

DMX

DMX (also known as DMX-512) stands for Digital Multiplex. The definition for multiplex is “using equipment permitting the simultaneous transmission of two or more trains of signals or messages over a single channel”.

So in theatre terms, one single DMX cable controls a full lighting rig. The original name DMX-512 was because one cable can control a maximum of 512 individual channels. DMX works using a universe. One universe is 512 individual channels. If you needed more than 512 individual channels then most modern lighting desks have more than one DMX universe output. In small scale theatre you will mostly only use one DMX universe. In large concerts and arenas then you may use several universe. You may run all your FOH lanterns on universe 1, FOH moving lights on universe 2, on-stage lanterns on universe 3, and on-stage moving lights on universe 4.

A lighting desks channels use values from 0 to 100. DMX uses values 0 to 255. When a channel is at 0 on the lighting desk, its DMX value is at 0. When a channel is at 100 (full) on the lighting desk, its DMX value is at 255.



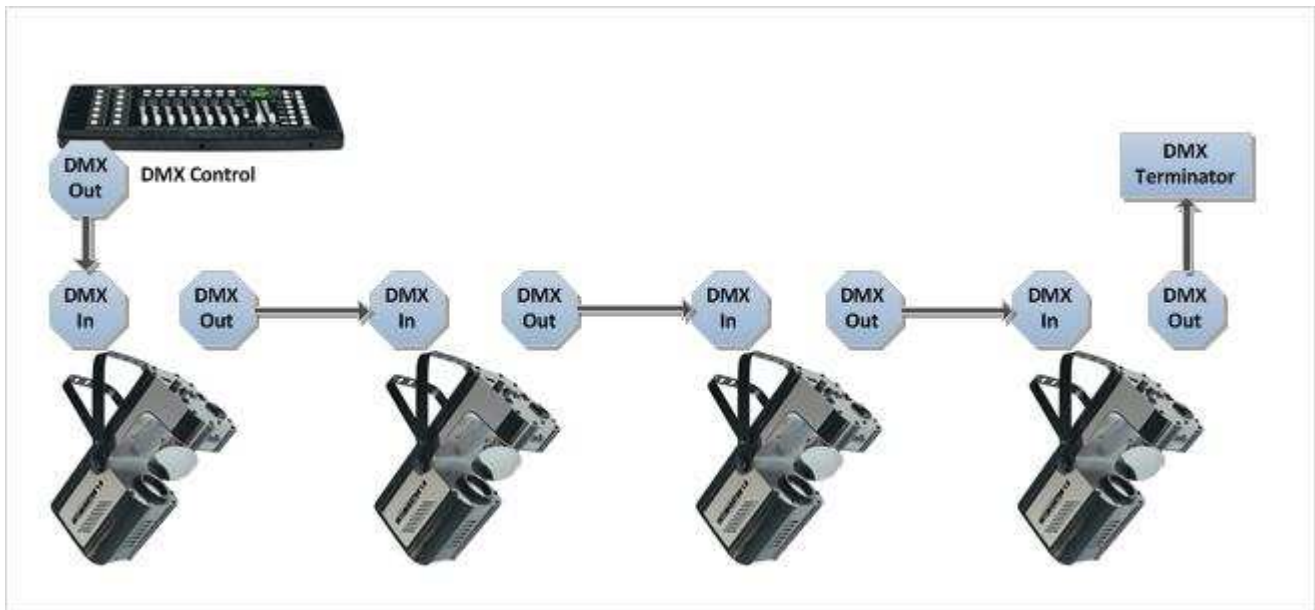
DMX uses a 5-pin XLR style connector.

Pin 1 = Ground, Pin 2 = Data -, Pin 3 = Data +, Pin 4 = Not Used, Pin 5 = Not Used.

Pins 4 & 5 were designed to carry a second DMX universe but consequently the standard practice is now to send additional universes on separate connectors and leave the secondary data link pins unused.

At the speed DMX works, correct wiring practice is important. Always arrange wiring that the data source is at one end of the cable. Never use a Y-connector but rather a DMX splitter.

All DMX lines must be correctly terminated at the end of the chain to stop signal loss. For example you are running DMX from a lighting desk to a dimmer, and then to a smoke machine. If the smoke machine doesn't have a built in terminator then you need to add one. Most DMX fixtures have a DMX in and out. The terminator will be plugged into the DMX out of the last fixture in the DMX chain.



A terminator looks like a DMX plug with no cable. Inside it has a 110ohm, 0.5W resistor across pins 2 & 3.



In order for a fixture to work when plugged into a DMX universe it must be addressed. The lighting desk can send up to 512 separate control messages down one DMX universe, but if nothing is address then no messages are received.

For example if we are using 2 of our 6 channel touring dimmers, then the first dimmer must be addressed to start at number 1, and the second must be addressed to start at number 7. When you bring up channel 1 on the lighting desk, the desk sends out a signal telling DMX channel 1 to increase in value. In this case the dimmer receives DMX channel 1 and increase in level to bring up a lantern. If nothing is addressed to receive DMX channel 1, then nothing will happen.

There are different ways to address DMX.

Dip Switch



The dip switch uses 10 switches that are set to on (up position) or off (down position). Each switch has a corresponding DMX value.

<u>Dip Switch</u>	<u>DMX Channel</u>
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128
9	256
10	512

If you have a light that needs a DMX address of 1, then your dipswitches will be set with only 1 in the on position.

If you have a light that needs a DMX address of 40, then your dipswitches will be set with 4 & 6 in the on position.

If you have a light that needs a DMX address of 393, then your dipswitches will be set with 1,4,8 & 9 in the on position.

Zero 88 use 3 address wheels. The first is your single value, the second is your 10's value, and the third is your hundreds value.

If you wanted to address a dimmer to start at 23, then you would turn the single's wheel to 3, the 10's value to 2 and the hundred's value to 0.

A lot of fixtures such as moving lights are addressed using a menu structure on its screen.



When a lighting desk is connected to a dimmer with 48 channels, you know that there are 48 channels being used on your lighting desk connected using 48 channels of DMX.

A fixture such as a moving light may use 15 or more DMX channels. An example of functions on each DMX channel would be:-

- Channel 1 = Dimmer
- Channel 2 = Colour 1
- Channel 3 = Colour 2
- Channel 4 = Pan
- Channel 5 = Tilt
- Channel 6 = Gobo 1
- Channel 7 = Gobo 2
- Etc.....

As mentioned at the beginning you can quickly see how you would need to use multiple universes when lighting concerts in an arena.

DMX can be used to control dimmers, moving lights, smoke machines, led fixtures, scrollers, computers running projectors etc.