

The DMX Base Address

This is a short guide to the configuration of base addresses for DMX equipment. All receivers on a DMX bus are allocated a base address that may be represented by a 9 bit binary number. The address determines the first slot that is used by the receiving device.

Here are some examples:

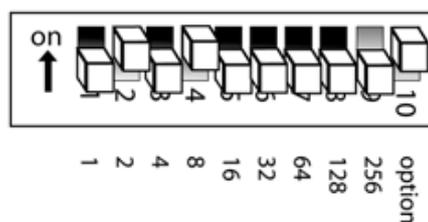
- A device that uses four channels and has a base address of 1 will interpret the slots 1,2,3 and 4 to control its output values.
- A device that uses two channels and has a base address of 6 will ignore (skip) the first 5 slots (1-5) and will receive the slots 6 and 7.

There are three common ways to set the base address.

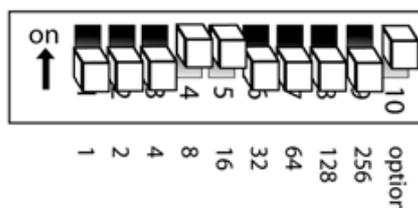
- The most common way is to use a Dual In Package (DIP) switch.
- A common way for devices that require more frequent configuration is to store the base address in flash memory and use a 3 digit LED/LCD display to show the current value. The address is usually set using up and down switch inputs.
- Finally, devices that support Remote Device Management (RDM) allow the base address to be set remotely using the DMX control bus. Some devices also display the present value using an LCD/LED display.

Setting the DMX Base Address using DIP Switches

The DIP switch method usually uses a 10-way, which consists of 10 microswitches. Each switch is wired so that when it is “on”, it connects an input to ground (inputs to microcontrollers normally float to a logical “1” when they are not connected, although for some inputs it is preferable to add a high-value resistor to the positive supply to ensure predictable operation). Since a DMX address requires 9 bits (each digit corresponding to 1 2 4 8 16 32 64 128 256), this leaves one switch spare - that could be used to configure an option (e.g. a self-test mode).



DIP switch setting for a base address of 10 (2+8=10). The least significant bit is usually on the left side, hence switch 1 has a value 1, switch 2 has a value 2, switch 3 has a value 4, switch 4 a value 8, etc. Note: 10th bit is used for other configuration.

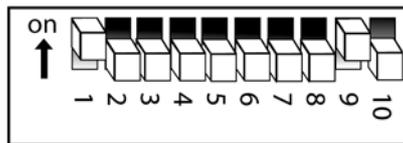


DIP switch setting for 24 (16+8=24). Note: 10th bit is used for other configuration.

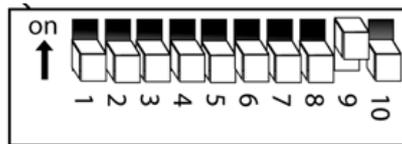
Using fewer DIP switches to represent the base address

Although the DMX specification allows any base address in the range 1-512, some manufacturers place constraints on the base address, for instance to only allow addresses to be configured on 8-slot boundaries, or to not support the full range of values. For instance, a manufacturer may choose to allocate some of the switches for configuration settings. These switch positions could allow a general-purpose board to configure the outputs in various ways: some as digital outputs, some as dimmer (PWM synchronised to mains zero crossing), some as direct PWM for servo control or LED lighting control.

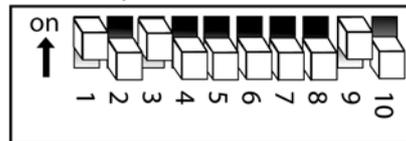
In the examples below, a weighting of 2^3 (8) is used for the first switch. The slot value is derived from the DIP switch setting on switches 1 to 5 by multiplying the binary value by 8 and then adding one to result. This gives a maximum base address of 249. A similar configuration is used for the Milford Instruments DMX receiver (1-479).



DIP switch setting for 1 = $8 \times 0 + 1$ (for an 8 channel device configured in 8 channel groups, Note: bits 6,7,8,9,10 is used for other configuration)



DIP switch setting for 9 = $8 \times 1 + 1$ (for an 8 channel device configured in 8 channel groups, Note: bits 6,7,8,9,10 is used for other configuration)



DIP switch setting for 41 = $8 \times 5 + 1$ (for an 8 channel device configured in 8 channel groups), note: bits 6,7,8,9,10 is used for other configuration)

The two things to remember to check is which switch represents the least significant bit of the address, and to note the weighting for this bit (i.e. does switch 0 represent 2^0 (1) or it could represent some other value, e.g. 2^2 (4) or 2^3 (8)).

Resources

A lot of people find binary manipulation hard to visualise, and some helpful people have built applets for phones, iPods and computers to help people get to grips with this. One example is the calculator available on-line at:

<http://www.sabretechnology.co.uk/downloads/dipcalc.swf>