NetLinx Module Interface Specification

for a

Sharp PGMB60X/ XGPH50X Projector

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Revision History

Date	Initials	Comments
5-13-06	DC	Initial release

Introduction

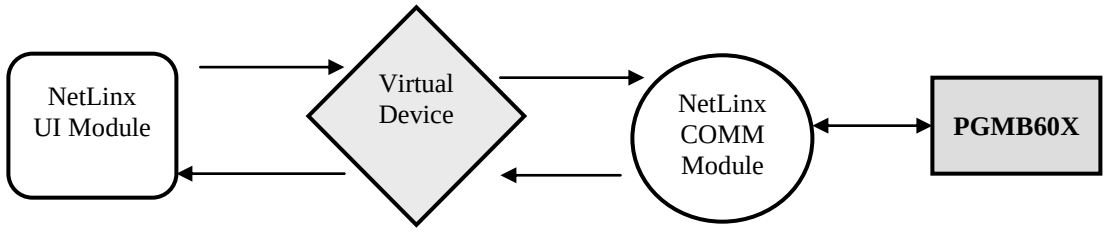
This is a reference manual to describe the interface provided between an AMX NetLinx system and a Sharp PGMB60X projector. The required communication settings are a baud rate of 19200, 8 data bits, 1 stop bit, no parity, and handshaking off.

Overview

The COMM module translates between the standard interface described below and the **PGMB60X** serial protocol. It parses the buffer for responses from the projector, sends strings to control the projector, and receives commands from the UI module or telnet sessions.

A User Interface (UI) module is also provided. This module uses the standard interface described below and parses the string responses for feedback.

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



Implementation

To interface to the PGMB60X module, the programmer must perform the following steps:

1. Define the device ID for the PGMB60X that will be controlled.
2. Define the virtual device ID that the PGMB60X COMM module will use to communicate with the main program and User Interface. NetLinx virtual devices start with device number 33001.
3. If a touch panel interface is desired, a touch panel file PGMB60X,REV0.tpd and module (Sharp_PGMB60X_UI.axs) have been created for testing.
4. The NetLinx PGMB60X 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 projector 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
   dvPGMB60X        = 5001:1:0      // The PGMB60X connected to the NetLinx on 1st RS-232 port
   dvPGMB60X TPl    = 10001:1:0     // The touch panel used for output

   vdvPGMB60X       = 33001:1:0     // The virtual device use for communication between the
                                    // Comm module interface and User_Interface (UI) module interface

DEFINE_VARIABLE
//Define arrays of button channels used on your own touch panel
integer nTP_BUTTONS[]={1,2,3,4,5,6,7}

DEFINE_START      // Place define_module calls to the very end of the define_start section.
// Comm module
DEFINE_MODULE 'Sharp_PGMB60X_Comm' mdlPGMB60X_APP(dvPGMB60X, vdvPGMB60X)

// Touch panel module
DEFINE_MODULE 'Sharp_PGMB60X_UI' mdlPGMB60X_APP(vdvPGMB60X, dvTPArray,
nTPButtons, nTuneButtons)
```

Upon initialization the AMX Comm module will communicate with the Sharp PGMB60X and information will be exchanged.

Command Interface

The UI module controls the projector 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 projector devices.

Command	Description
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 = RGB1 2 = RGB2 3 = COMPOSITE 4 = S-VIDEO 5 = RGB3 (XG-P50X) INPUT=3
INPUT?	Request the current input setting. INPUT?
PASSTHRU=<string>	Allows user the capability of sending commands directly to the PGMB60X 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?

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 **PGMB60X** changes via string events. The strings supported are listed below.

String	Description
INPUT=<value>	Reports the input source. <value> : 1 = RGB1 2 = RGB2 3 = Composite Video 4 = S-Video 5 = RGB3 (XG-P50X) INPUT=3
LAMPTIME=<value>	Reports the hours usage of the lamp. LAMPTIME=290
LAMPLIFE=<value>%	Reports the estimated percentage of life remaining for the lamp. LAMPLIFE=30%
POWER=<value>	Reports the power status. <value> : 0 power is off 1 power is on 2 cooling down 3 warming up
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 projector devices. Several of the PGMB60X commands have been omitted and may be executed using the PASSTHRU command.

Programming Notes

The COMM module imposes synchronous operation i.e. the COMM will not send a command to the PGMB60X 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 (800 milliseconds). The device is polled every 10 seconds to return the one of the following values: Power state, lamp hours used, lamp life remaining. The power request takes place every 30 seconds except where noted below. The lamp commands are only executed while the projector is in the ON state.

For 30 seconds after a power on request, and 90 seconds after a power off request, NO commands will be sent to the projector, per the vendor documentation. Internally polled commands are not issued during this time and commands received from the UI are stacked until the time period has passed. The command queue will hold approximately 100 commands before reaching an overflow condition. After the queue is full, additional commands are rejected until there is sufficient space in the buffer to hold additional commands.

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.