

Kino Flo Dmx Overview

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Kino Flo Dmx Overview

1.1 What is Dmx?

Dmx (Digital Multiplex) is an electronic control protocol that is the standard for the Entertainment Industry. Kino Flo uses Dmx512/1990 protocol. Dmx allows lighting, controllers and control desks to communicate with other lighting equipment. It was designed to allow equipment from different companies to be used together easily.

1.2 Why use Dmx?

Dmx allows control of many different pieces of Dmx equipment such as lighting equipment, smoke machines, projectors, dimmers, etc. from a central location. In addition, fewer cables are used saving set up time and cost. One of the best applications to use Dmx is when lighting Blue and Green Screens or large Cycloramas.

1.3 Power Requirements

Provide the correct primary AC power. If powering Kino Flo Dmx products through a dimmer rack, the dimmer profile must be set to “Non-Dim”. Do not dim any Kino Flo Dmx products through a dimming circuit. Do not turn on power to a Kino Flo Dmx product by dimming up on a dimming circuit.

Load considerations: Except for the ParaBeam and ParaZip, Kino Flo ballasts are not power factor corrected. They will draw double the current on the neutral from what is being drawn on the two hot legs. When necessary double the size of your neutral.

1.4 Dmx Addressing



Kino Flo Dmx Products*	Maximum # of Channels Used	Dmx Operation
4Bank Dmx Ballast	5	4 Lamps + HO/Std Feature**
4Bank Mega/Dmx Ballast	5	4 Lamps + HO/Std Feature
Image 85 Dmx	9	8 Lamps + HO/Std Feature
Image 80 Dmx	8	8 Lamps
Image 45 Dmx	5	4 Lamps + HO/Std Feature
Image 40 Dmx	4	4 Lamps
Image 20 Dmx	4	4 Lamps
Multi-Flo Dmx Ballast	12	12 Lamps
ParaBeam 400 Dmx	2	2 or 4 Lamps
ParaBeam 200 Dmx	1	2 Lamps
ParaZip 400 Dmx	2	2 or 4 Lamps
ParaZip 200 Dmx	1	2 Lamps
VistaBeam 600 Dmx	7	6 Lamps + HO/Std Feature
VistaBeam 300 Dmx	4	3 Lamps + HO/Std Feature
Wall-O-Lite Dmx	8	10 Lamps (4 center in pairs, 6 outer individually)

*See Operation Manual by product for more information.

**HO/Std = High Output/Standard Output light level settings. Standard Output drops light level by ½ f-stop.

Prior to hanging any instruments, Dmx addresses should be manually set for each fixture. Depending on the fixture, determine how many Dmx channels each one uses.

For example, the Image 85 uses 9 channels. Eight addresses for lamps 1 – 8 and the 9th address to control the HO/Std Select feature. Push the tabs above or below the number window. The 1st Image 85 should be set at address 1 and the 2nd at 10, etc. For the sake of simplification, select sequences such as 10, 20, 30, 40 and so on. (Valid Dmx addresses range from 001-512).

Note: If a Fixture or Ballast loses its Dmx signal, it will hold its last Dmx command. For this reason, it is important to turn a Fixture or Ballast off using the Dmx commands. For example, if you try to turn off the lights by turning off the dimmer board, the lights will remember their last Dmx command and stay on. The Fixtures or Ballasts require a Dmx “Off” or “Black-out” command in order to turn off.

Important: The dimmer board/light console should have its channel set to LINEAR light output response. (LINEAR response is the default setting on most dimmer boards).

All Kino Flo Dmx products have an On-board Dimming or Lamp Selector Feature. Manual lamp switching, remote hand control as well as HO/Std switching are disabled as soon as the Dmx cables are applied.

For Manual control with Dmx cables plugged in, set address to “000”. There is a 5 second delay when switching between Dmx and Manual control.

1.5 Kino Flo Fixture Mode / Individual Lamp Mode

All Kino Flo Dmx non-dimming products except for the Multi-Flo have the Kino Flo Fixture/Individual Lamp mode.

Kino Flo Dmx Products (Non-Dimming)	Fixture Mode/ Individual Lamp Mode	Dimming
4Bank Dmx Ballast	Yes	No
4Bank Mega/Dmx Ballast	Yes	No
Image 85 Dmx	Yes	No
Image 45 Dmx	Yes	No
Image 20 Dmx	Yes	No
Multi-Flo Dmx Ballast	No	No
VistaBeam 600 Dmx	Yes	No
VistaBeam 300 Dmx	Yes	No
Wall-O-Lite Dmx	Yes	No

Kino Flo Dmx Products (Dimming)	Fixture Mode/ Individual Lamp Mode	Dimming
ParaBeam 400 Dmx	No	Yes
ParaBeam 200 Dmx	No	Yes
ParaZip 400 Dmx	No	Yes
ParaZip 200 Dmx	No	Yes



The Kino Flo “Fixture” mode re-creates the manual on/off switching. For the Image 85, setting the unit to “Fixture” mode allows the user to re-create the “Inside-Out” pattern of the manual switch. One dimmer channel controls the lamps; another channel controls the HO/Std setting.

Assign the first address to a dimmer channel. Adjusting the slider up or down sets the number of lamps to be turned on. Setting the 9th address from 0%~50% operates all the lamps in the fixture at HO mode, from 50%~100% operates the lamps in the Std mode and the overall light output drops by ½ f-stop.



Setting the fixture to the Kino Flo “Individual Lamp” mode allows each lamp within the fixture to have its own address. One of the best applications for the “Individual Lamp” mode is when lighting Blue and Green screen. It can turn on every other lamp or light only center lamps. It can also achieve light effects like flickering, chasing or creating light patterns. Although this option will use up a lot of addresses, it may be preferable for certain situations.

For example, the Image 85 captures 9 addresses. Lamps can be individually addressed through Dmx. Lamps are on addresses 1-8. The 9th address controls the HO/Std mode. Settings from 0%~50% on the dimmer slider on the 9th address will operate lamps in the HO setting. Settings from 50%~100% operate the lamps in the Std mode and the overall light output of the fixture drops by ½ f-stop.

1.6 Dmx Termination / Termination Switch



All units must be correctly terminated if reliable operation is to be obtained. If not, signal loss can occur. The last unit in a Dmx chain must always be Terminated and set to Closed “I”. All Dmx fixtures within the chain must be set to Open “O”. The last fixture will absorb all energy in the Dmx line, ensuring Dmx signals are transmitted correctly. If a signal is not terminated, it is called a “reflected wave” and may create transmission errors by causing valid Dmx signals to be cancelled.

All Kino Flo Dmx products have a built-in Dmx Terminate switch. Other manufacturers’ products may require an external xlr terminate plug. The termination consists of a 120 ohm ¼ watt resistor fitted across pins two and three at the end of the line furthest from the Dmx transmitter.

1.7 Dmx Line Routing/ Jumpering



Kino Flo uses 5-pin xlr male and female connectors. Dmx units can be jumpered using the IN and OUT 5-pin xlr ports. As many as 100 Kino Flo Dmx units can be jumpered on one chain as long as the Dmx cable run remains under 1000 feet or 40 x 25ft Dmx cables.

Note: When operating Dmx units at great distances from the dimmer board, it is recommended to use Opto-Isolators to provide Dmx signal amplification.

1.8 Dmx512 Line Routing

- Dmx512 Lines can only be run as a daisy chain. The Line jumps from the console or dimmer board to one Dmx unit and then to the next and so on.
- The Dmx512 protocol indicates that only 32 Dmx units can be connected to one Line. Kino Flo Dmx units are equal to 1/8 of a standard device. If all units are Kino Flos, the potential theoretically would equal 256 units per line. (Kino Flo has tested up to 100 units but not 256).
- Dmx units may be connected to the line at any point along its length.
- Avoid long parallel runs with power cables. Dmx cables should be run separate from power lines and off of floors and catwalks.
- Avoid dimmer load cables wherever possible. (Crossovers of power and load cables are acceptable). Do not run Dmx cables in conduit or trunking with power cables carrying large currents. Doing so will cause interference and errors in Dmx transmission.
- Avoid locations where the cable may degrade over time, or alternatively, choose a suitably resistant cable.
- Use a strong cable and provide adequate support. Some cables are fitted with a core of high-tensile fibers.
- If cable is likely to come in contact with hot objects, like studio lighting fixtures, choose a type with PTFE, FEP or polyurethane jacket.

Important! Dmx512 lines cannot be split into branches by making up simple “twofer” adapter leads (Y cords).

If Dmx512 signals must be sent in different directions, then you must use a splitter amplifier. The amplifier requires a separate output for each branch that you need to provide.

Lines fed from splitter amplifiers must be treated individually as new Dmx512 lines. Each requires a Termination Resistor at the far end. Each is subject to the same 32 device maximum limitation or greater if the units are Kino Flos.

1.9 Dmx Isolation / Opto-Isolator



An Opto-Isolator is necessary when using multiple power sources or when Dmx devices are far apart. It's usually recommended for Dmx runs greater than 250ft.

The EIA485 system, by which the Dmx512 signals are sent, can in some circumstances suffer from problems due to equipment grounding. This effect is similar to the "hum loop" problem with audio equipment when multiple units are connected to mains ground.

If the grounds of all Dmx units are not the exact same voltage, then a current may flow down the shield between units. This current, if large enough, can cause errors, or even destruction of Dmx512 transmitters and receivers.

In small systems this is unlikely to occur. But in larger systems, it is advisable to isolate some or all of the Dmx units from each other and/or the console. It is strongly recommended that optical isolation is fitted where practical, or that the units chosen feature built-in optical isolation.

It is easy to isolate devices by means of an Opto-Isolator Amplifier. These are available from many manufacturers of Dmx512 equipment throughout the world.

Identification of isolated equipment can be carried out by means of a continuity Tester:

- Measure the resistance between pin one of a Dmx unit's input connector and the mains ground for that unit. If the measurement shows open circuit, or very high resistance, then the unit is isolated.

1.10 Dmx Cable Requirements



Kino Flo Dmx products use five-pin xlr male and female connectors to receive Dmx signals from the Dimmer Board and to jumper the units in a series. Dmx pin-out wiring follows the USITT Dmx512 standard:

- Pin 1: Shield** Foil and braid shield
- Pin 2: Data –** First conductor of the first twisted pair
- Pin 3: Data +** Second conductor of the first twisted pair
- Pin 4: Spare –** First conductor of the second twisted pair
- Pin 5: Spare +** Second conductor of the second twisted pair

Note: Pin four and five in the Dmx unit are connected internally as pin four to four and pin five to five. Connecting pin four and five as the pass-thru allows secondary data to be passed through for other equipment.

No connection should be made on the shell of either end of the xlr connectors.

1.11 Cable Type

The type of cable used is critical for reliable operation. It should conform to the following requirements for EIA485 (RS485) operation at 250k baud:

- Characteristic impedance 85-150 ohms, nominally 120 ohms
- Low capacitance
- One or more twisted pairs
- Foil and braid shielded
- 24 AWG min. gauge for runs up to 300m (1000ft)
- 22 AWG min. gauge for runs up to 500m (1640ft)

Do not use Microphone Cables and other general purpose, two-core cables designed for audio or signaling use. They are not suitable for Dmx512. Problems due to incorrect cabling may not be immediately apparent. Microphone Cables may appear to work fine, but systems built with such cables may fail or be prone to random errors. Cable must comply with EIA-485 (RS485).

As many as 100 x Dmx fixtures can be jumpered using the IN and OUT ports on one chain as long as the Dmx cable run remains under 1000 feet or 40 x 25ft Dmx cables.

Kino Flo Dmx Troubleshooting Guide

The following is a checklist of solutions to common problems with Dmx technology:

2.1 Dmx unit is not receiving signal.

- Dmx unit not set to valid address “001” to “512”.
- Dmx cable not connected to unit, dimmer board, not jumpered properly or faulty cable.
- Dmx unit not plugged into A/C or unit not turned on.
- Too many devices on the line. This could happen if you have DOL isolating receivers. Otherwise, up to 32 standard EIA485 receivers are allowed. Kino Flo Dmx units equal 1/8 of a standard device. If all units are Kino Flos, potential units equal 256.

2.2 Dmx unit is intermittent or flashing

- End of line not terminated. All fixtures except for the last fixture should be set to Open “O” and the last fixture set at Closed “I”.
- Faulty Cable
- Faulty channel on dimmer board or the dimmer board itself
- The conductors are connected at both ends of the cable. Dmx512 has a tendency to work intermittently even if the inverted data wire is cut (pin two).
- One of the data signals is missing. This may cause random flickering during an apparently normal operation.
- The introduction of an opto-isolator in the network clears up or reduces the problem. If so, there is probably a ground-loop effect taking place. You may be able to reroute the power cabling to minimize this. Otherwise, you may have to introduce an opto-isolator to some branches of – or the whole of – the Dmx network.

2.3 Don't have Fixture control

- Check that each fixture is manually set to "Fixture" mode.
- Each Fixture should have a unique address.

2.4 Don't have Individual Lamp control

- Check that each fixture is manually set to "Individual Lamp" mode.
- Must "reserve" addresses from one unit to the next. For example, an Image 85 has 9 addresses. Lamps are on addresses 1-8 and the 9th address controls the HO/Std setting. First fixture should be set on address channel 1. 2nd fixture should be set on address channel 10. (See Operation Manual for particular model or product.)

2.5 Random flashing of fixtures & lamps when powering up from a dimmer board

- Circuits must be set to **non-dim**. Turning on fixtures by dimming on power, causes Dmx receiver to malfunction resulting in erratic behavior of fixtures.

2.6 Dmx Resistance Tests

With transmitter (i.e. dimmer board) disconnected and all receivers attached, measure across the console-end male connector as follows:

Test	Normal Value	Abnormal Value	Possible Faults
Pin 1 – Pin 2	Greater than 2k ohms	Open circuit	Either no devices, only current mode devices or broken wire
		Less than approximately 200 ohms	Faulty receiver, short circuit in line or connector wiring error
Pin 1 – Pin 3	Greater than 2k ohms	Open circuit	Either no devices, only current mode devices or broken wire
		Less than approximately 200 ohms	Faulty receiver, short circuit in line or connector wiring error

Pin 2 – Pin 3	Approximately 90-120 ohms	Approximately 400 – 20k ohms	Missing or incorrect termination
		Open circuit	Broken wire or faulty receiver(s)
		Less than approximately 75 ohms	Multiple terminators on line, short circuit in line
Connector shell to any pin	Open circuit	Less than several Mega-ohms	Short circuit to connector body or moisture inside connector