

Application Note

Remote control of HMB|TEC DMX Ethernet Controller using MXE Matrix Mix Engine's Active HTTP API and the OMNEO Dante OCA network interface

MXE Matrix Mix Engines are equipped with an OMNEO Dante OCA network interface for connecting to other systems, using CAT cables and Ethernet network switches.

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Image 1: MXE rear view

The network interface (*OMNEO Dante OCA*) can be found on the MXE's rear panel. It offers in total three network ports: *CONTROL*, *PRIMARY* and *SECONDARY*.

The three network ports can be configured via SONICUE to run either in Transparent, RSTP or Glitch-Free mode.



Image 2: MXE network interface detail view

Requirements for using MXE Task Engine:

MXE Matrix Mix Engine with firmware version 1.4.3119 (or higher)

SONICUE Sound System Software 1.3.0 (or higher) installed on computer

Documentation (recommended in addition to this application note)

A detailed description of all features and functions of the products mentioned in this application note can be found on the manufacturer's websites and in the HMB|TEC DMX Ethernet Controller device manual.



1. HMB|TEC DMX Ethernet Controller (third party)

Product images



Image 3: HMB|TEC DMX Ethernet Controller bottom/rear view (left) and top/front view (right)

Applications

HMB|TEC's DMX Ethernet Controller offers the following applications with MXE.

- Control DMX devices such as lamps, moving heads, spots, effects, light bars, etc.
 - o switch DMX channels (color, brightness, flash, etc.) on/off (0, 255)
 - \circ set single or multiple DMX channels to a certain value (0...255)

Installation

The HMB|TEC DMX Ethernet Controller can be plugged-in directly at a DMX device with 3-pole XLR connection. In addition, a USB power supply needs to be connected.

Variants

The XLR 3-pole (blue) version is standard.

An XLR 5-pole (black) version is available from HMB|TEC on request.



Connections

The DMX Ethernet Controller has only three physical connections:

- Ethernet (RJ45)
- DMX (XLR 3-pole or 5-pole)
- USB for power

In addition, there's a built in Wi-Fi interface that can be used as an alternative to Ethernet.

Basic set up - network connection



Image 4: HMB|TEC DMX Ethernet Controller connection to Dynacord MXE via Ethernet network switch



2. HMB|TEC DMX Ethernet Controller web interface

The HMB|TEC DMX Ethernet Controller's web interface is a very helpful tool to support testing of any programming made for the HTTP interface.

The network settings (*NETWORK-IP*) are made in the upper section of the web interface.



Image 5: HMB|TEC DMX Ethernet Controller web interface – upper section

With current device firmware it's necessary to use a DHCP server or as alternative - the Broadcast address.

If a DHCP server is present, there are two options:

- *NETWORK-IP* "0": all four octets of the IP address are set by the DHCP server.
- NETWORK-IP "100...250": the last octet of the IP address will be fixed The value entered here by default is "222", which means that if for example the gateway IP address is 192.168.178.1 (Home network with a Fritzbox), the DHCP server will assign the network ID 192.168.178 and the converter will add the last octet 222 as host ID. The IP address will then be 192.168.178.222 (as used in the example).
- NETWORK-IP "255": this is the broadcast address inside the network, in our example 192.168.178.255. In order to differentiate between multiple converters, the DMX Univers needs to be entered in addition. As there's no option in MXE Logic to define a DMX universe, this option is only relevant if the DMX converter is operated via dedicated DMX control apps and has NOT been tested. See device manual for further details concerning this mode.



For a simple function check, the following three basic settings can be made very quickly in the middle section = *DMX Control Tool* of the web interface:

- set ALL Chan OFF (0)
- set ALL Chan ON (255)
- set ALL Chan RANDOM

For those who are not familiar with the DMX protocol yet:

- setting a channel to "0" means 0% = off (minimum value)
- setting a channel to "255" means 100% = fully on (maximum value)

		HMB		Â
D	MX C	ontr	ol Tool	
	set ALL Chan OFF (0)	set ALL Chan ON (255)	set ALL Chan RANDOM	

Image 6: HMB|TEC DMX Ethernet Controller web interface – middle section *DMX Control Tool*



For a detailed function check and testing, the UNIVERSAL DMX Control Panel can be used:

192.168.178.222/ × +							- (- ×
$\leftarrow \rightarrow$ C \textcircled{a} \bigcirc \textcircled{b} 192.	168.178.222				숪 Q Suc	hen		± ≡
C BON- Bosch Intranet & Meistbeaucht (B) Bosch A	IV ON	EF tr	RS ol	A P	L I ar	DM 1el		.esezichen
DMX Channel OFFSET	DMX Offset 0	DMX Offset +16	DMX Offset +32	DMX Offset +48	DMX Offset +64			
DMX Chan 1: MASTER DIMMER	Dimmer 0%	Dimmer 25%	Dimmer 50%	Dimmer 75%	Dimmer 100%			
DMX Chan 2: RED COLOR DIMMER/MIXER	RED 0%	RED 25%	RED 50%	RED 75%	RED 100%			^
DMX Chan 3: GREEN COLOR DIMMER/MIXER	GREEN 0%	GREEN 25%	GREEN 50%	GREEN 75%	GREEN 100%			
DMX Chan 4: BLUE COLOR DIMMER/MIXER	BLUE 0%	BLUE 25%	BLUE 50%	BLUE 75%	BLUE 100%			
DMX Chan 5: WHITE COLOR DIMMER/MIXER	White 0%	White 25%	White 50%	White 75%	White 100%			
DMX Chan 6: AMBER COLOR DIMMER/MIXER	AMBER 0%	AMBER 25%	AMBER 50%	AMBER 75%	AMBER 100%			
DMX Chan 7: UV COLOR DIMMER/MIXER	UV 0%	UV 25%	UV 50%	UV 75%	UV 100%			

Image 7: HMB|TEC DMX Ethernet Controller web interface – lower section UNIVERSAL DMX Control Panel

Important hint: the channel mapping may be different on various DMX controlled devices.

Always check channel mapping of the device you want to control first (see device manual)!



3. HMB|TEC DMX Ethernet Controller HTTP commands

The HMB|TEC DMX Ethernet Controller's HTTP interface serves as a simple and easy to integrate interface to other systems.

The HTTP interface allows for sending commands to single DMX channels, and (theoretically) also multiple DMX channels at once.

Here's an overview of the supported commands (translated form the HMB|TEC website and adopted to the example IP address 192.168.178.222):

- /on switches all 512 DMX channels to a data value of 255 (e.g., "192.168.178.222/on")
- /off switches all 512 DMX channels to a data value of 0 (e.g., "192.168.178.222/off")
- /dim?on switches one DMX channel to a data value of 255 (e.g., 192.168.178.222/dim?on")
- /dim?off switches one DMX channel to a data value of 0 (e.g., 192.168.178.222/dim?off")
- /dmx?chan=N&value=VAL switches one DMX channel between 1 and 512 to a certain data value between 0 and 255 (e.g., "192.168.178.222/dmx?chan=3&value=128" switches the DMX channel 3 to a data value of 128)
- /dmxrange?chan1=N&chan2=M&value=VAL switches a range of DMX channels between 1 and 512 to a certain data value between 0 and 255 (e.g., "192.168.178.222/dmx?chan1=1&chan2=16value=100" switches the DMX channels 1 to 16 to a data value of 100)

For testing only single channels commands were used.



4. MXE Task Engine with active HTTP API

MXE Task Engine offers *HTTP Protocol* blocks for actively sending HTTP GET and POST requests to control 3rd party products or systems with HTTP control protocol.

4.1. MXE Task Engine configuration for controlling DMX channels via 3rd party HMB|TEC DMX Ethernet converter using http commands.

Hint: When online with the MXE Matrix, the Task Engine shows the status of logic or analog values on the connecting lines between blocks (screenshot: true/false or analog value).

Matrix1 - TaskEngine - SONICUE		-	
≡ File Matrix1		Logic λ Analog λ DEPLOY	Online
Workspaces Credentials			
Q Search	Main Workspace +		
Analog Operations			
Logic Operations	MXE Matrix	false	
Text Operations	Power Power VLogic 1 Error	HTTP Logic Set	
Constants	VLogic 2 VLogic 1 false false	false In	
Scheduler	VLogic 3 VLogic 2 false VLogic 4 VLogic 3	HTTP Logic Set	
Thru	VAnalog 1 VLogic 4 66		
Itilities	VAnalog 1 •	true	
MYF Matrix		• In	
		<	
		HTTP Analog Set	<
HTTP Protocol		• In	
OCA Protocol			
PROMATRIX Controller			
	CPU: 13.8		
	Network: 12.0		
	Memory: 2.2		

Image 8: MXE Task Engine configuration for controlling DMX channels via HMB|TEC DMX Ethernet converter

Hint: After creating a new or modifying an existing Task Engine configuration, don't forget to click the *DEPLOY* button when *Online* with the system!

Matrix1 - TaskEngine - SONICUE	-	
≡ File Matrix1	Logic λ 🛛 Analog λ 📃 DEPLOY 📐	-]- Online
Workspaces Credentials		
Q Search Main W	orkspace +	

Image 9: MXE Task Engine DEPLOY button



4.2. MXE Task Engine *MXE Matrix* block configuration for using Virtual Logic and Virtual Analog values as interfaces.

The *MXE Matrix* block, added from the *MXE Matrix* menu, can be modified by selecting it, and then clicking the arrow button on the right-hand side of the worksheet.

🗾 Matrix1 - TaskEngine - SONICUE					-		×
≡ File Matrix1		Logic λ	Analog λ	DEPLOY		-]- On	line
Workspaces Credentials							
Q Search	Main Workspace +						
Analog Operations							
Logic Operations	MXE Matrix		HTTPL	ogic Set			
Text Operations	Power Power ● VLogic 1 Error ●		 In HTTP Lo 	ogic Set			
Constants	VLogic 2 VLogic 1		• In				
Scheduler	VLogic 3 VLogic 2		HTTP Lo	ogic Set			
Thru	VAnalog 1 VLogic 4 VAnal			utio Cot			
Utilities				igic set			
MXE Matrix			U 111				
MXE Log MXE Matrix MXE Time			HTTP A	Toggle prope	erty pai	ne	<.,,,,

Image 10: MXE Task Engine MXE Matrix block, added from the MXE Matrix menu

The VLogic 1-4 and VAnalog 1 connectors on the MXE Matrix block are configured by selecting Visible Virtual Logics 1-4 and Visible Virtual Analog 1 in the drop-down menus.

Matrix1 - TaskEngine - SONICUE						_		(
≡ File Matrix1				Logic λ	Analog λ		Online	
Workspaces Credentials								
Q Search	Main Workspace							
Analog Operations	MXF Matrix		MXE-f56130oca	tcp.local.		Select Device		
Logic Operations	 Power 	Power •	Visible GPOs					
Text Operations	VLogic 1	Error •	Select visible GPOs					
Constants	VLogic 2 VL VLogic 3 VL	.ogic 1 O	Visible Digital GPIs					
Scheduler	VLogic 4 VL	ogic 3 O	Select visible Digita	l GPIs				
Thru	VAnalog 1 VL VAn	.ogic4 ● alog1 ●	Visible Analog GPIs					
Utilities			Select visible Analo	g GPIs				
MXE Matrix			Visible Virtual Logics					1
IPX Amplifier		>	4 × Select visibl	le Virtual Log	ics		^	
HTTP Protocol			✓ 1					
OCA Protocol								
PROMATRIX Controller			▼ 2			J		
			✓ 3					
			✓ 4					

Image 11: MXE Task Engine MXE Matrix block configuration with Visible Virtual Logics 1-4 and Virtual Analog 1



It's important to select the *Device* with the *Select Device* drop-down menu (therefore the Devices must be visible on network!).

Analog Operations	_				
1	MXE Matr	ix		MXE Matrix	
Logic Operations					
Text Operations					
Constante				Title	
Constants				MXE Matrix	
Scheduler					
Theu	VAnalog 1			Credentials	
Thiu		VAnalog 1 🔍		undefined	~
Utilities					
MXF Matrix				Device	Select Device
PIAC PIACIDA				MXE-f56130ocatcp.local.	Select Device ^
IPX Amplifier			>		
HTTP Protocol				Visible GPOs	Matrix1
				Select visible GPOs	
OCA Protocol					- TPC1-2233
PROMATRIX Controller				Visible Digital GPIs	
				Select visible Digital CPTe	WPN1-172040

Image 12: MXE Task Engine MXE Matrix block selection of Device

4.3. MXE Task Engine HTTP Logic Set blocks added from the HTTP Protocol menu

Matrix1 - TaskEngine - SONICUE		- 🗆 X
≡ File Matrix1		Logic λ Analog λ DEPLOY -→ Online
Workspaces Credentials		
Q Search	Main Workspace +	
Analog Operations		
Logic Operations	MXE Matrix	HTTP Logic Set
Text Operations	Power Power Vlogic 1 Error ●	HTTP Logic Set
Constants	VLogic 2 VLogic 1 VLogic 3 VLogic 2	
Scheduler	VLogic 3 VLogic 2	HTTP Logic Set
Thru	VAnalog 1 VLogic 4 VAnalog 1	In HTTP Logic Set
Utilities		• In
MXE Matrix		
IPX Amplifier		
HTTP Protocol		
HTTP Analog Get		
HTTP Analog Set		
HTTP Logic Get		
HTTP Logic Set		
OCA Protocol		
PROMATRIX Controller		
	CPU: 13.8	
	Memory: 2.2	

Image 13: MXE Task Engine HTTP Logic Set blocks, added from the HTTP Protocol menu



The HTTP Logic Set blocks need to be configured with the following information:

- *Title* optional, should be edited for better overview
- *Protocol* HTTP or HTTPS (S = secure)
- Host IP address of the device to be controlled
- *Port* standard = 80 for HTTP, 443 for HTTPS
- Basic Auth Credentials optional, to be used if the device to be controlled requires a login
- *Method* GET or POST, depending on implementation
- URL command to be sent to the device to be controlled
- Body optional, only necessary for method POST
- If input reads true, ... value sent if input reads true, replaces %value% in URL or Body
- If input reads false, ... value sent if input reads false, replaces %value% in URL or Body

In the screenshot example the command /*dmx?chan=1&value=%value%* is used to control DMX Ch1, sending value = 255 (DMX = fully on) or value = 0 (DMX = fully off)

Matrix1 - TaskEngine - SONICUE		- 0	×
≡ File Matrix1		Logic λ Analog λ DEPLOY →→ On	line
Workspaces Credentials			
Q Search	Main Workspace +		
Analog Operations	MYE Matrix	HTTD Logic Sot	
Logic Operations			
Text Operations	• VLogic 1	Title	
Constants	 VLogic 2 VL VLogic 3 VL 	HTTP Logic Set	
Scheduler	 VLogic 4 VL VAnalog 1 VI 	Protocol	
Thru	VAn	нттр	~
Utilities		Host	
MXE Matrix		192.168.1.222	
IPX Amplifier		Port	
HTTP Protocol		80 –	+
HTTP Analog Get		Basic Auth Credentials	
HTTP Analog Set		undefined	~
	>	Method	
		GET	~
DDOMATRIX Controller		URL	
PROMATRIX Controller		/dmx?chan=1&value=%value%	
		Body (only used by method POST)	
		Body (only used by method POST)	
		If input reads true, replace %value% with	
		255	
		If input reads false, replace %value% with	
		0	

Image 14: MXE Task Engine HTTP Logic Set blocks information to be configured



Matrix1 - TaskEngine - SONICUE	- 0	×
≡ File Matrix1	Logic À Analog À DEPLOY On	line
Workspaces Credentials		
Q Search	Main Workspace +	
Analog Operations Logic Operations	MXE Matrix HTTP Logic Set	
Text Operations Constants	Power Power Power Vlogic 1 Error Vlogic 2 Vlogic 1	
Scheduler	VLogic 3 VLogic 2 VLogic 4 VLogic 3 VLogic 4 VLogic 4 VLogic 4	
Thru Utilities	VAnalog 1 • HTTP Logic Set	
MXE Matrix		_
HTTP Protocol	HTTP Analog Set	<
HTTP Analog Get		
HTTP Analog Set		
HTTP Logic Set		

4.4. MXE Task Engine *HTTP Analog Set* block added from the HTTP Protocol menu

Image 15: MXE Task Engine HTTP Analog Set block, added from the HTTP Protocol menu

The HTTP Analog Set block needs to be configured with the following information:

- *Title*, *Protocol*, *Host*, *Port*, *Basic Auth Credentials*, *Method*, *URL* and *Body* as described for the HTTP Logic Set block
- *Replace and format %value% as* analog value sent at %value% position in URL or Body, to be formatted for example as:
 - o %1s data type string with no decimal place, like 0, 128, or 255
 - %.2f data type float with two decimal places, like 32.45 or 11.20

MXE Matrix		192.168.1.222	
IPX Amplifier			
HTTP Protocol		Port	
HTTP Analog Get			+
HTTP Analog Set		Basic Auth Credentials	
HTTP Logic Get	>	undefined V	
- HTTP Logic Set		Method	
OCA Protocol		GET	
		URL	_
PROMATRIA CONTINUEI		/dmx?chan=5&value=%value%	
		Body (only used by method POST)	
		Replace and format %value% as	
		%1s	

Image 16: MXE Task Engine HTTP Analog Set block Replace and format %value" as configuration



5. User interfaces created in SONICUE Panel Designer

Example User Interface 1 created for TPC-1

The Virtual Logics can be controlled by Toggle button controls configured in SONICUE Panel Designer, like the *DMX Ch 1 - Red* button in the screenshot below. Virtual Analog values can be controlled for example by a Knob with *Up* and *Down* buttons, as used for the Dimmer control.

✓ TPC1-2233 - PanelDesigner - SONICUE − □ ×							
≡ File	Design Preview]- Onlin	ne
Colors / DMX Ch. 1-4			Dimmer / DMX Ch. 5				
	DMX Ch 1 - Red						
	DMX Ch 2 - Green						
	DMX Ch 3 - Blue						
	DMX Ch 4 - White		Down	Up 📐			

Image 17: SONICUE Panel Designer design for TPC-1 (in Preview mode)

Alternative user interface 2 created for WPN-1

MXE light controlDMX ColorsDMX DimmerMXE light controlDMX ColorsDMX Dimmer (Ch 5)DMX ColorsRed (Ch1)Green (Ch2)DMX DimmerBlue (Ch3)66White (Ch4)Back to menu

Simple layout with a main menu and two subpages.

Image 18 - 20: SONICUE Panel Designer design for WPN-1 (in *Preview* mode)



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