

PhaseX

Commissioning *guide*

dmf

Table of Contents

Introduction	3
Basics of DMX-512A DMX-512/RDM DMX Wiring	
Addressing a PhaseX System	5
PhaseX Commissioning Overview	6
DMF Commissioning Utility RDM Commissioning	7
Commissioning via Lighting Controls System Crestron Home Integration Lutron Homeworks Integration	8
Appendix A - PhaseX DMX Personalities B - DMX Value Lookup Table C - Additional Documentation	9

Introduction

PhaseX systems are controlled by the industry standard, open protocol, DMX-512A. Any standard DMX controller, be it a standalone unit or an integration with a larger lighting controls system will work to control PhaseX lighting systems. This Commissioning Guide outlines the commissioning process for PhaseX systems, including required hardware and the use of software utilities.

Basics of DMX-512A

DMX stands for Digital Multiplexing. It is a digital control signal that was initially developed for the control of entertainment and theatrical lighting equipment. The standard is maintained by ESTA or the Entertainment Services and Technology Association, and the most current version was approved by ANSI in 2008. The current standard it titled "E1.11 – 2008, USITT DMX512-A", but is commonly referred to as DMX-512-A.

A DMX signal consists of 512 "addresses" (ranging from 1 to 512), each with a corresponding "level" (ranging from 0-255). Due to the nature of its intended application, DMX is a very fast protocol and the data rates can update all 512 addresses as frequently as 44 times per second (such as when devices are fading between levels). When levels remain unchanged, every address will be updated at a minimum rate of 1 time per second. A full set of 512 addresses is referred to as one Universe of DMX.

= Level for Address 1
= Level for Address 1 & 2
= Level for all 512 Address
Repeats up to 44 times/second

The DMX Signal is an 8-bit digital signal, consisting of level data for up to 512 discrete addresses transmitted in sequence.

Every fixture in a DMX system has an address, which is set and stored locally on the device itself. DMX devices can occupy a single address (eg. a traditional dimmer) or multiple addresses (eg. tunable white LED's). These multi-address fixtures are often referred to as "intelligent fixtures". An intelligent fixture's "Profile" or "Personality" is a setting that is set and stored in the fixture itself and dictates how it should respond to each address that it is assigned to (eg. 1 for intensity, 2 for CCT). Both the DMX Controller and the Lighting Device must be set to the same personality for proper control – to make an analogy, if both the controller and fixture are using the DMX Language, the Personality would be the dialect that they share.

Typically, when a fixture personality spans multiple addresses, the first parameter occupies the "start address" of the fixture, and the following n parameters are set to "start address + n" (ie. The user only sets a single starting address, and all following parameters follow directly after). Personalities that have parameters that can be individually set typically state so explicitly.

DMX devices can be set to their own unique addresses (not shared with any other devices) or multiple devices can all be set to the same address such that they all respond to the same address or control zone. Choosing between these two approaches largely depends on system address capacity.

DMX-512/RDM

RDM, or Remote Device Management, is a provision that was added to the DMX specification that allows for bi-directional communication between DMX control devices and DMX fixtures. This allows for remote discovery of lighting fixtures, identification (via flashing), and configuration of personalities and addressing. Lighting control systems that support RDM should allow for PhaseX fixtures to be discovered and configured remotely, simplifying the commissioning process and potentially eliminating the need to use DMF's commissioning utility.

DMX Wiring

DMX is a balanced signal, like XLR audio signals. Traditional DMX wiring required shielded, twisted pair wire, and must be treated as Class 2 wiring, meaning that it must be physically separated from any Class 1 (line voltage) wiring. The 3 wires used are Data+, Gata- and Ground. DMX devices must be wired in a daisy chain format, meaning each device is wired sequentially one after another.

If splitting is required, an optical isolation device must be used to maintain signal integrity. The DMX signal must also be terminated using a resistor between the Data+ and Data– wires. Some fixtures may be self-terminating or have built in termination switches to simplify installation.

Addressing a PhaseX System

The lighting controls system architecture and address capacity will largely dictate how your lighting zones need to be addressed. Systems that support a full universe (or 512 addresses) will provide the most flexibility in addressing and planning your lighting zones and in many cases each fixture can be assigned its own unique address. This approach may potentially make future modifications system programming simpler.

Control systems with gateways that have limited capacities may require addressing fixtures in groups so that DMX addresses can be conserved. For example, Lutron Homeworks requires the QSE-CI-DMX gateway for DMX control and is limited to 32 addresses. In this situation, one Lutron DMX gateway can provide up to 16 discrete zones of control. Therefore, fixtures that are a part of the same control zone should all be set to the same address to conserve the 32 usable addresses.

PhaseX Commissioning Overview

After PhaseX systems have been physically installed and wired according to the gateway and module installation guides, system startup and commissioning will need to be performed to finalize the install and allow for fixture control. The steps below outline the commissioning process. For homes with multiple PhaseX Gateways, complete this process for only one PhaseX Gateway at a time, leaving all other gateways powered off – after initializing the first gateway, power it off and proceed to the following gateway(s).

- 1. Once all fixtures, PhaseX Gateway(s) and lighting controls system gateway(s) are installed and wired, power on the system as outlined in the Gateway Install Guide.
- 2. Run the Auto Setup process, per the Gateway Install Guide.
- 3. Verify all fixtures are on and responding to gateway control.
- 4. Using the DMF Commissioning Utility, connect to the PhaseX Gateway and verify that the gateway and modules have the most current firmware version. Update firmware if necessary.
- 5. Proceed to commissioning for your specific controls system:

For Systems that Support RDM

- 1. Connect your Control System DMX Gateway to the PhaseX Gateway and power on the system.
- 2. Using the lighting control system's device discovery page, identify fixtures and set the appropriate personality and address and/or assign fixtures to the room/control zone in the system software.
- 3. Program lighting scenes, schedules and keypads according to the standard process for your controls manufacturer.

For Systems without RDM Support

- 1. Continue using the PhaseX Commissioning Utility to identify fixtures and set the appropriate personality and addresses.
- 2. Note: when manually addressing, restrict addresses to 1-500. Addresses 501-512 are reserved for PhaseX system use.
- 3. Input configured settings into the lighting control system configurator to match the setup control zones.
- 4. Program lighting scenes, schedules and keypads according to the standard process for your controls manufacturer

DMF Commissioning Utility

The DMF Commissioning Utility allows for direct connection to a DMF PhaseX Gateway via Micro-USB data cable, and provides the following functionality:

- Gateway configuration, including setting the communication channel.
- Firmware updates for the PhaseX Gateway and Modules via file upload.
- Reading and writing PhaseX modules settings
- Utility for remote identification
- Manual testing

The DMF Commissioning utility can be used with any controls system for manual configuration and for controls systems that do not have support for RDM commissioning.

For full guidance on using the DMF Commissioning Utility, reference the PhaseX Technical Reference Guide, linked under Appendix B - Additional Documentation.

RDM Commissioning

Lighting control system gateways that support RDM should all be compatible with PhaseX modules and allow for remote fixture discovery, personality setting and addressing, and should not require the use of the DMF Commissioning Utility. For lighting control systems that support RDM, you may utilize direct setup in the lighting control system. When configuring PhaseX modules directly in a lighting control system configurator, addressing is typically handled automatically by the configurator, simplifying the commissioning process.

Commissioning via Lighting Controls System

Crestron Home Integration

The DMF PhaseX gateway and enabled fixtures have native support within the Crestron Home application. This means that PhaseX modules are treated as and show up as DMX-C devices, with full support for remote commissioning, identification and full functionality as lighting devices in Crestron Home.

Step by Step Crestron Home Commissioning

For step by step details on Creston Home commissioning with PhaseX, please reference the PhaseX Commissioning Guide.

Lutron Homeworks Integration

DMX integration with Homeworks QS or QSX platform is via the Lutron QSE-CI-DMX interface. The interface permits up to 32 DMX slots to be mapped to Lutron Lighting Zones. For control PhaseX fixtures in the Tunable White personality, the 32 DMX slots would only permit up to 16 zones of control. Additionally, any form of circadian control is limited within the Homeworks programming environment for non-Ketra fixtures.

DMX Personality 3 (Lutron Personality with Circadian Support) enables Circadian control via simple timeclock events. The personality uses 5 DMX slots to provide manual zone level control of Intensity and CCT, one channel for circadian enable and the remaining two channels for Circadian Intensity and CCT control that follows a master circadian schedule, set by timeclock events.

Step by Step Lutron Homeworks Commissioning

For step by step details on Lutron Homeworks commissioning with PhaseX, please reference the PhaseX Commissioning Guide.

Appendix

A - PhaseX DMX Personalities

Fixtures can be configured to follow one of the following DMX Personalities. Note that the default personality for fixtures is Personality 1 (Tunable White), set to address 1.

- 1. Tunable White (Intensity, CCT)
 - a. Two DMX slots are used to control INTENSITY and Color Temperature (CCT)
 - b. INTENSITY:
 - i. Value of 0-255 corresponds to 0-100% (exponential dimming curve).
 - ii. Map to any DMX slot 1-500
 - c. CCT:
 - i. Value of 0-255 sets the Color Temperature (1800k-4000k linear relationship)
 - ii. The CCT slot is always the INTENSITY slot +1
 - iii. This personality is suited to systems that require separate CCT control for every zone.
- 2. Crestron Tunable White (6 DMX Addresses)
 - a. This personality is optimized for use with Crestron Home on the DMX-C network.
 - b. DMX Slots are identical to the Tunable White personality (Intensity, CCT)
 - c. Select this personality when using Crestron Home and connecting to the DMX-C network
- 3. Lutron Personality with Circadian (5 DMX Addresses)
 - a. This personality is optimized for use with Lutron Homeworks and enables a Circadian Lighting effect using a simple set of timeclock actions.
 - b. Additionally, the slot for MANUAL CCT control can be assigned manually and independently from MANUAL INTENSITY, allowing multiple lighting zones to have different Intensity slots but a common CCT slot. A typical room with four zones of lighting may consume four DMX slots for intensity control (Ex. Slots 1,2,3 and 4) and one DMX slot for the room CCT control (Ex. Slot 5), i.e. consumes only five total DMX slots.
 - c. The Lutron Personality may also be used with Slots 3 to 5 (Circadian Enable and Intensity/CCT) unassigned in Homeworks. This would allow for Manual control of lighting zones with a reduced footprint of DMX addresses, as discussed above in section (b). If choosing this approach, ensure that Circadian parameters (slots 3 to 5) are set to addresses that are out of the range of standard control addresses.
 - d. An additional set of DMX slots are provided to facilitate a Circadian lighting effect using the "Circadian Intensity" and "Circadian CCT" slots. Simple timeclock events can be set up to vary the Circadian CCT and Intensity values over the day.
 - e. Fixtures are directed to either follow the manual Intensity and CCT slots or the Circadian Intensity and CCT slots based on the "Circadian Enable" slot. The Circadian Enable slot cross fades between the Manual and Circadian slot. A value of 0 means all control via the manual Intensity and CCT slots. A value of 100% (255) means all control based on the Circadian slots. The fade time with which the Circadian Enable ramps between 0 and 100% dictates the transition or fade time of the affected lights.

- f. DMX Slots
 - i. MANUAL INTENSITY: Value of 0-255 corresponds to 0-100% for manual control
 - 1. Map to any DMX slot 1-500 (using PhaseX Utility)
 - 2. All fixtures controlled as a Zone would have the same INTENSITY slot.
 - ii. MANUAL CCT: Value of 0-255 sets the Color Temperature (1800k-4000k linear relationship)
 - 1. Map to any DMX slot 1-500 (using PhaseX Utility)
 - 2. Typically, all fixtures in a room will have the same CCT slot assigned to maintain color consistency
 - iii. CIRCADIAN ENABLE:
 - 1. This DMX slot selects the control source for the PhaseX fixture
 - 2. When value = 0, Intensity and Color Temperature are set based on the MANUAL INTENSITY and MANUAL CCT slots (same as default Tunable White Personality)
 - 3. When value is 100% (255), Intensity and Color Temperature are set based on the CIRCADIAN INTENSITY and CIRCADIAN CCT slots.
 - 4. The value should be faded from 0-255 and vice-versa to cross fade between manual control and circadian control.
 - 5. Map to any DMX slot 1-500 (using PhaseX Utility)
 - 6. Typically, all fixtures in a room will have the same CCT slot assigned to maintain color consistency
 - iv. CIRCADIAN INTENSITY
 - 1. Time clock events can be programmed to vary the CIRCADIAN INTENSITY over the day using a slow fade rate.
 - 2. When the CIRCADIAN ENABLE slot value is 100% (255), the PhaseX fixture will follow the CIRCADIAN INTENSITY slot for brightness
 - 3. Map to any DMX slot 1-500 (using PhaseX Utility), default is 200
 - 4. Typically, all fixtures connected to the DMX Gateway will have the same CIRCADIAN INTENSITY slot assigned.
 - v. CIRCADIAN CCT
 - 1. Time clock events can be programmed to vary the CIRCADIAN CCT over the day using a slow fade rate.
 - 2. When the CIRCADIAN ENABLE slot value is 100% (255), the PhaseX fixture will follow the CIRCADIAN CCT slot for color temperature
 - 3. The slot is set based on the CIRCADIAN INTENSITY slot + 1, default is 201
 - 4. Typically, all fixtures connected to the DMX Gateway will have the same CIRCADIAN CCT slot assigned.

B-DMX Value Lookup Table

Int (%)	DMX	CCT (k)
0%	0	1800
5%	13	1910
10%	26	2020
15%	38	2130
20%	51	2240
25%	64	2350
30%	77	2460
35%	89	2570
40%	102	2680
45%	115	2790
50%	128	2900
55%	140	3010
60%	153	3120
65%	166	3230
70%	179	3340
75%	191	3450
80%	204	3560
85%	217	3670
90%	230	3780
95%	242	3890
100%	255	4000

C-Additional Documentation

PhaseX Product Page:



PhaseX Technical Reference Guide:



PhaseX Gateway Installation Instructions:





dmfLuxury.com

dmf