

DMX USB Pro Widget API Specification 1.42

Purpose

This document specifies the interface requirements for PC based application programs to use the DMX USB Pro Widget to send or receive DMX512 packets.

PC Setup

Install the VCOM [FT245BM](#) device driver on the PC.

Application Message Format

The PC based application program communicates with the Widget via the FTDI driver. The table below specifies the general format of the messages between the application program and the FTDI driver.

Size In Bytes	Description
1	Start of message delimiter, hex 7E.
1	Label to identify type of message. See below for value.
1	Data length LSB. Valid range for data length is 0 to 600.
1	Data length MSB.
data_length	Data bytes.
1	End of message delimiter, hex E7.

Application Messages

1. Reprogram Firmware Request (Label = 1, no data)

This message requests the Widget firmware to run the Widget bootstrap to enable reprogramming of the Widget firmware.

2. Program Flash Page Request (Label=2)

This message programs one Flash page of the Widget firmware. The Flash pages must be programmed in order from first to last Flash page, with the contents of the firmware binary file.

Size In Bytes	Description
64	One page of firmware binary file.

3. Program Flash Page Reply (Label=2)

The Widget sends this message to the PC on completion of the Program Flash Page request.

Size In Bytes	Description
4	Success character array, set to 'TRUE' if firmware page was programmed successfully, set to 'FALS' if firmware page programming failed.

4. Get Widget Parameters Request (Label=3)

This message requests the Widget configuration.

Size In Bytes	Description
1	LSB of user configuration size in bytes. Valid range for user configuration size is 0 to 508.
1	MSB of user configuration size in bytes.

5. Get Widget Parameters Reply (Label=3)

The Widget sends this message to the PC in response to the Get Widget Parameters request.

Size In Bytes	Description
1	Firmware version LSB. Valid range is 0 to 255.
1	Firmware version MSB. Valid range is 0 to 255.
1	DMX output break time in 10.67 microsecond units. Valid range is 9 to 127.
1	DMX output Mark After Break time in 10.67 microsecond units. Valid range is 1 to 127.

Size In Bytes	Description
1	DMX output rate in packets per second. Valid range is 1 to 40.
user_configuration_size	User defined configuration data. See Set Widget Parameters request.

6. Set Widget Parameters Request (Label=4)

This message sets the Widget configuration. The Widget configuration is preserved when the Widget loses power.

Size In Bytes	Description
1	LSB of user configuration size in bytes. Valid range for user configuration size is 0 to 508.
1	MSB of user configuration size in bytes.
1	DMX output break time in 10.67 microsecond units. Valid range is 9 to 127.
1	DMX output Mark After Break time in 10.67 microsecond units. Valid range is 1 to 127.
1	DMX output rate in packets per second. Valid range is 1 to 40.
user_configuration_size	User defined configuration data.

7. Received DMX Packet (Label=5)

The Widget sends this message to the PC unsolicited, whenever the Widget receives a DMX packet from the DMX port, and the Receive DMX on Change mode is 'Send always'.

Size In Bytes	Description
1	DMX receive status. When this is 0, the DMX data in this message is valid. When this is nonzero, the DMX data in this message is corrupted. Bit 0: 0=No error,1=Widget receive queue overflowed. Bit 1: 0=No error,1=Widget receive overrun occurred.
1 to 513	Received DMX data beginning with the start code. The size of the received DMX data can be determined from the overall message size.

8. Output Only Send DMX Packet Request (Label=6)

This message requests the Widget to periodically send a DMX packet out of the Widget DMX port at the configured DMX output rate. This message causes the widget to leave the DMX port direction as output after each DMX packet is sent, so no DMX packets will be received as a result of this request.

The periodic DMX packet output will stop and the Widget DMX port direction will change to input when the Widget receives any request message other than the Output Only Send DMX Packet request.

Size In Bytes	Description
1 to 513	DMX data to send, beginning with the start code. The overall message size specifies the size of the DMX data to send.

9. RDM Send DMX Packet Request (Label=7)

This message requests the Widget to send a DMX packet out of the Widget DMX port, and then change the DMX port direction to input, so that DMX packets can be received.

Size In Bytes	Description
1 to 513	DMX data to send, beginning with the start code. The overall message size specifies the size of the DMX data to send.

10.Receive DMX on Change (label = 8)

This message requests the Widget send a DMX packet to the PC only when the DMX values change on the input port.

By default the widget will always send, if you want to send on change it must be enabled by sending this message.

This message also reinitializes the DMX receive processing, so that if change of state reception is selected, the initial received DMX data is cleared to all zeros.

Size In Bytes	Description
1	0: Send always 1: Send on data change only

11.Received DMX Change Of State Packet (Label=9)

The Widget sends one or more instances of this message to the PC unsolicited, whenever the Widget receives a changed DMX packet from the DMX port, and the Receive DMX on Change mode is 'Send on data change only'.

Size In Bytes	Description
1	Start changed byte number.
5	Changed bit array, where array bit 0 is bit 0 of first byte and array bit 39 is bit 7 of last byte.
1 to 40	Changed DMX data byte array. One byte is present for each set bit in the Changed bit array.

The user program can decode the message into a 513 byte received DMX data array, beginning with the start code. The algorithm to do this is shown below:

On startup, zero out the 513 byte received_dmx_array

For each Change Of State packet received

 changed_byte_index = 0

 For bit_array_index = 0 to 39

 If changed_bit_array[bit_array_index] is 1 then

 received_dmx_array[start_changed_byte_number * 8 + bit_array_index] =
 changed_dmx_data_array[changed_byte_index]

 Increment changed_byte_index

 Endif

 Endfor

Endfor

12.Get Widget Serial Number Request (Label = 10, no data)

This message requests the Widget serial number, which should be the same as that printed on the Widget case.

13.Get Widget Serial Number Reply (Label = 10)

The Widget sends this message to the PC in response to the Get Widget Serial Number request.

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Size In Bytes	Description
4	BCD serial number, with LSB stored at lowest address. On old Widgets, the serial number was not programmed, and the value would be hex 0FFFFFFF.