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DMX Communications Protocol V1.7

DOC:9M010

The purpose of this document is to define the serial communications protocol between the host (any RS232 compatible device) and the DMX unit.
The command list is devided into two sections, normal command list and debug command list. You should always use the normal command list in you applications.

Not all commands are available on each unit, please refer to the documentation of each unit for the exact set of commands implemented.

Normal Command List

Code	***Name***
S	Set DMX properties
E	EEprom Functions
R	RS232 parameters
X	DMX write/read frame
V	Unit Version Information
F	Fade
H	Show Commands
C	Read input DMX into Memory
I	Read input DMX Timings and Start Code
J	Jump to specified scene
L	Load Scene from Show

Debug Command List

Code	***Name***
Z	Reset Device
D	Read Ram Memory
W	Write Ram Memory

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S Command

S0 Modify the DMX512 TX parameters

Warning the x,y and z values are BINARY data, not ascii, to send a start code of 0 you will have to send the following datastream: 0x53 0x30 0x00 ... ...

Format	S0xyzn
Parameters:	x = start code
	y = Break length in 4us increments (16 bit number)
	z = Mab length in 4us increments
	n = number of DMX512 channels we want to send (16 bit number)
Result:	'!' = OK
	'?' = Command error or not understood

S1 Stop DMX

Format	S1
Result:	'!' = OK

S2 Start DMX

Format	S2
Result:	'!' = OK

S3 Set Start DMX buffer

Format	S3x
Parameters:	x = 512 bytes of dmx data
Result:	'!' = OK after each data byte

S4 Enable DMX pass through

Format	S4
Result:	'!' = OK

S5 Disable DMX pass through

Format	S5
Result:	'!' = OK

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E Command

Read and write the on board EEProm

E0 Command, write EEPROM

Warning: During a long upload the DMX TX will be paused.
Between each byte of data the device will send back '!' to acknowledge the write, you must wait for this handshake caracter before sending another byte.

Format	E0xyzc
Parameters:	x = start adress eg:0000
	y = size of data to upload eg 2000 bytes
	z = binary data to upload
Result:	'!' = OK
	'?' = Error

E1 Command, read EEPROM

Warning: During a long download the DMX TX may be paused.

Format	E1xy
Parameters:	x = start adress eg:0000
	y = number of bytes to read eg: 1000 bytes
Result:	Number of bytes reguested in this range
	'?' = Command error or not understood

R Command

This command will set the RS232 communications protocol parameters

Warning: After a communications speed change, the result code will be returned at the new speed. The unit will return the Result code 3 times.
It is strongly recomended to work at the highest possible speed. On low communication speeds the DMX TX may be paused for long periods while downloading buffers.

Default is : 9600 bauds, no hanshaking, 1 stop bit, no parity

(Letters are capital)

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Format	Rn
Parameters:	n = A set the speed to 230400 buads n = B set the speed to 115200 bauds n = C set the speed to 57600 bauds n = D set the speed to 28800 bauds n = E set the speed to 14400 bauds n = F set the speed to 7200 bauds n = G set the speed to 3600 bauds n = H set the speed to 1800 bauds n = I set the speed to 76800 bauds n = J set the speed to 38400 bauds n = K set the speed to 19.2 bauds n = L set the speed to 9600 bauds n = M set the speed to 4800 bauds n = N set the speed to 2400 bauds n = O set the speed to 1200 bauds n = P set the speed to 600 bauds
Result:	'!' = OK '?' = Failed communication speed was not changed

X Command

This command must be used to update the DMX TX buffer and read the DMX RX buffer

Page 0 is the default DMX TX page. Page 1 is only used for the F (fade) commands

X0 Command, write DMX buffer page 0
Warning: During a long download the DMX TX may be paused.

Format	X0z
Parameters:	z = 512 bytes of binary data
Result:	'!' = OK '?' = Command error or not understood

X1 Command, write DMX buffer page 1
Warning: During a long download the DMX TX may be paused.

Format X1z
Parameters: z = 512 bytes of binary data

Result: '!' = OK
'?' = Command error or not understood

X2 Command, read DMX buffer
Warning: During a long upload the DMX TX may be paused.

Format X2

Result: 512 bytes of data
'?' = CRC check failed

X4 Command, write one byte into DMX buffer page 0

Format X4xz
Parameters: x = address of byte to change (16 bits)
z = data (8bits)

Result: '!' = OK
'?' = Command error or not understood

Xn Command, set TX buffer to predefined pattern

It is strongly recomended to use these functions as much as possible as they are executed at very high speeds (300 times faster then an update with 'X0') by the internal processor

n = 6 Clear memory, all values et to 0
n = 7 Set all values to full (0xFF)
n = 8 Set all values to half (0x7F)
n = 9 Ramp values 0 to 256 to 0

V Command

This command will return a string representing the version information of the unit and the capabilities code.

Format V
Parameters: nil

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Result: 'V1.00 CP15'

Capabilities code definition:

First Letter: Product Type
P = DMXPlayBack
O = DMXOem
Z = Reserved

Second Letter: Reserved

Third Letter: Reserved

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F Command

This command is used to fade between two scenes.
The fade will start as soon as the command is received.

It is strongly recomended to use this function (in contrast to manual update with the X command) for fading as all fades are calculated internally at very high speeds.

Format	F0xyn
Parameters:	x = Fade start memory, this is the memory page containing the fade start values. y = fade end memory, this page contains the fade end values. n = fade time calculated as : n = ms / (11.5) ms is milli seconds Valid values for n go from 200 to 700000 (700000 is 11 minutes)
Result:	'!' = OK '?' = Command error or not understood

Warning the n value is 16 bit BINARY data, not ascii, to send a fade time of 2 seconds from page 0 to page 1, you will have to send the following datastream: 0x46 0x30 0x30 0x31 0x00 0xAE

0xAE = 2000 / 11.5 = 174

In the DMXPlayback MK2 the fade time is in hundredths of a second. There is NO need for clauculations

example 0x46 0x30 0x31 0x00 0x20
will fade from 0 to 1 in 0x20 = 32 = 3.2 seconds

Also, please note: The memory pages do not alternate anymore in the DMXPlayback MK2 , page 0 is ALWAYS the DMX transmit page and page 1 is ALWAYS the next scene page. You always fade from 0 to 1

So to run a show you would

Load 0
Load 1
Fade 0 to 1
Load 1
Fade 0 to 1
Load 1
Fade 0 to 1

H Command

This command is used to start,stop a show and set the show to run.

H0 Command, Start Show

Format H0

If no show is stored this will have no effect

H1 Command, Stop Show

The command will stop the show.

Format H1

H3 Command, Start Show with loop times

Format H3x

Warning the X value is 8 bit BINARY data, not ascii.

This command will start the show and loop X times.
To run the show once X must be set to 0x00 the maximum number of loops is 100. If X is set to 101 the show will loop forever.

H5 Command, Erase Show

The command will stop the show.

Format H5x
Warning the X value is 8 bit BINARY data, not ascii.

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HA to HZ Command, Set Show to Run

This command will set the show to run, HA is the first show HB the second and so on.
To Run a diferent show you must first stop the current show, set the show to run and then start the show again.
Eg:
To run show C you would send the following commands:

H1 HC H0

H2 Command, Get current running show

Format H2

Result: if a show is runnin, the device will return the letter of the corresponding show
If no show is running 0 (zero) will be returned

C Command

Read DMX RX

When you issue this command data may be sent up to 2 seconds after the command is sent. This will be the case if no DMX signal is present. Otherwise the data will be sent as soon as the DMX frame has been read.

Format I

Result: n
n = number of DMX512 channels the unit has received (16 bits)

If the unit cannot read any DMX signal the channel count will be 0

I Command

Read DMX RX Timings and start Code

When you issue this command data may be sent up to 2 seconds after the command is sent. This will be the case if no DMX signal is present. Otherwise the data will be sent as soon as the DMX frame has been read.

Format I

Result: nxyz

n = number of DMX512 channels the unit has received (16 bits)
x = Break length (24 bit number) formula is:
Break Length in nano seconds = 340x + 120
y = Mab length (24 bit number) formula is:
Break Length in nano seconds =200y+ 120
z = Start Code

If the unit cannot read any DMX signal the break length will be set to 0xFFFFFF, and channel count will be 0

J Command

Jump to a particular scene in the show

For the function to work properly you must **download the show with no scene compression**.

Format	Jx
Parameters:	x = Number of the scene to jump to
Result:	'!' = OK '?' = Command error or not understood

L Command (Firmware V2.21 and above)

This command will load a selected scene from aselected show into the specified memory page

Fromat	Lxyz
Parameters	x=Destination memory page (same as in Fade command) y=Source show (A to Z) z=Scene index
Result:	'!' = OK '?' = Command error or not understood

Warning the z value is 8 bit BINARY data, not ascii. In the DMXPlayback MK2 z is a 16 bit number MSB first.

example : 0x4C 0x00 0x41 0x00 0x00
will load scene 0 from show A into memory page 0 (the DMX transmit page)

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example 0x4C 0x01 0x41 0x00 0x01
will load scene 1 from show A into memory page 1 (the next scene page)

DEBUG Command List

Z Command

This command will do a soft reset on the unit.

Format	Z
Parameters:	nil
Result:	nil

D Command

Dumps the specified Ram page, each ram page is 512 bytes in size

Format	Dn
Parameters:	n= ram page to download
Result:	512 bytes of binary data

W Command

Writes the specified Ram page, each ram page is 512 bytes in size

Format	Wn
Parameters:	n= 512 bytes of binary data
Result:	'!' = OK
	'?' = Command error, not understood or time out

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