.kit file to transfer (FIG. 159):

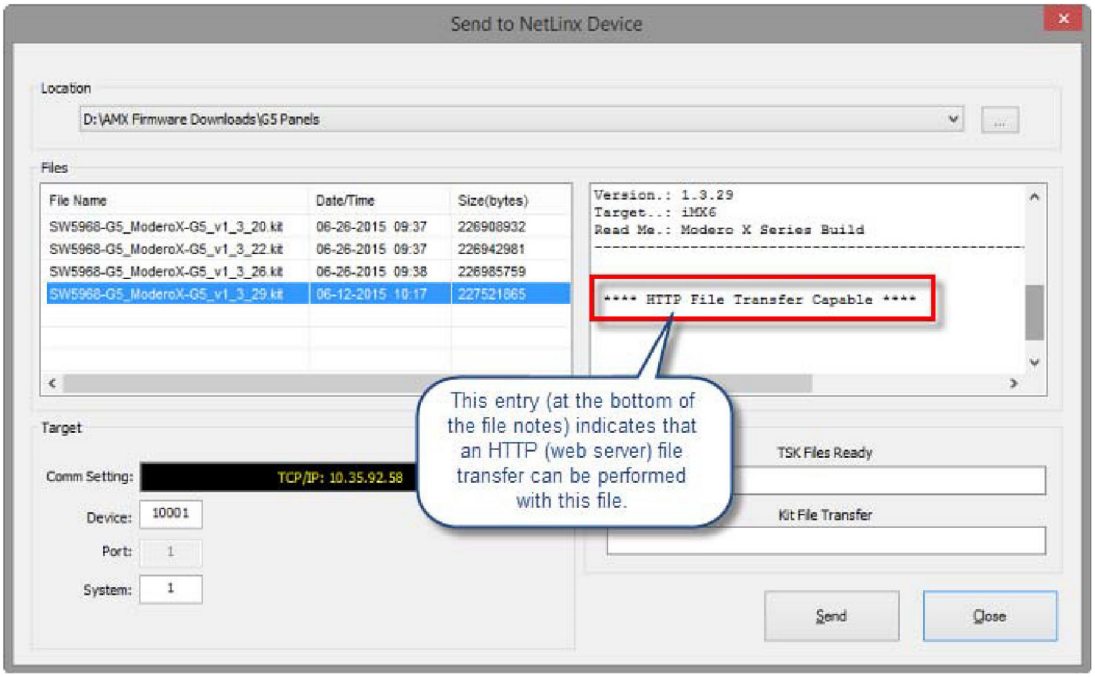


FIG. 159 NetLinx Studio - Send to NetLinx Device dialog This

invokes the Send To *NetLinx Device* dialog.

7. Click **Send** to initiate the firmware file transfer. The progress of the transfer is indicated in the progress bars (FIG. 160):

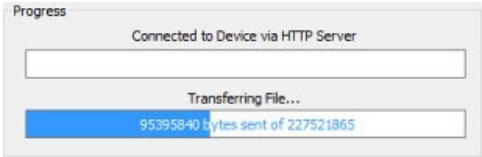


FIG. 160 NetLinx Studio - Send to NetLinx Device dialog (Progress bars indicating an active firmware file transfer)

8. The Panel will display the Message "*Updating System Files*", then restart itself.
9. The Installing *System Update* page will be displayed on the panel until the firmware upgrade process is complete. At this point, the panel will reboot and open it's home page.

HTTP Server Transfer Error

If an error occurs during this type of transfer, then the HTTP Server Transfer Error dialog is invoked (FIG. 161):

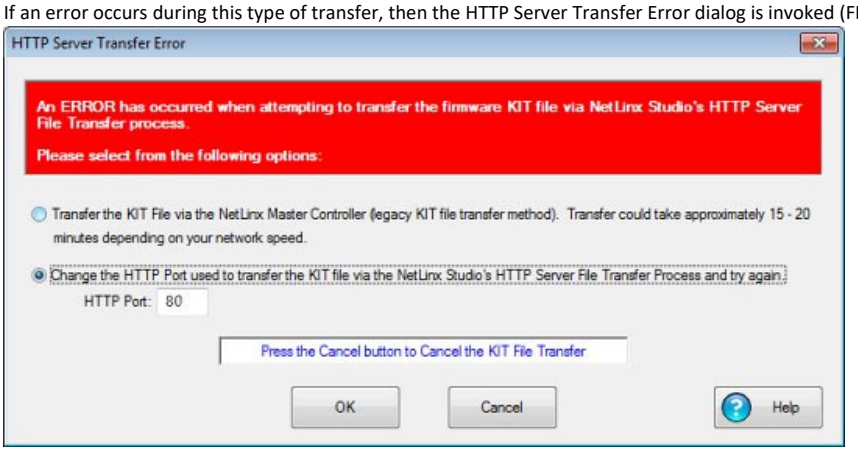


FIG. 161 NetLinx Studio v3.4 or higher - HTTP Server Error dialog

In this case, there are two options for proceeding with the firmware transfer:

- Select **Transfer the KIT File via the NetLinx Controller Controller (legacy KIT file transfer method)**... to proceed using the standard (non-HTTP) method used for other NetLinx Devices (via the controller controller) when OK is clicked. Note that depending on network speed and the size of the *.kit file, this method could take up to 20-30 minutes to complete. More specifically, timed tests indicate that it takes approximately 60 seconds per 9.5MB of a *.kit file to transfer.

  The following table indicates the approximate length of time to send a *.kit file via the legacy file transfer method:

File Size	Time Required to Complete Transfer (legacy file transfer method)
0-150MB	10 - 15 minutes
150-200MB	15 - 20 minutes
200-250MB	20 - 25 minutes
250-300MB	25 - 30 minutes
300-350MB	30 - 35 minutes
>350MB	> 35 minutes

- By default, **Change the HTTP Port used to transfer the KIT file**... is selected. Use this option to change the HTTP port assignment, in cases where the IP port (default = 80) is in conflict or blocked on the PC. This option will restart the web server with a different HTTP port assignment and restart the file transfer when **OK** is clicked.
- Select the appropriate option and click **OK** to restart the file transfer.
- Click **Cancel** to cancel the current file transfer.

Appendix B: Using NetLinx to Define a Data Source (Listview Buttons)

Example Listview Workflow - NetLinx Data Source

The following section describes an example workflow for implementing a Listview button that uses NetLinx code as the data source. The use case for this example is that of a contact list for a SIP phone system. In this case, the user finds and presses a contact on the screen to initiate the call.

The workflow in this example describes each step required to implement a data source for a Listview button via NetLinx Code:

1. Creating a Listview button on a G5 panel page and set button properties
2. Creating a data source in NetLinx code
3. Conf iguring and populating the Listview
4. Configuring a response to a user selection

1) Create the Listview Button and Set Button Properties

Create a Listview button in TPDesign5 and configure the display characteristics for the default and selected states.

Although not currently being rendered correctly in the screenshot below, this Listview has two lines of text and an image Varia on the left for each Listview entry.

1. In TPDesign5 (v1.0.2 or greater), use the Button Draw Tool to draw a new button.
2. In the General tab of the Properties window, select Listview as the Type (FIG. 162):

FIG. 162 TPDesign5 - Listview button

3. Use the TPD5 Properties window to set General, Programming, States and Events properties to configure the list items and the display characteristics for the Default and Selected states, as well as provide the Listview button with an Address code assignment. Note that Listview buttons use standard button properties, as well as several new properties that are specific to Listview buttons:
   a. In the General tab, set properties to specify basic display characteristics for the selected Listview button (FIG. 163).

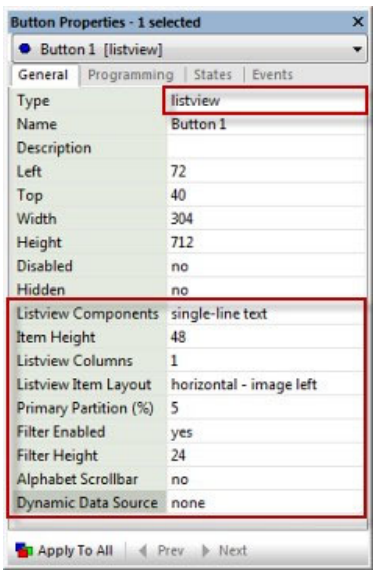
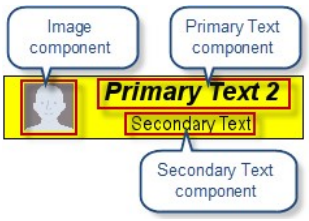
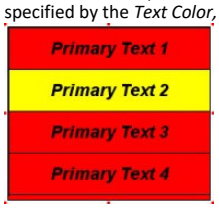
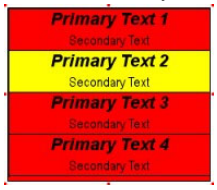
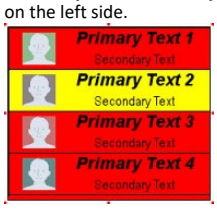
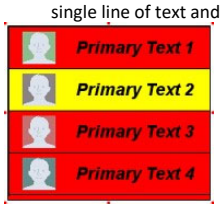


FIG. 163 TPDesign5 - General Properties for Listview buttons

General button properties that are specific to Listview buttons include:

Listview Buttons - General Properties

List View Components	This property controls which components (*Primary Text, Secondary Text and Image*) will be displayed on the selected Listview button. With a Listview button selected in the Design View, click the browse (...) button on the Listview Components (General) property to open the *Edit Listview Components* dialog. Use this dialog to specify which components (Primary Text, Secondary Text and Image) will be displayed on the selected Listview button.  If only **Primary Text** is selected in the *Edit Listview Components* dialog (the default setting for new Listview buttons), each list item is represented with a single line of text using center-middle justification and the font face and size specified by the *Text Color, Font* and *Font Size* (State) properties (as well as *Text Effect* and *Text Effect Color* if desired).  • The *List View Components* (General) Property will indicate **single-line text**. If **Primary Text** and **Secondary Text** are selected, each list item is represented with a two lines of text.  • The two lines of text are stacked vertically, with each line centered horizontally. • The font face and size are specified by the Secondary Font and Secondary Font Size (State) properties. • The text is rendered within a two-pixel margin of the button boundary. • Note that the *Secondary Text* option is only enabled if *Primary Text* is selected. • Secondary Text uses the same Text Color settings as the Primary Text. • The *List View Components* (General) Property will indicate **two-line text**.

Listview Buttons - General Properties	
List View Components (Cont.)	If **Primary Text, Secondary Text** and **Image** are selected, each list item is represented with two lines of text and an image on the left side.  • The image is left-justified within a six-pixel margin of the top, bottom, and left item boundaries, and is scaled-to-fit within a square region. • The two lines of text are stacked vertically and centered horizontally in the remaining item region. The top line (Primary Text) is rendered using the font face and size specified by the Font and Font Size (State) properties. The bottom line (Secondary Text) is rendered using the font face and size specified by the *Secondary Font* and *Secondary Font Size* (State) properties. The text is rendered within a two-pixel margin of the button boundary. • The *List View Components* (General) Property will indicate **two-line text w/ Image**. If only **Image** is selected in the *Edit Listview Components* dialog, each list item is represented with a single image centered horizontally within the item region, within a six-pixel margin of the item region. • The *List View Components* (General) Property will indicate **image only**. • If **Primary Text** and **Image** are selected in the *Edit Listview Components* dialog, each list item is represented with a single line of text and an image on the left side.  • The image is left-justified within a six-pixel margin of the top, bottom, and left item boundaries, and is scaled-to-fit within a square region. • The text is center-middle justified in the remaining portion of the item region within a two-pixel margin, using the font and font size specified by the *Font* and *Font Size* (States) properties. • The *List View Components* (General) Property will indicate **single-line text w/ Image**.
Item Height	This property controls the height for the list view items (in pixels).
List View Columns	This property controls the number of columns to display. By default, this value is set to 1. This property provides the ability to present a "grid view" on the Listview button, if desired.
List View Item Layout	This property controls the layout of the components (*Primary Text*, *Secondary Text* and *Image*) specified to display on the list view items in the selected Listview button. Listview components are selected via the *List View Components* (General) property. Click in this field to select from a drop-down of layout options for list items (horizontal - image left, horizontal - image right and vertical - image top).
Primary Partition (%)	This property sets the position of the separation between the Image and the Primary/Secondary Text components.
Secondary Partition (%)	If the *List View Item Layout* property is set to is set to horizontal - image left (the default setting), the Secondary Partition (%) sets the position of the separation between the Primary Text and the Image as a percentage of cell height (allowed range = 5%-95%). • If the List View Item Layout property is set to is set to horizontal - image right, the Secondary Partition (%)sets the position of the separation between the Primary Text and the Image as a percentage of cell height (allowed range = 5%-95%): • If the List View Item Layout property is set to vertical- image top, the Secondary Partition represents thearea used by the Image. In this case, Secondary Partition (%) sets the position of the separation between the Image and the Primary Text as a percentage of cell height (allowed range = 5%-95%).
Filter Enabled	Use this property to enable/disable the filter (Search) feature on the selected Listview button. By default, this property is set to no (disabled).

Listview Buttons - General Properties	
	To enable this feature, select yes from the drop-down menu. If enabled, a search window will be rendered at the top of the Listview button, with a height specified by the Filter Height property. The remaining area of the Listview button will be available for the display of list items:
Filter Height	• • Use this property to specify the height of the filter entry box for a Listview button (in pixels).Note that this property is available only if Filter Enabled is set to Yes.The minimum allowed value (and the default setting) is 24 pixels.
Alphabet Scrollbar	This property enables/disables the alphabet scrollbar feature for Listview buttons.
Dynamic Data Source	This property specifies the data source (CSV or XML) to use as the source for content that will be displayed on the selected Listview button.

b. In the Programming tab, assign a unique Address Port and Address Code to the selected Listview button:

Listview Buttons - Programming Properties	
Address Code	Select or enter the address code sent to the controller on the specified Address Port. The options available to the Address Code property depend on the Address Port selection: • If 1 is selected as the Address Port, then the options for Address Code are None and Auto-Assign. Select None to leave the Address Code unspecified. Select Auto-Assign to automatically assign the next available Address Code to the selected TPD5 element. • If 0-Setup Port is selected as the Address Port, then the options for Address Code are Advanced Codes or Basic Codes. By default, the Basic Address Codes are displayed: Click on Date Display to select from a list of date display formats. Click on Time Display to select from a list of time display formats. Click Advanced Codes to view the Advanced Channel Code options: Click on None to leave the Address Code unspecified. Click on Panel Setup to select Connection Status. This option will display the panel's current connection status on the selected element.
Address Port	Select or enter the port to which the selected element's Address Code will be associated. The options are "1" (the default setting) and "0-setup port": • If 1 is selected as the Address Port, then the options for the Address Code property are None and Auto-Assign. • If 0-Setup Port is selected as the Address Port, then the options for Address Code are Advanced Codes or Basic Codes. By default, the Basic Address Codes are displayed.
Note that Listview buttons do not use Channel Port and Channel Code assignments. The combination of Address Port and Address Code must be unique. See Address Codes (Basic and Advanced) in the TPD5 online help for details.	

c. In the States tab, set (font) properties to specify font display characteristics for the Default and Selected states for the selected Listview button. States properties that are specific to Listview buttons include:

- Secondary Font
- Secondary Font Size

d. In the Events tab, set event properties for the selected Listview button. Listview button support three Events properties that are specific to Listview buttons. However, these Events support the same actions as existing events:

- Item Selected
- Scrollbar Begin
- Scrollbar End

NOTE: Refer to the TPDesign5 online help for descriptions of all button properties.

2) Create the Data Source

Follow the example NetLinx code (below) to create a data source in NetLinx and publish the data source to the NetLinx Controller's internal web server.

The "*Data_PublishFeed*()" function (see *NetLinx.axi*) will return a URL for the published data.

NetLinx Usage Example - ASCII

```
PROGRAM_NAME='Listview Example'

DEFINE_DEVICE
dvTP = 10001:1:0

DEFINE_CONSTANT
```

```
// Listview button address
INTEGER btnListview = 11

DEFINE_VARIABLE
CHAR publishedURL[DATA_MAX_VALUE_LENGTH] CHAR recordsetID[DATA_MAX_ID_LENGTH]

DEFINE_FUNCTION CreateDataFeed()
{
    STACK_VAR DATA_FEED datafeed
    STACK_VAR DATA_RECORD record

// ---------------------------------------------------
// CREATE A NEW DATA FEED
// ---------------------------------------------------
- datafeed.name = 'phonelist'  datafeed.description
= 'Employees'
 datafeed.source = 'netlinx Listview Example code'
DATA_CREATE_FEED(datafeed)

 // A recordset id is required for adding records to the feed recordsetID = 'phonelist'

// ---------------------------------------------------
// DEFINE AND POPULATE THE DATA FIELDS
// This example will have 10 names in a phone list
// ---------------------------------------------------
 // Records can have metadata fields and content fields. In this
 // example we won't use any metadata
 SET_LENGTH_ARRAY(record.metadata, 0)

 // We will have 3 content fields per record: photo, name and phone number
SET_LENGTH_ARRAY(record.content, 3)

 // Initialize the field attributes that will be the same for every record
 // the first field in a record will be the image
 record.content[1].id = 'photo';
record.content[1].type = DATA_TYPE_IMAGE;
record.content[1].format = DATA_FORMAT_URL;

 // The label can be something different from the id but in our case we'll
    // keep them the same
record.content[1].label = 'photo';

 // The second field in a record will be the name
record.content[2].id = 'name';  record.content[2].type
= DATA_TYPE_STRING;  record.content[2].format = '';
record.content[2].label = 'name';

 // The third field will be the phone number
record.content[3].id = 'number';  record.content[3].type
= DATA_TYPE_STRING;  record.content[3].format =
DATA_FORMAT_PHONE;  record.content[3].label = 'number';

 // The next step is to put in the actual values for the 3 fields
 // Do this for the first record
 record.content[1].value = 'http://192.168.222.333/ftp/listview/hunter.jpg'
record.content[2].value = 'Hunter Pence'  record.content[3].value = '888-
555-1111'

 // Add the record to the feed
 DATA_ADD_RECORD(datafeed.name, recordsetID, record)
// The same record can be reused for the rest of the list // Just
change the relevant values and add the record to the feed
record.content[1].value =
'http://192.168.222.333/ftp/listview/pablo.jpg'
record.content[2].value = 'Pablo Sandoval' record.content[3].value =
'888-555-2222' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/buster.jpg'
record.content[2].value = 'Buster Posey' record.content[3].value =
'888-555-3333' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/angel.jpg'
record.content[2].value = 'Angel Pagan' record.content[3].value =
'888-555-4444' DATA_ADD_RECORD(datafeed.name, recordsetID, record)
```

```
record.content[1].value =
'http://192.168.222.333/ftp/listview/jeremy.jpg'
record.content[2].value = 'Jeremy Affeldt' record.content[3].value =
'888-555-5555' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/madison.jpg'
record.content[2].value = 'Madison Bumgarner' record.content[3].value =
'888-555-6666' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/timh.jpg'
record.content[2].value = 'Tim Hudson' record.content[3].value =
'4888-555-7777' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/timl.jpg'
record.content[2].value = 'Tim Lincecum' record.content[3].value =
'888-555-8888' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/javier.jpg'
record.content[2].value = 'Javier Lopez' record.content[3].value =
'888-555-9999' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/jake.jpg'
record.content[2].value = 'Jake Peavy' record.content[3].value =
'888-555-1010' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/sergio.jpg'
record.content[2].value = 'Sergio Romo' record.content[3].value = '888-
555-1020' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/ryan.jpg'
record.content[2].value = 'Ryan Vogelsong' record.content[3].value =
'888-555-1030' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/brandon.jpg'
record.content[2].value = 'Brandon Belt' record.content[3].value = '888-
555-1040' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/andrew.jpg'
record.content[2].value = 'Andrew Susac' record.content[3].value =
'888-555-1050' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/gregor.jpg'
record.content[2].value = 'Gregor Blanco' record.content[3].value =
'888-555-1060' DATA_ADD_RECORD(datafeed.name, recordsetID, record)

record.content[1].value =
'http://192.168.222.333/ftp/listview/michael.jpg'
record.content[2].value = 'Michael Morse' record.content[3].value =
'888-555-1070' DATA_ADD_RECORD(datafeed.name, recordsetID, record)
 // The final step is to publish the feed
 publishedURL = DATA_PUBLISH_FEED(datafeed.name)
 }

DEFINE_START
     CreateDataFeed()

DEFINE_EVENT
DATA_EVENT[dvTP]
{

 ONLINE:
 {
 // Set the URL for the data source for the listviewer in the panel
 SEND_COMMAND dvTP,"'^LVD-',ITOA(btnListview),',',publishedURL"
 // Map the fields in the listviewer to the columns
 SEND_COMMAND dvTP,"'^LVM-',ITOA(btnListview),',i1=${photo}|t1=${name}|t2=${number}'"
 // Sort by name
```

```
 SEND_COMMAND dvTP,"'^LVS-',ITOA(btnListview),',${name};a'"
 // Command the listview to load the data from the controller
 SEND_COMMAND dvTP,"'^LVR-',ITOA(btnListview)"
 }
}

// The custom event that is raised whenever a listview item is selected on the panel
CUSTOM_
EVENT[dvTP,btnListview,LISTVIEW_ON_ROW_SELECT_EVENT
] {

 SLONG payloadId
 SLONG payloadType
 CHAR fields[2][16]
 CHAR name[DATA_MAX_VALUE_LENGTH] CHAR number[DATA_MAX_VALUE_LENGTH]
 DATA_RECORD record
    // Get the data access ID from the custom event
payloadId = custom.value1
    // Get the data type from the custom event
payloadType = custom.value2

 if (payloadId > 0 && payloadType == DATA_STRUCTURE_DATARECORD)
 {
 // Specify which fields we want to retrieve from the
payload  fields[1] = 'name'  fields[2] = 'number'
 // Populate a record with the requested fields from the event
if (DATA_GET_EVENT_RECORD(dvTP, payloadId, fields, record) > 0)
 {

          // All is well so far so retrieve the values that we are
          // interested in from the selection that the user made on // the panel.
   name = record.content[1].value
   number = record.content[2].value
          // Put the name and number that was selected on a popup and
           // show the popup
           SEND_COMMAND dvTP,"'^TXT-50,0,',name"
           SEND_COMMAND dvTP,"'^TXT-51,0,',number"
           SEND_COMMAND dvTP,"'^PPN-Calling'"
 }
 }
}
(***********************************************************)
(*            THE ACTUAL PROGRAM GOES BELOW                *)
(***********************************************************)
DEFINE_PROGRAM
(***********************************************************)
(*                    END OF PROGRAM                       *)
(*         DO NOT PUT ANY CODE BELOW THIS COMMENT         *)
(***********************************************************)
```

3) Configure the Response to a User Selection

Follow the CUSTOM_EVENT example at the end of the *NetLinx Usage Example - ASCII* (above) to retrieve the phone number that was selected by the user.

Appendix C: Text Formatting

Text Formatting Codes for Bargraphs

Text formatting codes for bargraphs provide a mechanism to allow a portion of a bargraphs text to be dynamically provided information about the current status of the level (multistate and traditional). These codes are entered into the text field along with any other text.

The following is a code list used for bargraphs:

Bargraph Text Code Inputs		
Code	**Bargraph**	**Multi-State Bargraph**
$P	Display the current percentage of the bargraph (derived from the Adjusted Level Value as it falls between the Range Values)	Display the current percentage of the bargraph (derived from the Adjusted Level Value as it falls between the Range Values)
$V	Raw Level Value	Raw Level Value
$L	Range Low Value	Range Low Value
$H	Range High Value	Range High Value
$S	N/A	Current State
$A	Adjusted Level Value (Range Low Value subtracted from the Raw Level Value)	Adjusted Level Value (Range Low Value subtracted from the Raw Level Value)
$R	Low Range subtracted from the High Range	Low Range subtracted from the High Range
$$	Dollar sign	Dollar sign

By changing the text on a button (via a VT command), you can modify the codes on a button. When one of the Text Formatting Codes is encountered by the firmware, it is replaced with the correct value. These values are derived from the following operations:

Formatting Code Operations	
Code	**Operation**
$P	(Current Value - Range Low Value / Range High Value - Range Low Value) x 100
$V	Current Level Value
$L	Range Low Value
$H	Range High Value
$S	Current State (if regular bargraph then resolves to nothing)
$A	Current Value - Range Low Value
$R	Range High Value - Range Low Value
$$	Dollar sign

Given a current raw level value of 532, a range low value of 500, and a high range value of 600, the following text formatting codes would yield the following strings as shown in the table below:

Example	
Format	**Display**
$P%	32%
$A out of $R	32 out of 100
$A of 0 - $R	32 of 0 - 100
$V of $L - $H	532 of 500 - 600

Text Area Input Masking

Text Area Input Masking may be used to limit the allowed/correct characters that are entered into a text area. For example, in working with a zip code, a user could limit the entry to a max length of only 5 characters; with input masking, this limit could be changed to 5 mandatory numerical digits and 4 optional numerical digits. A possible use for this feature is to enter information into form fields. The purpose of this feature is to:

- Force the use of correct type of characters (i.e. numbers vs. characters)

- Limit the number of characters in a text area
- Suggest proper format with f ixed characters
- Right to Left
- Required or Optional
- Change/Force a Case
- Create multiple logical f ields
- Specify range of characters/number for each field With this feature, it is not necessary to:
- Limit the user to a choice of selections
- Handle complex input tasks such as names, days of the week, or month by name
- Perform complex validation such as Subnet Mask validation

Input mask character types

These character types define what information is allowed to be entered in any specific instance. The following table lists what characters in an input mask will define what characters are allowed in any given position.

Character Types	
Character	**Masking Rule**
0	Digit (0 to 9, entry required, plus [+] and minus [-] signs not allowed)
9	Digit or space (entry not required, plus and minus signs not allowed)
#	Digit or space (entry not required; plus and minus signs allowed)
L	Letter (A to Z, entry required)
?	Letter (A to Z, entry optional)
A	Letter or digit (entry required)
a	Letter or digit (entry optional)
&	Any character or a space (entry required)
C	Any character or a space (entry optional)

NOTE: *The number of the above characters used determines the length of the input masking box. Example: 0000 requires an entry, requires digits to be used, and allows only 4 characters to be entered/used.*

Refer to the following SEND_COMMANDs for more detailed information:

- ^BIM- Sets the input mask for the specified addresses - see page 112.
- ^BMF subcommand %MK - sets the input mask of a text area - see page 114.

Input Mask Ranges

These ranges allow a user to specify the minimum and maximum numeric value for a field. *Only one range is allowed per field. Using a range implies a numeric entry ONLY.*

Input Mask Ranges	
Character	**Meaning**
[	Start range
]	End range
|	Range Separator

An example from the above table:

[0|255] This allows a user to enter a value from 0 to 255.

Input Mask Operations

Input Mask Operators change the behavior of the field in the following way:

Input Mask Operators	
Character	**Meaning**

<	Forces all characters to be converted to lowercase
>	Forces all characters to be converted to uppercase

Input Mask Literals

To define a literal character, enter any character, other than those shown in the above table *(including spaces, and symbols)*. A back-slash ('\') causes the character that follows it to be displayed as the literal character. For example, **\A** is displayed just as the letter **A**. To define one of the following characters as a literal character, precede that character with a back-slash. Text entry operation using Input Masks.

A keyboard entry using normal text entry is straightforward. However, once an input mask is applied, the behavior of the keyboard needs to change to accommodate the input mask's requirement. When working with masks, any literal characters in the mask will be "skipped" by any cursor movement, including cursor, backspace, and delete keys.

When operating with a mask, the mask should be displayed with placeholders. The "-" character should display where you should enter a character. The arrow keys will move between the "-" characters and allow you to replace them. The text entry code operates as if it is in the overwrite mode. If the cursor is positioned on a character already entered and you type in a new (and valid) character, the new character replaces the old character. There is no shifting of characters.

When working with ranges specified by the [] mask, the keyboard allows you to enter a number between the values listed in the ranges. If a user enters a value that is larger than the maximum, the maximum number of right-most characters is used to create a new, acceptable value.

- **Example 1**: If you type "125" into a field accepting 0-100, then the values displayed will be "1", "12", "25".
- **Example 2**: If the max for the field was 20, then the values displayed will be "1", "12", "5".

When data overflows from a numerical field, the overflow value is added to the previous field on the chain if the overflow character was specified. In the above example, if the overflow flag was set, the first example will place the "1" into the previous logical field and the second example will place "12" in the previous logical field. If the overflow field already contains a value, the new value will be inserted to the right of the current characters and the overflow field will be evaluated. Overflow continues to work until a field with no overflow value is set or no more fields remain (i.e. reached first field).

If a character is typed and that character appears in the Next Field list, the keyboard should move the focus to the next field. For example, when entering time, a ":" is used as a next field character. If you enter "1:2", the 1 is entered in the current field (hours) and then the focus is moved to the next field and 2 is entered in that field.

When entering time in a 12-hour format, entry of AM and PM is required. Instead of adding AM/PM to the input mask specification, the AM/PM should be handled within the NetLinx code. This allows a programmer to show/hide and provide discrete feedback for AM and PM.

Input Mask Output Examples

The following are some common input masking examples

Output Examples		
Common Name	**Input Mask**	**Input**
IP Address Quad	[0|255]{.}	Any value from 0 to 255
Hour	[1|12]{:}	Any value from 1 to 12
Minute/Second	[0|59]{:}	Any value from 0 to 59
Frames	[0|29]{:}	Any value from 0 to 29
Phone Numbers	(999) 000-0000	(555) 555-5555
Zip Code	00000-9999	75082-4567

URL Resources

A URL can be broken into several parts. For example, with the URL *http://www.amx.com/company-info-home.asp*, this URL indicates that the protocol in use is **http** (HyperText Transport Protocol) and that the information resides on a host machine named **www.amx.com**. The image on that host machine is given an assignment (by the program) name of **company-info-home.asp** *(Active Server Page).*

The exact meaning of this name on the host machine is both protocol dependent and host dependent. The information normally resides in a file, but it could be generated dynamically. This component of the URL is called the file component, even though the information is not necessarily in a file.

A URL can optionally specify a port, which is the port number to which the TCP/IP connection is made on the remote host machine. If the port is not specified, the default port for the protocol is used instead. For example, the default port for http is 80. An alternative port could be specified as: *http://www.amx.com:8080/company-info-home.asp*. **NOTE**: *Any legal HTTP syntax can be used.*

Special Escape Sequences

The system has only a limited knowledge of URL formats, as it transparently passes the URL information onto the server for translation. A user can then pass any parameters to the server side programs such as CGI scripts or active server pages. However; the system will parse the URL looking for special escape codes. When it finds an escape code, it replaces that code with a particular piece of panel, button, or state information.

For example, "http://www.amx.com/img.asp?device=$DV" would become *http://www.amx.com/img.asp?device=10001*. Other used escape sequences include:

Escape Sequences	
Sequence	**Panel Information**
$DV	Device Number
$SY	System Number
$IP	IP Address
$HN	Host Name
$MC	Mac Address
$PX	X Resolution of current panel mode/file
$PY	Y Resolution of current panel mode/file
$BX	X Resolution of current button
$BY	Y Resolution of current button
$BN	Name of button
$ST	Current state
$AC	Address Code
$AP	Address Port
$CC	Channel Code
$CP	Channel Port
$LC	Level Code
$LP	Level Port

Appendix D: Bargraph Functions

Overview

For drag operations on Bargraph and Multi-State Bargraph buttons, each movement increments based on the drag increment field. For centering, the bargraph/multistate bargraph will return to the middle - either the 50% mark for bargraphs, or the median state number, once the touch point is released.

Setup Codes

Bargraph Functions - Setup Codes		
Code	**Code**	**Description**
Channel	2	Panel Setup:Brightness Up
Channel	3	Panel Setup: Brightness Down
Channel	6	Panel Setup: Controller Volume Up
Channel	7	Panel Setup: Controller Volume Down
Channel	8	Panel Setup: Controller Volume Mute
Channel	158	Panel Setup: Mic Volume Mute
Channel	171	Panel Setup: Call Volume Up
Channel	172	Panel Setup: Call Volume Down
Channel	1403	Panel Setup: Notification Alarm Volume Mute
Channel	1404	Panel Setup: Notification Volume Up
Channel	1405	Panel Setup: Notification Volume Down
Channel	1407	Panel Setup: Alarm Volume Up
Channel	1408	Panel Setup: Alarm Volume Down
Address	33	Panel Setup: Brightness
Address	35	Panel Setup: Controller Volume
Address	144	Time Display: AM|PM
Address	46	Panel Setup: Call Volume
Address	450	Panel Setup: Notification Volume
Address	451	Panel Setup: Alarm Volume
Level	1	Panel Setup: Brightness
Level	3	Panel Setup: Controller Volume
Level	9	Panel Setup: Call Volume
Level	450	Panel Setup: Notification Volume
Level	451	Panel Setup: Alarm Volume

Appendix E: Video Streaming

Optimizing Motion JPEG Video Presentation and Speed

In some cases, multiple Motion JPEG streams may slow presentation of individual screen popups, or prevent all of the streams from showing at the same time. This may happen even though the Panel Preview in TPDesign 5 may show no issues. To minimize this and assure a smooth and non-sluggish stream, try these options:

- Limit the number of simultaneous Motion JPEG streams to eight or fewer streams at a time.
- Remove any unnecessary buttons associated with the Motion JPEG streams.
- Make sure that the Refresh rate on a Motion JPEG is set to 0.
- Make sure to hide the preview popup before displaying the full image.
- If possible, uncheck the "Scale to Fit" option, as scaling is very resource-intensive.
- Dial down the frame rate of the server. The frame rate of a Motion JPEG is determined by the server.
- When you go from a page with multiple previews to a page with a single full screen video, it is best to do a page flip rather than popup attach, or hide the preview windows first. Otherwise, the preview windows will continue to decode (taxing the system), even though they may be completely or partially obstructed by the popup.
- Verify that the full-screen image is set for acceleration by checking the "Dynamo" box in Resource Manager."

Motion JPEG Support for VARIA Panels	
Baseline mode:	ISO 10918-1
Encoding:	ISO-10918-5 (JFIF)
Maximum Resolution:	720p
Recommended resolution:	720x480-NTSC or 720x576-PAL (or less). If the video is defined in the Resource Manager as opposed to video fill, consideration must be made for the video being decoded by the panel, which cannot decode 720p.
Maximum Frame Rate:	Up to 30fps
Latency:	From 1-3 seconds, depending on multiple factors including button size, resolution and network performance.

Streaming a Video File Saved on the Panel via Custom URL Scheme

To use a custom URL scheme and File Transfer (in NetLinx Studio) to play a video stored in the G5 touch panel's internal storage:

1. In NetLinx Studio **4**, select **Tools -> File Transfer** to open the *File Transfer* dialog - *Send* tab (FIG. 164):

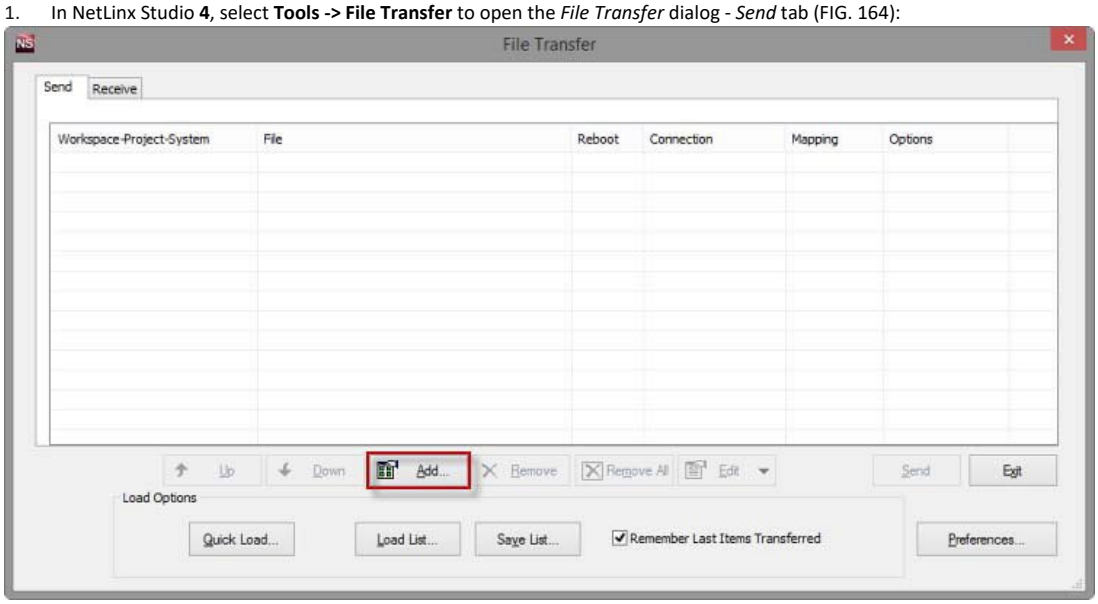


Fig. 164 NetLinx Studio 4 - File Transfer dialog

2. Click **Add** to open the Select *Files for File Transfer* dialog, open the *Individual Files* tab and select **Send Non-System File** (FIG. 165):

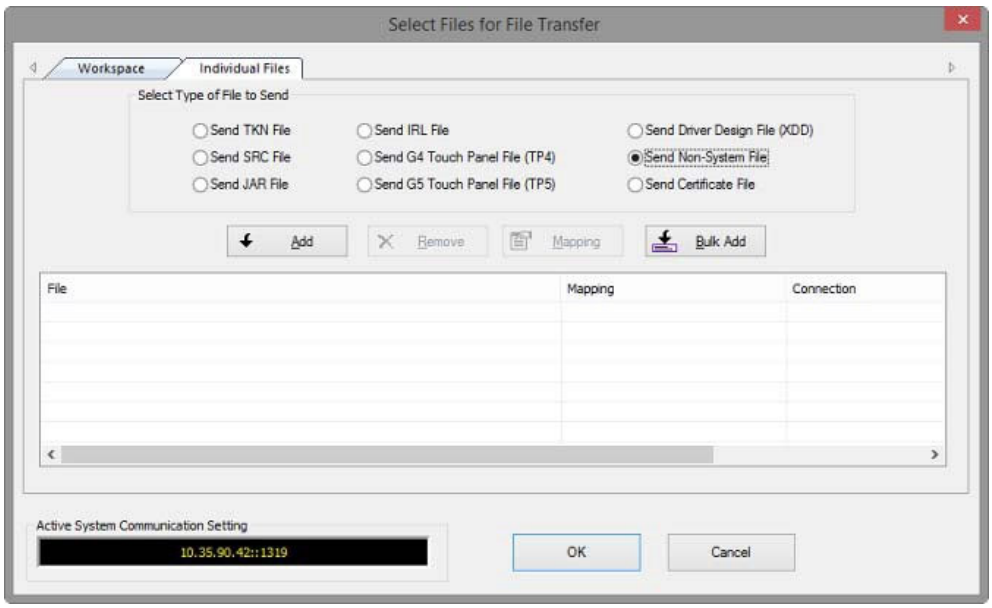


Fig. 165 NetLinx Studio 4 - Select Files for File Transfer dialog (Individual Files tab)

3. Click **Add** to select the video file you want to use: Select the video file in the *Open* dialog and click **OK** to invoke the *Enter Device Mapping Information* dialog (FIG. 166):

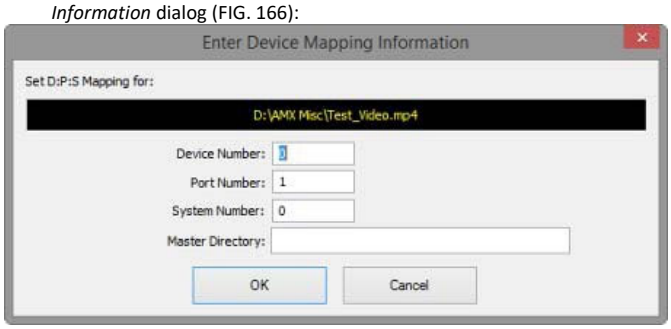


Fig. 166 NetLinx Studio 4 - Enter Device Mapping Information dialog

4. Enter device mapping information (D:P:S) for the target G5 panel Leave the *Controller Directory* field blank.
5. Click **OK** to save changes and close the *Enter Device Mapping Information* dialog.
6. Click **OK** to close the *Select File For File Transfer* dialog.
7. Click **Send** in the *File Transfer* dialog to transfer the file (this may take time for large video files).
8. In TPDesign5, select the page/button state you want to play the video file.
9. In the desired state tab, set the *Video Fill* property to **streaming video** (FIG. 167). Note that this selection enables the *Streaming Source* property.

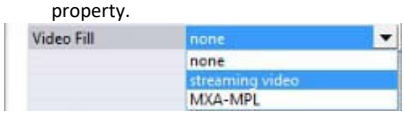


Fig. 167 TPDesign5 - Video Fill (State) property

10. For the Streaming Source property, enter the filename of the video file with **amxdir:///** as the prefix. For example, if the video filename is "test-video.mp4" then enter the Streaming Source as "*amxdir:///test-video.mp4*" (FIG. 168):

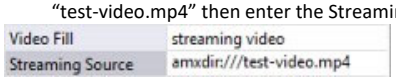


Fig. 168 TPDesign5 - Streaming Source (State) property

NOTE: *There are three slashes after amxdir:, not two as in a standard URL. If there aren't three slashes the video file won't be found.*

11. Load the TP5 file on the panel and the desired state should continually play the video.
    If you desire to change the video using the ^SDM command to another that you have transfered, use the same URL scheme as the prefix (**amxdir:///**).
    Any file that is transfered to the amxdir:/// directory is not cleared by a panel file transfer or "Remove User Pages". The only way to transfer is to do a Factory Data Reset, or to upload an empty file with the same filename.

To get around this, you can specify a file to be **amxdir:///AMXPanel/images/filename** instead.

To do this using NetLinx Studio File Transfer, set the "Controller Directory" to \AMXPanel\images\ in the device mapping. This will put the file in the panel file images directory. A TP5 file transfer will not remove the file, but a "Remove User Pages" will. The Streaming Source value in the TP5 file would have to correspond to the same path.

NOTE: *See page 132 for details on the ^SDM Button State Streaming Digital Media command*.

Transcoding Guidelines

For certain H.264 video and audio streaming , you may observe a drift between audio and video the longer the content is streamed. This drift can be more pronounced when streaming from a non- MXA-MPL source such as a Vision 2 steaming server. If the panel detects excessive drift, it will attempt to restart the stream decode. During the restart, the audio will be temporarily interrupted and the video will be frozen on the last frame until the restart is complete (typically a couple of seconds). To reduce the drift issue for Vision 2 H264 steaming, video transcoding tools (such as HandBrake or FFMPEG) are available to convert H.264 video into lower bitrates, reduced resolution and/or lower H.264 profiles. For example you can try the H.264, 2mbps bit rate, 480p resolution, Baseline profile. If this does not work, try transcoding the stream into MPEG2 video, which is less susceptible to A/V drift.

NOTE: *Third-party encoders and digital television devices have not been tested with VARIA touch panels, and are not supported by AMX.*

The table below lists the typical synchronization and latency times for each supported video and audio stream:

Video Performance					
Device	**Typical A/V Sync (offset/ hr)**	**Typical A/V Sync Restart Rate**	**Expected Latency Typical**	**Expected Latency - Max**	**Notes:**
3rd Party Solutions					
H.264	N/A	N/A	N/A	N/A	Third-party encoders and digital television devices have not been tested with Varia touch panels, and are not supported by AMX. Network congestion can cause video glitches. We recommend the panel be installed behind a smart Ethernet switch to filter unintended multicast packets reaching the panel and consuming panel resources. We recommend maintaining aspect ratio of source and following usage guidelines regarding window/button placement.
MPEG2	N/A	N/A	N/A	N/A	Third-party encoders and digital television devices have not been tested with Varia touch panels, and are not supported by AMX. Network congestion can cause video glitches. We recommend the panel be installed behind a smart Ethernet switch to filter unintended multicast packets reaching the panel and consuming panel resources. We recommend maintaining aspect ratio of source and following usage guidelines regarding window/button placement.

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Founded in 1982 and acquired by HARMAN in 2014, AMX® is dedicated to providing AV solutions for an IT World. AMX solves the complexity of managing technology with reliable, consistent and scalable systems comprising control, video switching and distribution, digital signage and technology management. AMX systems are deployed worldwide in conference rooms, classrooms, network operation/command centers, homes, hotels, entertainment venues and broadcast facilities, among others. AMX is part of the HARMAN Professional Group, the only total audio, video, lighting, and control vendor in the professional AV market. HARMAN designs, manufactures and markets premier audio, video, infotainment and integrated control solutions for the automotive, consumer and professional markets. ©2019 Harman. All rights reserved. Specifications subject to change.

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