

We typically refer to the lighting control protocol as DMX, but what is it, how does it work and what does it actually do.

Lighting control works on a technology called multiplex which originally was a low voltage analog protocol. As technology developed, a digital control was developed in order to carry more data control. Hence the name DMX which stands for **D**igital **M**ultiplex**X**. For the nerds, it's serial based packet communication of data over a two wire bus regardless of the connector on the end. It can carry up to 6 volts of DC power per pin.

You may also hear the current protocol referred to as DMX512. The 512 refers to the number of control channels that are contained in a specified **Universe**. One universe or one DMX run of cable can carry 512 control channels for lights. Within each one of those control channels is one of 256 control channel values (from 0-255).

Lighting fixtures are connected in line with the previous and the data passes in one fixture and then out again into the next device in line. Usually, DMX universes can accept up to 32 fixtures on one universe before the data packets start getting lost or corrupted.

All data is sent to all fixtures at all times and doesn't stop. Even when all fixtures are blacked out, it's still sending commands. It stops when the console or control device is shut down. How those fixtures behave when they lose DMX signal is fixture specific. They could hold their state, black out, or even run a specific preprogrammed function.

Each fixture you have connected to a universe and wired in line or daisy chained will receive all data packets sent through that universe. Which channels it decides to "listen" to depend on a few factors. The amount of control channels a fixture needs depends on the different parameters that can be controlled on that fixture. Some fixtures are pre-programmed to combine or separate different parameters into specified channels. This can give the user more individualized control of different parts of the fixtures and get really tweaky or, it can combine different control parameters and will provide less individualized control of elements in order to speed up programming or to allow other channels on a specific universe to be used elsewhere. This option on the fixture will be typically referred to as "Fixture Personality" or "Fixture Profile". The amount of channels it takes up on the universe is called "fixture space". Fixture space will tell you how many channels a specific fixture and a selected personality will take up on the universe.

The most common connections for DMX will be DMX 5-pin XLR however, you may see 3 pin XLR as well. The output or transmitting side is female while the input or receiving side is male.

While the connectors may seem similar to audio XLR lines, they're very different. The resistance level of the cable for analog audio versus digital data is different as well as the voltage they carry. Be careful not to connect a 3 pin DMX to a speaker or other device because the voltage could damage the speaker components. In the same vein, connecting a 3 pin audio cable to a light can also damage to a light fixture especially if phantom power from an audio console is passing through that line. Always double check what you're plugging in and where you're routing it to.

Typical pin out configurations are as designated below:

### **DMX XLR 5-pin**

1-Ground

2-Data 1 (-) (Primary data link)

3-Data 1 (+) (Primary data link)

4-Not typically used (can be used as a secondary data link as the negative terminal)

5-Not typically used (can be used as a secondary data link as the positive terminal)

### **DMX XLR 5-pin**

1-Ground

2-Data 1 (-) (Primary data link)

3-Data 1 (+) (Primary data link)

### **DMX RJ-45 Connector**

1-Data 1 (+)

2-Data 1 (-)

3-Data 2 (+)

4-Not assigned

5-Not assigned

6-Data 2 (-)

7-Signal ground for Data 1

8-Signal ground for Data 2

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