Comm-Tech UPB Module for AMX Netlinx Systems

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Communications and Monitoring
Module for AMX Netlinx Systems.

Module Version 1.24
Manual Version 1.00

This document describes the AMX Communication and Monitoring Module for the Universal Powerline Bus (hereafter referred to as UPB) lighting control system. It is a standard AMX Netlinx module written by Comm-Tech AV, LLC of Center Valley, Pennsylvania. A brief introduction to the UPB system is presented to help the new user get up and running as quickly as possible.

UPB System Overview:

The UPB system is an electrical load control system consisting of various styles of dimmers, keypads, plug-in load control modules, wire-in lamp modules and several other device types. The devices are used on 120 volt AC circuits, most typically to control lighting. The UPB system is patented by Powerline Control Systems of Northridge, California. In addition to being the patent holder, Powerline Control Systems also manufacturers UPB devices under the name Pulseworx. Several other manufacturers license the UPB system from Powerline Control Systems and produce UPB components under their respective names.

The UPB system uses the existing AC wiring of a building as a means for UPB devices to communicate with each other. Although AC line communications are nothing new, the UPB system brings three substantial improvements to AC line communication when compared to previous systems. First, the UPB system has a much stronger AC line communication signal with better means of noise suppression than other systems. These characteristics create much more reliable powerline communications than previous powerline-based technologies. Second, UPB devices have the ability to transmit and receive messages. This feature is most valuable in automation environments such as AMX. When a user presses a wall dimmer, the dimmer transmits the status change back to the automation system, allowing the automation system to present true feedback of the UPB system status. Lastly, the UPB system offers tremendous flexibilities in the creation and operation of lighting scenes. Many functionalities of the UPB system exceed what is available in hard-wired dimming systems.

The UPB system is very immune to powerline noise. However, noise can hamper the communication between UPB devices. Many of the commands sent from this module to the UPB devices are broadcast commands with no acknowledgement of their receipt at the UPB devices. The module assumes that the message got through. Therefore, it is in the installer's best interest to take all steps possible to reduce powerline noise. Our experience has shown that most noise issues originate from electronic fluorescent ballasts and variable speed motor controllers. The reduction of noise is beyond the scope of this document, but the methods are proven. Help is available from the UPB device manufacturers.

An AMX-controlled UPB system has two major parts. The first part is the dimmers. The dimmers take the place of standard wall dimmers and light switches and can directly replace them in existing electrical

systems. It should be noted that UPB devices require a neutral conductor to be present at the device. The second part of the system is the Powerline Interface Module (hereafter referred to as PIM.) The PIM provides a serial-to-powerline interface, allowing the AMX system to send and receive messages to and from dimmers via the powerline.

UPB devices are initially configured by means of a software application called UPStart. UPStart is available as a free download from the websites of UPB hardware manufacturers. After configuration, the AMX module learns the device configurations at startup and is then able to communicate and track events within the UPB system. UPStart is then no longer necessary for day-to-day operations. If UPB devices are added to the system or have their configurations changed, the AMX module simply needs to be restarted to learn the changes.

The foremost benefit of this module is that it provides feedback from UPB events that do not create feedback on their own. For example, a lighting scene may contain numerous dimmers at various levels. The command to activate that scene only creates the activation. It does not, and has no ability to create feedback changes resulting from the activation of the scene. During startup, the module learns all of the preset scene values. During operation, when a scene is called, the module is able to predict what the dimmers will do and report feedback accordingly. Furthermore, when a dimmer is manually changed, the feedback status of any scene that contains that dimmer is changed and reported. The module also gives the user the ability to change presets on the fly, writing them to the flash of the dimmer and altering those values in the module, without restarting the system.

Using the Comm-Tech AMX Module:

1. Configure UPB devices as normal with UPStart. The only caveat is that the UPB Network Password must be set to 0000. When adding link receive components to devices, they must be contiguous. You cannot skip a receive component on a device, otherwise the links following the skipped link slot will be ignored. Link component 1-15 of each UPB devices will be processed by the module. All 15 receive components need not be used.

2. Install the .tko communication module and sample .axs file into your Netlinx system. Load your G4 UI with the sample UI.

3. Be sure that the PIM is in ‘Message Mode.’ This is most easily accomplished by pressing the button on the PIM five times, then ten times, then once more. The system will not work if the PIM is in Pulse Mode.

4. Upon reboot, the UPB devices will be polled, current feedback created, and the system will be ready for normal use.

UPB commands exist in two flavors, DIRECT and LINK. Direct commands are intended for processing by a specific UPB device and are sent to a specific device ID. In the UPB system, direct commands can have acknowledgements returned from their target device. The second command type is LINK. Link commands are broadcast to and received by all devices. As link commands are typically processed by more than one device, any sort of acknowledgement is impossible.

Module Commands:

The following commands are sent to the Netlinx virtual UPB device for transmission onto the powerline in the parameter format is as follows:

NNN:LLL:RRR:VVV:D/L:COMMAND where

NNN=Number
LLL=Level
RRR= Rate
VVV=Value
D/L=DIRECT or LINK
COMMAND=Command Name

Not all parameters are valid for all commands. Unused parameters must be sent as '000' in a command where they are not used. A description of each command is presented to help in your understanding of its usage.

NID SET (Network ID Set)
This command is a Direct command and is only used at startup to tell the module the network ID which was configured by UPStart.
Example, set NID to 69:
SEND_COMMAND vdvUPB,'69:000:000:000:DIRECT:NID SET'

TOTAL UPBS (Total number of UPB devices in system)
This command is a Direct command and is only used at startup to tell the module how many UPB devices are in the system.
Example, there are 50 devices in the system:
SEND_COMMAND vdvUPB,'50:000:000:000:DIRECT:TOTAL UPBS'

TOTAL LINKS (Total number of UPB links programmed in system)
This command is a Direct command and is only used at startup to tell the module how many UPB links are programmed in the system.
Example, there are 50 links in the system:
SEND_COMMAND vdvUPB,'50:000:000:000:DIRECT:TOTAL LINKS'

GOTO
This command sends a single device or a link to a specific level over a specific fade time.
Example, set device 5 to 75% over rate 5 time:
SEND_COMMAND vdvUPB,'5:50:5:000:DIRECT:GOTO'
Example, set link 5 to 75% over rate 3 time:
SEND_COMMAND vdvUPB,'5:50:5:000:DIRECT:LINK'

LINK ACTIVATE
This command sends all devices programmed to receive a specific link to their programmed value at their programmed rate. The UPB system currently does not allow the overriding of the programmed rate.
Example, activate link 36
SEND_COMMAND vdvUPB,'36:000:000:000:LINK:ACTIVATE LINK'

LINK DEACTIVATE
This command sends all devices programmed to receive a specific link to zero at their programmed rate. The UPB system currently does not allow the overriding of the programmed rate.

Example, deactivate link 36
SEND_COMMAND vdvUPB,'36:000:000:000:LINK:DEACTIVATE LINK'

STORE STATE
This command tells all devices containing the specific link as a receive component to store their current level in that receive component slot.
Example, store current state in all devices with link 72 as a component
SEND_COMMAND vdvUPB,'72:000:000:000:LINK:STORE STATE'

REPORT STATE
This command requests the current dimmer level from a specified device
Example, get current level of device 101:
SEND_COMMAND vdvUPB,'101:000:000:000:DIRECT:REPORT STATE'

RAMP UP
This command tells a specific device or a link to begin ramping up at a specified rate
Example, ramp device 2 up over rate 5 time:
SEND_COMMAND vdvUPB,'2:000:5:000:DIRECT:RAMP UP'
Example, ramp link 2 up over rate 5 time:
SEND_COMMAND vdvUPB,'2:000:5:000:LINK:RAMP UP'

RAMP DOWN
This command tells a specific device or a link to begin ramping down at a specified rate
Example, ramp device 2 down over rate 5 time:
SEND_COMMAND vdvUPB,'2:000:5:000:DIRECT:RAMP DOWN'
Example, ramp link 2 down over rate 5 time:
SEND_COMMAND vdvUPB,'2:000:5:000:LINK:RAMP DOWN'
Note: The ramp down command will not ramp a device to zero. It will ramp to a minimum level of 1%. Use the goto command to ramp to zero.

RAMP STOP
This command tells a specific device or a link to stop ramping. This command is typically used after a ramp up or down command on the release event of the ramp button.
Example, ramp device 2 down over rate 5 time:
SEND_COMMAND vdvUPB,'2:000:5:000:DIRECT:RAMP DOWN'
Example, ramp link 2 down over rate 5 time:
SEND_COMMAND vdvUPB,'2:000:5:000:LINK:RAMP DOWN'
Note: The direct ramp stop command automatically issues a report state command so that status of the device can be maintained.

LINK PUSH
LINK RELEASE
The link push and release commands are a mechanism to control a link from a single button, typically on a keypad. A single push followed by an immediate release will cause the link to go to 100%. A subsequent push and immediate release will cause the link to go to 0%. A push without an immediate release (hold) will cause the link to ramp up. A release will then cause it to stop. A subsequent push with no release will cause the link to ramp down. A release will cause the ramp to stop.
Example, a push and release of a button for link 32:
SEND_COMMAND vdvUPB,'32:000:000:000:LINK:LINK PUSH'
SEND_COMMAND vdvUPB,'32:000:000:000:LINK:LINK RELEASE'

GET ROOM NAME
This command requests the programmed room name within the UPB device. Note: All room names are polled out at startup.
Example, get room name of device 42:
SEND_COMMAND vdvUPB,'42:000:000:000:DIRECT:GET ROOM NAME'

GET DEVICE NAME
This command requests the programmed device name within the UPB device. Note: All device names are polled out at startup.
Example, get device name of device 42:
SEND_COMMAND vdvUPB,'42:000:000:000:DIRECT:GET DEVICE NAME'

Module Strings:
The following strings are sent from the UPB virtual device to the main program. The format is the same as the commands except that all values are always reported with three decimal places for easy parsing.

REPORT STATE
021:025:000:000:DIRECT:REPORT STATE
Device 21 is reporting that its current level is now 25%

STORE STATE
101:000:000:000:LINK:REPORT STATE
A store state command has been issued for link 101

LINK BUTTON FEEDBACK
004:000:000:000:LINK:LINK BUTTON FEEDBACK=1
Feedback of a button for link 4 should now be set on
004:000:000:000:LINK:LINK BUTTON FEEDBACK=0
Feedback of a button for link 4 should now be set off

ROOM NAME:
043:000:000:000:DIRECT:ROOM NAME=KITCHEN
Device 43 has reported that its programmed room name is ‘KITCHEN’

DEVICE NAME:
043:000:000:000:DIRECT:DEVICE NAME=ISLAND
Device 43 has reported that its programmed device name is ‘ISLAND’

The Comm-Tech UPB Communications and Monitoring Module is a premium module, sold for use on one AMX Netlinx system per license. The module is licensed to the system user by means of the serial number of their Netlinx master. Upon submitting an order for the module, a copy of the module will be hard-coded with the serial number of the Netlinx master. The module will only work on that master. A database is kept of all orders. Future updates to the module are automatically emailed when available.

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