

## RS-232 to DMX512 Interface, 3rd Generation

model: 2322DMX

September 2021 (Software V2.0)

For Serial Number 223148 and higher

The third generation RS-232 to DMX512 interface has numerous features beyond the original devices. The protocol described in this document supports the new features. All existing commands and command syntax from the second generation version of this product are fully supported. Replacing an existing second generation interface with the new version should require no hardware or software changes on the host control system.

### Connections

The RS-232 signals are available on the front panel DB-9M connector and on the 3 pin female XLR connector or terminal block on the rear panel. Please connect to only one of these ports. You may not use the two ports simultaneously.

The front panel DB-9M connector pinout is:

Pin Number	Function
2	Receive data
3	Transmit data
5	Common

The rear panel 3 pin XLR connector pinout is:

Pin Number	Function
1	Common
2	Receive data
3	Transmit data

The male and female 5 pin XLR connectors or terminal blocks are in parallel. When the interface is configured for transmitting (mode zero), only the female output connector should be used. When the interface is configured for receiving (mode one), the external DMX source should be connected to the male input connector. The female output connector can be used to connect to other DMX devices. If the female output “thru” connection is not used, a 120 terminator should be connected.

The pinout for the 5 pin XLR connectors is:

Pin Number	Function
1	Common
2	DMX data minus
3	DMX data plus
4	Connected from input to output only
5	Connected from input to output only

## Indicators

The red POWER LED will illuminate when the interface is powered.

The green MIMIC LED will display the relative intensity of the DMX slot which is selected on the address switches just above the MIMIC LED. While transmitting, the LED will display the level of the selected outgoing channel. While receiving, the LED will display the level of the selected channel of the incoming DMX signal.

The green SIGNAL LED will flash when an RS-232 command is received while in transmitting zero. While in receiving mode, the SIGNAL LED will turn on when DMX input is present.

## Address switches

The address switches select a “channel of interest”. While in transmitting mode, the MIMIC LED will display the relative intensity of the selected channel. While in receiving mode, the MIMIC LED will display the relative level of the selected channel and the interface will report changes in level for the channel of interest through the RS-232 port using the standard level format described in the protocol below.

## Communication port settings

The RS-232 port is configured with the following settings:

Baud	9600
Start bits	1
Data bits	8
Parity	None
Stop bits	1

No handshake signals are required or provided.

The RS-232 port is full duplex and the receiver has a 256 byte circular buffer.

If you are using a Windows computer, the comm port flow control must be set to “None”. The FIFO buffers should be disabled.

## Protocol

All commands are sent in plain ASCII format. Each command is terminated with a carriage return <CR>. This is the character used by the interface to trigger any action. The hexadecimal value for the <CR> is 0x0d.

After receiving a carriage return, the interface will respond with “OK” if the command was formatted and processed successfully. If there was any syntax problem, the interface will respond with “Error”.

Spaces between characters are optional. All letters can be either upper or lower case. All channel numbers are in the range of 1-512. All channel levels are in decimal format

in the range of 0-255. All preset numbers are in the range of 1-20. All times are in the range of 0-999. Leading zeros are allowed and are optional. The total number of digits must not be more than is allowed for the given parameter. For example, sending a preset number as "005" will cause an error because only two digits are allowed in preset numbers. Sending "05" as a preset number is acceptable. Similarly, a channel number of "004" is OK while "0004" would cause an error.

One special command is executed immediately without the <CR> terminator. Sending the ASCII dollar sign character (\$) will cause the interface to immediately reset. This feature was added as a fallback in case the input buffer becomes overrun. Any pending actions are aborted when this character is received.

ASCII character	Command	
C	Channel number (or list)	1-3 digit number (range 1-512)
F	Record a fade time to a preset	1-3 digit number (range 0-999)
H	Heartbeat (on/off)	1 digit (range 0-1)
L	Channel level (same as @)	1-3 digit number (range 0-255)
M	Mode (DMX transmit or receive)	1 digit (range 0-1)
P	Play a preset	1-2 digit number (range 1-20)
R	Record a preset	1-2 digit number (range 1-20)
S	Remote station support	1 digit (range 0-1)
T	Temporary time fade value	1-3 digit number (range 0-999)
U	Update software	No longer supported
V	Version number	None
Z	Set all levels to zero	None
@	Channel level (same as L)	1-3 digit number (range 0-255)
?	Query	Letter C followed by a 1-3 digit channel number or P, T, F, D, or M
\$	Reset interface	None

### Setting a channel or a channel list to a level

The format for setting a channel to a level is:

C ### L ### <CR>                    or:                    C ### @ ### <CR>

For example, setting a channel to a level could be sent as:

C 15 L 255 <CR>

In this example, channel 15 would be set to a level of 255.

A time may also be assigned to the move to the new level. The format is:

C ### L ### T ### <CR>

For example:

C 15 L 45 T 5 <CR>

In this example, channel 15 would fade from its current level to a level of 45 in 5 seconds.

Note that setting channels to levels is not supported while the interface is in receiving mode. Attempting to set a channel to a level while in receiving mode will result in an error message.

New to this version of the 2322DMX is the ability to create complex channel lists using the '+' and '-' characters. Any combination of channels can be selected and set to a level. The format is the same as for setting a single channel to a level including the optional time parameter. For example:

```
C 10 - 15 + 25 + 500 @ 255 T 7 <CR>
```

In this example channels 10, 11, 12, 13, 14, 15, 25, and 500 will all fade to a level of 255 (full) over a seven second fade time.

Note that channel order is not important. Thus, the following command would yield the same results:

```
C 500 + 25 + 15 -10 @ 255 T 7 <CR>
```

### **Setting a level on an existing channel list**

The '@' or 'L' command is used to set an existing channel list to a new level. The format for this command is:

```
@ ### <CR>      or      L ### <CR>
```

For example:

```
@ 128 <CR>
```

In this example, the list of channels that were previously set to a level using the 'C' command will all be set to the level of 128. This allows the user to create a complex channel list and then alter the level of those channels without the need to re-enter the list again.

An optional time parameter may also be included with this command using the format:

```
L ### T ### <CR>
```

For example:

```
L 34 T 3 <CR>
```

In this example, the level of the previously selected channel list will all fade to a level of 34 over a three second fade time. Again, the 'L' and '@' characters can be used interchangeably.

## Setting a temporary fade time

The 'T' command is used to set the current fade time. This will be applied to any future channel fades using the 'C', '@', or 'L' commands. Note that the fade time will be overwritten if a preset is recalled. The fade time will be set to the time recorded with the preset or the temporary fade time used optionally in the preset play command.

The format for this command is:

```
T ### <CR>
```

For example:

```
T 10 <CR>
```

In this example, the next time a channel or list of channels is set to a level, those channels will move in toward those new levels over a 10 second fade. This assumes that no time is included with the future level setting commands.

## Recording a preset

The RS-232 to DMX512 interface can record 20 different presets. Once levels have been set using the channel command, those levels can be recorded in a preset for later recall. While the interface is in receiving mode, DMX levels from an external source (a console) can be recorded. The format for this command is:

```
R ## <CR>
```

For example:

```
R 5 <CR>
```

In this example, the current output levels will be recorded into preset 5. If the interface is in receiving mode, the current DMX input levels will be recorded into preset 5.

A default time of 2 seconds is recorded with each preset. The time recorded with the preset can be changed using the "F" (fade) command.

## Playing a preset

The 20 presets can be recalled using the play preset command. The interface uses a "radio button" action. When one preset is recalled, all output channels go to the recorded levels for the new preset. Thus, only one preset is active at a time. Once the preset is "live", individual channels can be set to new levels to create new presets or to modify the existing look. Note that this command only works while the interface is in transmit mode. Attempting to play a preset while in receiving mode will result in an error message.

The format for playing a preset is:

```
P ## <CR>
```

For example:

```
P 5 <CR>
```

In this example, preset 5 will be recalled. The output will fade to the levels in preset 5 in the fade time recorded with the preset.

The fade time for a preset can be temporarily overridden using the time parameter in the preset recall command using the format:

```
P ## T ### <CR>
```

For example:

```
P 10 T 8 <CR>
```

In this example, preset 10 will be recalled. The output will fade to the levels in preset 10 using an 8 second fade regardless of the fade time recorded with preset 10 originally. Note that this new fade time is temporary. To permanently change the fade time for the preset, you must recall the preset and then change the fade time for that preset using the F command.

### **Changing the fade time recorded with a preset**

Each preset has a default fade time of 2 seconds. The fade time associated with each preset can be changed so that when the preset is played, its revised fade time is also recalled. The fade time command sets the time for the last preset recalled. To set the time of a particular preset, recall that preset using the play preset command and then set its time using the command format:

```
F ### <CR>
```

For example:

```
F 10 <CR>
```

In this example, the currently active preset's fade time will be set to 10 seconds.

### **Clearing outgoing levels**

The 'Z' (zero) command is used to set all DMX channels to 0. This is useful for clearing all levels as a starting point to build a new preset. The format for the command is:

```
Z <CR>
```

Entering this command will immediately set all channels to zero. No parameters are allowed with this command.

Note that this command is only valid while in the transmit mode. Entering this command while in receiving mode will result in an error message.

## Software version

The 'V' (version) command is used to view the installed software version number. The format for the command is:

```
V <CR>
```

There are no parameters allowed with this command.

## Setting the mode (transmit or receive)

The 'M' (mode) command is used to select whether the DMX port is set to transmit or receive. While in transmit mode, the interface is the source of DMX like a console. While in receive mode, an external DMX source can be used to set up looks. The RS-232 to DMX interface can record those looks into its presets and queries can be used to retrieve the current incoming DMX levels. Mode 0 sets the interface to transmit DMX. Mode 1 sets the interface to receive DMX. The format for the mode command is:

```
M # <CR>
```

For example:

```
M 1 <CR>
```

In this example, the interface will be set to receive DMX.

The mode selection is stored in non-volatile memory and will be recalled on power up.

## Query for information

The '?' (query) command is used to request status information from the interface.

The current level of a specific channel can be requested. The '?' is followed by a 'C' and then the channel number being requested. The command format is:

```
? C ### <CR>
```

For example:

```
? C 451 <CR>
```

In this example, the interface would return the current level of channel 451 in the format:

```
C451@??? <CR> (where ??? is the decimal level for the channel)
```

Sending a query for channel 0 will cause the interface to respond with the current levels for all 512 DMX channels. For example:

```
? C 0 <CR>
```

In this example, the interface would return the values for all channels in the format:

```
C001@???  
C002@???  
...  
...  
C512@???
```

Note that all channel level queries can be used to determine the level of DMX being sent by the interface in transmit mode or of incoming DMX levels while in receive mode.

Sending a query for 'P' after the '?' will cause the interface to respond with the currently active preset. For example:

```
? P
```

Note that if a channel level has been changed after a preset has been recalled, the preset number reported will be preset 0. This indicates that the levels are not representative of any recorded preset.

In this example, the interface would return the number of the active preset in the format:

```
P ##
```

Sending a query for 'T' or 'F' after the '?' will cause the interface to respond with the currently active fade time. For example:

```
? T
```

In this example, the interface would return the current fade time in the format:

```
T ###
```

Note that requesting either 'T' or 'F' will return the fade time using the 'T' prefix.

Sending a query for 'M' after the '?' will cause the interface to respond with the currently active system mode. For example:

```
? M
```

In this example, the interface would return the current system mode in the format:

```
M0 (TRANSMIT) or M1 (RECEIVE)
```

Sending a query for 'D' after the '?' will cause the interface to respond with the status of the DMX input. This feature is only valid while the interface is in receiving mode (M1).

The syntax for this command is:

```
? D
```



In this example, the interface will return the state of the DMX input signal if the system is in DMX receiving mode (M1) in the format:

DMX OK <CR>                      or                      DMX no signal <CR>

If the interface is in transmitting mode (M0), the interface will respond with an error as follows:

Error <CR>  
Feature Not Supported <CR>  
in TX mode (mode 0) <CR>

### **Setting the heartbeat**

The 'H' (heartbeat) command is used to select whether the heartbeat is on or off. When enabled, a period "." is sent from the RS-232 port every 1 second to allow a control system to detect that the interface is connected. Setting the heartbeat equal to 1 turns the feature on. Setting it to 0 (the default) turns the feature off. The format for this command is:

H # <CR>

For example:

H 1 <CR>

In this example, the interface will start sending heartbeat characters.

The heartbeat selection is stored in non-volatile memory and will be recalled on power up.

### **Setting the remote station support mode**

The 'S' (remote station) command is used to select whether the interface will support a Preset 10 remote station on the DMX port. When enabled, alternate start code packets are sent from the interface and remote stations are allowed to reply to select presets. The default value for this feature is 0 (disabled). When set to 1, remote stations are enabled. The interface may be queried to determine the current active preset. When enabled, remote stations the interface will send a message when a remote station has changed the active preset. The format for this command is:

S # <CR>

For example:

S1<CR>

In this example, the interface will be set to support remote stations.

The remote station support value is stored in non-volatile memory and will be recalled on power up.

When a preset is recalled from the remote station, the interface will send a message from the RS-232 port. This message is in the format:

```
REMOTE P ## <CR>
```

When remote stations are enabled, the yellow time fade LED on those stations will illuminate while the 232DMX interface is performing a timed fade. This will happen whether a preset is fading or if individual channels are being faded.

When no preset is selected (preset 0) or if presets 11 – 20 are active, no green preset LEDs will be illuminated on the remote station(s).

### **Receive mode channel reporting**

While in receive mode (mode 1), the interface will report changes in the incoming DMX512 levels. When the address switch is set from 1-512 (inclusive), changes to the addressed “channel of interest” will be reported through the RS-232 port in the format:

```
C###@??<CR>
```

### will be the channel number of interest and ?? will be the newest level for that channel.

If the address switches are set to 000, any change to any channel will cause that change to be reported via the RS-232 port.

### **Resetting the interface**

The '\$' command is used to reset the interface. This special command does not need the <CR> to be executed. As soon as the interface receives this character, it will reset the interface. This is equivalent to cycling the power to the interface.

### **Updating the software**

The 'U' (update software) command is no longer supported by this product. Entering this command will result in an error message.

## **Limited Manufacturer's Warranty**

Products manufactured by Doug Fleenor Design (DFD) carry a five-year parts and labor warranty against manufacturing defects. It is the customer's responsibility to return the product to DFD at the customer's expense. If covered under warranty, DFD will repair the unit and pay for return ground shipping. If a trip is necessary to the customer's site to solve a problem, the expenses of the trip must be paid by the customer.

This warranty covers manufacturing defects. It does not cover damage due to abuse, misuse, negligence, accident, alteration, or repair by other than by Doug Fleenor Design.

Most non-warranty repairs are made for a fixed \$50.00 fee, plus shipping.

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