NetLinx Module Interface Specification

for the

Bosch
PLENA PLM-8M8
DSP Mixer Matrix

V1.00

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Introduction

This manual describes the use of the PLENA PLM-8M8 NetLinx Modules designed to provide an interface between an AMX NetLinx system and a single or multiple Bosch PLENA PLM-8M8 DSP Matrix Mixers. The interface communicates to the mixers via the Ethernet network, utilising UDP datagrams on ports 12128 and 12129.

Scope

The PLENA PLM-8M8 DSP Matrix Mixer provides 8 zones of matrix mixing, with each zone capable of having a unique mix of the four available mic/line inputs, one of 3 background music sources, as well as a paging input.

 The modules allow control and monitoring of the following parameters from the NetLinx system.

Global (all zones)

- Standby / Power
- Global Mute
- Preset activation 1-5

For individual zones :-

- Mic/Line 1 Mix Level
- Mic/Line 2 Mix Level
- Mic/Line 3 Mix Level
- Mic/Line 4 Mix Level
- BGM Mix Level
- Paging Mix Level
- Master Zone Level
- Mic/Line 1 Mix Mute
- Mic/Line 2 Mix Mute
- Mic/Line 3 Mix Mute
- Mic/Line 4 Mix Mute
- BGM Mix Mute
- Paging Mix Mute
- Master Zone Mute
- BGM Source Selection

In addition, the following status values can be monitored.

- Application Status

The device discovery functionality of the protocol is not implemented.

Overview

These are two separate modules, a communication module that handles the communications between the NetLinx system and all mixers (and PLENA PLM series amplifiers) and a mixer module that provides access to the various mixers controls and parameters. A single instance of the communication module is required as well as separate mixer modules for each mixer to be controlled. The mixers communicate to the communications module and hence to the actual hardware via a common virtual device. Each mixer is assigned a unique ID number (e.g. 1 for the first mixer, 2 for the second etc) that is used by communication module to differentiate between the mixers.

The mixer functions are manipulated by sending commands to the respective mixer modules. The status responses are return via strings sent from the module.

The setting of an amplifier's IP address, presets and other configuration settings are performed using the "PLM-8M8" application from Bosch, available for free download from its website.

The following diagram gives a graphical view of this interface.
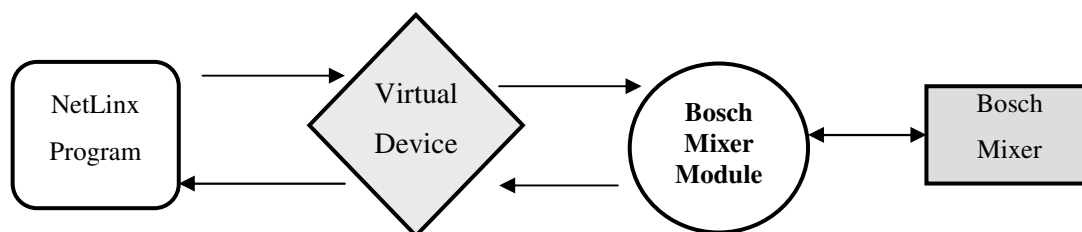
A Few Notes of Caution

The Bosch applications "PLM-8M8" and "PLM-2xPx" which are used to configure the mixers and amplifiers utilise the signal monitoring features of the protocol to display a real time level of each of the channel or zone outputs. These monitoring packets are transmitted via UDP broadcasts and, as such, will be received and decoded by the communication module (although they are not passed on to the respective amplifier or mixer module). If multiple instances of these applications are running on the LAN and connected to different amplifiers / mixers, the amount of broadcasted traffic may swamp the modules and cause the NetLinx system to become slow and unresponsive.

In addition, ensure that your NetLinx has the latest firmware installed. Some earlier versions of firmware limited the size of received UDP packets to a maximum of 256 bytes which is less than the size of some of the packets sent from the amplifiers / mixers.

Implementation

To interface to the PLENA DSP Matrix Mixer, the programmer must do each of the following:

1. Define the virtual device for the communication module. NetLinx virtual devices start with device number 33001.
2. Define a virtual device for each mixer module.
3. Define a character string variable for each mixer module that specifies the actual hardware's IP address.
4. Define an integer variable for each mixer that defines its unique ID.
5. Define an integer variable that contains the base port number for the UDP ports, The communication modules requires one port (0:<base port>:0) and each mixer module also requires one port (0:<base port + id>:0.
6. Copy the "PLENA PLM Comms.tko" file into the same folder as the main program .axs file or into the shared TKOs folder.
7. Copy the "PLENA PLM-8M8.tko" file into the same folder as the main program .axs file or into the shared TKOs folder.
8. Define the modules within the main program with a DEFINE_MODULE command. .

An example of how to do this is shown below.

```
DEFINE_DEVICE

dvTP                        = 10001:1:0     // TOUCH PANEL
vdCOMMS                     = 33001:1:0     // MIXER / AMPLIFIER COMMS
vdMIXER                     = 33002:1:0     // MIXER #1

DEFINE_VARIABLE

CHAR       MIXER_ADDR[]     = '192.168.0.31'  // IP ADDRESS OF MIXER #1
INTEGER    MIXER_ID         = 1               // ID OF MIXER #1
INTEGER    BASE_PORT        = 10              // USES 0:10:0 UPWARDS

DEFINE_START

// Put this between the DEFINE_START and DEFINE_EVENT sections

DEFINE_MODULE 'PLENA Comms' COMMS1 (vdCOMMS, BASE_PORT)
DEFINE_MODULE 'PLENA PLM-8M8' MIXER1 (vdMIXER, vdCOMMS, MIXER_ADDR, MIXER_ID)

DEFINE_EVENT

DATA_EVENT [vdMIXER]
{
   STRING :
   {
      // DECODE RESPONSES FROM MATRIX MIXER
   }
}

…
```

Messages Overview

Mixer Control Messages

Changes to a mixer, are made from the main program by using the SEND_COMMAND function to send ASCII commands to the respective mixer module. Status messages from the mixer are sent back to the main program via SEND_STRING messages from the module that can be trapped using the STRING event of the DATA_EVENT handler. The following table defines the set of valid control messages.

Message	Format	Description
Power On	POWER:1	Force amplifier into operational mode.
Power Off	POWER:0	Force amplifier into standby mode.
Power Toggle	POWER:T	Switch between operational and standby modes.
Global Mute On	MUTE:1	Mute all channels
Global Mute Off	MUTE:0	Revert channels back to their local mute values.
Global Mute Toggle	MUTE:T	Switch between Global Mute On and Off.
Ping Time	PING_TIME:<value>	Time in 10ths secs between ping requests to try and detect an amplifier that is offline.
Poll Time	POLL_TIME:<value>	Time is 10ths secs between requesting level and status updates from the amplifier,
Trigger Preset	PRESET:<preset>	Trigger a stored preset (1-5)
Set Mic / Line Mix Level	MIC_LEVEL:<mic>:<zone>:<level>	Set the mic / line input mix level. (0-249)
Set Mix / Line Mix Mute	MIC_MUTE:<mic>:<zone>:<mute>	Set the mic / line input mix mute. (0,1,T)
Set BGM Mix Level	BGM_LEVEL:<zone>:<level>	Set the background music mix level. (0-249)
Set BGM Mix Mute	BGM_MUTE:<zone>:<mute>	Set the background music mix mute. (0,1,T)
Set PAGING Mix Level	PAGING_LEVEL:<zone>:<level>	Set the paging mix level. (0-249)
Set PAGING Mix Mute	PAGING_LEVEL:<zone>:<mute>	Set the paging mix mute. (0,1,T)
Set Zone MASTER Level	MASTER_LEVEL:<zone>:<level>	Set the zone master level. (0-249)
Set Zone MASTER Mute	MASTER_MUTE:<zone>:<level>	Set the zone master mute. (0,1,T)
Refresh	REFRESH	Refreshes the names, status, levels and mutes.

Table 1 Request/Control Messages

Response/Feedback Messages

When changes on a mixer are detected, the mixer module will pass this information on to the main program via simple ASCII string messages. The following table defines the set of valid messages.

Message	Format	Description
Power Status	POWER:\<status\>	Describes the mixer's current power mode. 0 – Standby 1 - Operational
Mixer Name	NAME:\<name of mixer\>	Describes mixer's name.
Online Status	ONLINE:\<status\>	Describes the online status of the mixer. 0 – No responses from poll or ping requests. 1 – Mixer responding to poll requests.
Global Mute Status	MUTE:\<status\>	Describes the status of the global mute. 0 – Global Mute not in effect. 1 – Global Mute if effect.
Mixer Status	STATUS:\<status\>	Describes the status of the mixer. The status has the following values:- 0 – Normal. 1 – Mixer in Standby. 2 – Mixer generating Alert Tones. 3 – Mixer generating Evac Tones. 4 – Mixer in Override mode.
Mic / Line Input Names	MIC_NAME:\<input\>:\<name of input\>	Describes the mic / line input names. (1-4)
BGM Input Names	BGM_NAME:\<input\>:\<name of input\>	Describes the BGM input names. (1-3)
Zone Names	ZONE_NAME:\<zone\>:\<name of zone\>	Describes the Zone output names (1-8)
Mic / Line Status	MIC:\<mic\>:\<zone\>:\<level\>:\<mute\>	Describes the level and mute status for a mic / line input.
BGM Status	BGM:\<zone\>:\<level\>:\<mute\>:\<selection\>	Describes the level, mute and selection status for a background music input.
Paging Status	PAGING:\<zone\>:\<level\>:\<mute\>	Describes the level and mute status for a paging input.
Master Status	MASTER:\<zone\>:\<level\>:\<mute\>	Describes the level and mute status of a zone output.
Preset Name	PRESET:\<preset\>:\<valid\>:\<name of preset\>	Describes the name and validity of a preset. 0 – Preset is not valid 1 – Preset is valid

Table 2 Response/Feedback Messages