NetLinx Module Interface Specification

for a

Projection Design
LCD Projector
Using pw_392 Protocol
(F12, F22, F32 series)

TABLE OF CONTENTS

Revision History

Date	Initials	Comments
12-6-09	DC	Initial release
4-29-12	DC	Updated for IP control

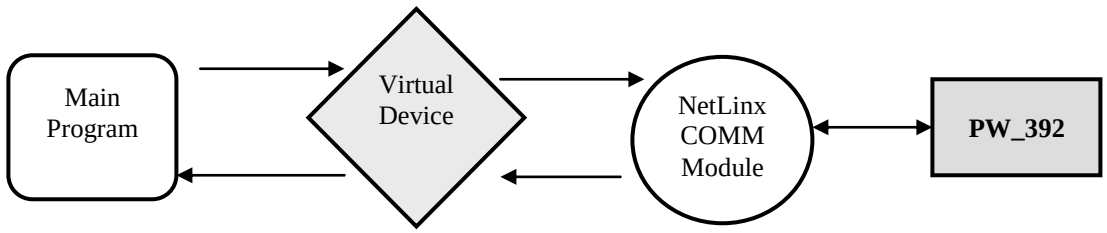
Introduction

This is a reference manual to describe the interface provided between an AMX NetLinx system and a Projection Design PW_392 LCD projector. The required communication settings are a baud rate of 19200, 8 data bits, 1 stop bit, no parity, and handshaking off.

Overview

The COMM module translates between the standard interface described below and the **PW_392** serial protocol. It parses the buffer for responses from the LCD, sends strings to control the LCD, and receives commands from the UI module or telnet sessions.

The following diagram gives a graphical view of the interface between the interface code and the NetLinx module.



Implementation

To interface to the PW_392 module, the programmer must perform the following steps:

1. Define the device ID for the PW_392 that will be controlled.
2. Define the virtual device ID that the PW_392 COMM module will use to communicate with the main program and User Interface. NetLinx virtual devices start with device number 33001.
3. The NetLinx PW_392 module must be included in the program with a DEFINE_MODULE command. This command starts execution of the module and passes in the following key information: the device ID of the LCD to be controlled, and the virtual device ID for communicating to the main program.

An example of how to do this is shown below.

```
DEFINE_DEVICE
   dvPW_392          = 5001:1:0      // The PW_392 connected to the NetLinx on 1st RS-232 port
  OR
   dvPW_392          = 0:3:0         // The PW_392 connected to the NetLinx via IP

   dvPW_392 TPl      = 10001:1:0     // The touch panel used for output

   vdvPW_392         = 33001:1:0     // The virtual device use for communication between the
                                     // Comm module interface and User_Interface (UI) module interface


DEFINE_START      // Place define_module calls to the very end of the define_start section.
// Comm module
DEFINE_MODULE 'Projection Design_pw392_Comm' mdlPW_392_APP(dvPW_392, vdvPW_392)
```

Upon initialization the AMX Comm module will communicate with the Projection Design PW_392 and information will be exchanged.

Channels

The channels supported by the COMM module are listed below. These channels are associated with the virtual device(s) and are independent of the channels associated with the touch panel device.

Note: An '*' indicates an extension to the standard API.

Channel	Description
251	This channel is used for feedback only. ON: Device is online. OFF: Device is offline.
255	This channel is used for feedback only. ON: POWER is ON. OFF: POWER is OFF

Command Interface

The UI module controls the LCD via command events (NetLinx command *send_command*) sent to the COMM module. The commands supported by the COMM module are listed below.

NOTE: AMX has not defined a standard API for LCD devices.

Command	Description
ADDRESS=<value>	Sets the IP address for the projector <value>: valid IP address ADDRESS=192.168.1.200
ASPECT=<value>	Sets the current aspect ratio. <value>: 1 = 1:1 2 = 16:9 3 = 4:3 4 = fill all 5 = fill aspect ratio 6 = letterbox 16:9 7 = letterbox st to 16:9 ASPECT=2: Turn aspect mode to 16:9.
ASPECT?	Request for current aspect ratio. ASPECT?
DEBUG=<state>	Set the debug state <state> : 0 OFF 1 ON DEBUG=1
DEBUG?	Request the debug state. DEBUG?
INPUT=<value>	Selects the input source. <value> : 1 = VGA 2 = BNC 3 = DVI 4 = S-VIDEO 5 = COMPOSITE 6 = COMPONENT 7 = RGB Video 8 = HDMI INPUT=3
INPUT?	Request the current input setting. INPUT?

MUTE=<value>	Mutes/unmutes video <value> : 0 = off 1 = on MUTE=1
PASSTHRU=<string>	Allows user the capability of sending commands directly to the PW_392 without processing by the NetLinx module. User must be aware of the protocol implemented by the unit to use this command. This gives the user access to features which may not be directly supported by the module. See "Adding Functions to Modules" section at the end of this document for more information. The COMM module **automatically adds the required checksum to the command string.** <string> : string to send to unit PASSTHRU=RVER
POWER=<state>	Sets the power state. <state> : 0 = off 1 = on POWER=0
POWER?	Request the current power setting. POWER?
REINIT=<value>	Reinitialize communications with the projector <value> : 1 = re-establish IP communication REINIT=1
VERSION?	Request the current version number of the NetLinx module. VERSION?

Table 1 – Send Command Definitions

String Feedback

The NetLinx COMM module provides feedback to the User Interface module for **PW_392** changes via string events. The strings supported are listed below.

String	Description
ASPECT=<value>	Reports the current aspect ratio. <value>: 1 = 1:1 2 = 16:9 3 = 4:3 4 = fill all 5 = fill aspect ratio 6 = letterbox 16:9 7 = letterbox st to 16:9 ASPECT=2:
INPUT=<value>	Reports the input source. <value> : 1 = VGA 2 = BNC 3 = DVI 4 = S-VIDEO 5 = COMPOSITE 6 = COMPONENT 7 = RGB Video 8 = HDMI INPUT=3
LAMP=<value>	Reports the number of lamp hours used. (This is the total amount and assumes that both lamps have been used for an equal amount of time). <value> : nnnnn Number of whole hours used
MUTE=<value>	Reports the mute status <value> : 0 = off (not muted) 1 = on (muted)
POWER=<value>	Reports the power status. <value> : 0 power is off 1 power is on 2 cooldown 3 warmup 4 ERROR CONDITION

VERSION=<version>	Reports the current version number of the NetLinx module. <value> : current version number in xx.yy format VERSION=1.06

Table 2 - String Feedback Definitions

Device Notes

Commands implemented by this interface include those that are commonly used and shared between various LCD devices. Several of the PW_392 commands have been omitted and may be executed using the PASSTHRU command.

A periodic poll will return the power state and the total number of hours used by the device. Should the LCD shift into sleep mode, it will be automatically shifted back into power-on mode.

Programming Notes

The COMM module imposes synchronous operation i.e. the COMM will not send a command to the PW_392 until it has gotten a response or a timeout from the previous command.

A queue is implemented so that the commands from can be stacked. Commands are pulled off the queue (1) when a reply is received or, (2) after the reply timer times out (200 milliseconds). The device is polled every 10 seconds to return the power state and the input selected.

If connecting via IP, the REINIT=1 command must be called after the commands to set the IP address, username, and password have been sent. There is no default IP address assumed by the module. The default username and password are both set to 'admin'.

The Request commands return the state that is currently stored in the COMM module. They do NOT send a new Request to the device. The COMM module states are updated either by the periodic poll or by the enforced feedback. When a state changes, the UI is automatically informed.

Adding Functions to Modules

Commands to the device

This module supplies a mechanism to allow additional device features to be added to software using the module. This is the PASSTHRU command, which allows protocol strings to be passed through the module. The device-specific protocol must be known in order to use this feature.

As an example, suppose that a module for a projector has not implemented the 'white balance adjustment' feature. The command that the projector protocol requires is 03H, 10H, 05H, 14H, followed by a checksum. The documentation for the PASSTHRU command specifies that the module will automatically generate the checksum. In this case, the following string should be sent from the UI code to implement 'white balance adjustment'.

```
send_command vdvDevice,"'PASSTHRU=',$03,$10,$05,$14"
```

The reason to use PASSTHRU instead of sending a protocol string directly to the device port is that the device may require command queuing, calculation of checksums, or other internal processing, which would not be done if the string was sent directly. Because of this, it is best to filter all communication TO the device through the module. (The module documentation will indicate any processing that will be automatically done to the PASSTHRU string like checksum calculation.)

Additional Feedback from the device

The module documentation indicates what feedback is provided. If additional feedback is required, a CREATE_BUFFER for the device must be implemented in the user code to process the strings from the device manually. Note that the module will still be processing the response strings independently and sending the interpreted feedback up to the user code.