

Crestron **CGDMX-512BI / B**

Bi-directional DMX512 Interface Operations Guide

Crestron Media Processor and DMX512 In
HTP / LTP or exclusive processed
to DMX512 Output
[single channel configurable]

DMX In or merge result to Crestron Media Processor
Inclusive RETIMER DMX512



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Description

The CGDMX-512BI is a serial to DMX512 interface which makes easy interfacing possible between a CRESTRON control system and lighting products using the DMX512 protocol.

Only one serial RS-232/422 port on the Crestron control system is required to communicate with the DMX512 interface.

The DMX Interface has two separate DMX Ports, one **DMX Out** to send data to the DMX lighting products and one **DMX In** to receive data from e.g. DMX512 lighting consoles or other DMX512 control units.

The CGDMX-512BI can operate in different modes, to process the incoming DMX512 data with the Crestron data like HTP¹, LTP² and exclusive³ handling. The Crestron media processor is able to change these modes, too. Furthermore the Crestron media processor can set the HTP, LTP and exclusive handling for each channel separately. See "Interface Modes".

The CGDMX-512BI interface processes the incoming DMX512 data byte by byte, as fast as possible. This method features delay times between an incoming DMX512 channel and its leaving of only 44µs up to 20ms at a RETIMER setting 0.

In the following "Crestron Media Processor" is abbreviated with **CMP**.

¹ HTP= highest takes precedence

² LTP= last takes precedence

³ excl. = DMX value or Crestron value takes precedence

Plug Connectors and Status-LED's

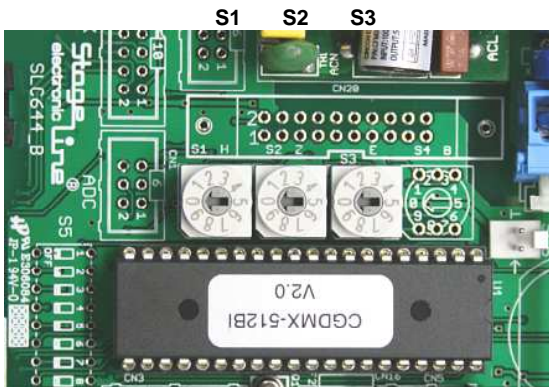


- 1) DMX512 Output [+Data (3), GND₂ (1), -Data (2)]
- 2) DMX512 Input [+Data (3), GND₁ (1), -Data (2)]
- 3) Status LED's
"CN COM" shows traffic between CMP and CGDMX-512BI
"DMX512" = ON - shows valid DMX512 input signal
 blink - no DMX512 Input
- 4) RS232/422 Interface-connector to CMP
Asymmetrical or symmetrical wiring is available by Jumper J5.

| | | | | |
|------------------|-------------|---------|-------------|---------|
| TX | (RS232) | = pin 2 | RTS (RS232) | = pin 7 |
| RX | (RS232) | = pin 3 | CTS (RS232) | = pin 8 |
| GND ₃ | (RS232/422) | = pin 5 | | |
| TX- | (RS422) | = pin 1 | RX- (RS422) | = pin 9 |
| TX+ | (RS422) | = pin 6 | RX+ (RS422) | = pin 4 |

Rotary Code Switches [inside CGDMX-512BI]

- S1:** Baud rate (1200 to 115200 bit/s, this page) /factory 7
S2: DMX512 Speed (44 to 20 frames/s, page 14) /factory 1
S3: Interface Modes (page 6) /factory 1



Baud rate COM interface [set by S1]

| | | | | | |
|-------|--------------|-------|--------|-------|-------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| 1200 | 2400 | 4800 | 9600 | 14400 | 19200 |
| 6 | 7 | 8 | 9 | | |
| 28800 | 38400 | 76800 | 115200 | | |

The interface type - symmetrical RS422 or asymmetrical RS232 is selectable by Jumper J5 as printed on pcb. (here RS422 = RS485)
(Factory setting RS232)

MODE select [by rotary code switch S3]

- | MODE | SHORTFORM / DESCRIPTION |
|-------------|---|
| 0 | TX DMX512 only XSIG values received from CMP - transmitted as DMX512 values. No DMX512 Input. |
| 1 | <i>RX/TX DMX512 + message on change</i> XSIG values received from CMP - transmitted as DMX512 values. ! every Data change on a single DMX512 channel will be transmitted to CMP as an 4 byte XSIG value. |
| 2 | RX/TX DMX512, HTP Merge HTP merge between DMX512-IN and CMP-values to DMX Output. ! HTP configuration is changeable by CMP (HTP, LTP, Excl., each channel separately). ! after Power-On or xFC (Interface-Reset) the CGDMX-Interface returns to HTP all channels. |
| 3 | RX/TX DMX512, HTP Merge + message on change HTP merge between DMX512-IN and CMP-values to DMX Output. ! every data change on a single DMX512 channel will be transmitted to CMP as an 4 byte XSIG value. ! HTP configuration is changeable by CMP (HTP, LTP, Excl. , each channel separately). ! after Power-On or xFC (Interface Reset) the CGDMX-Interface returns to HTP on all channels. |

MODE select [by rotary code switch S3]

MODE SHORTFORM / DESCRIPTION

- 4 RX/TX DMX512, LTP Merge**
LTP merge between DMX512-IN and CMP-values to DMX Output.
! LTP configuration is changeable by CMP (HTP, LTP, Excl. , each channel separately).
! after Power-On and xFC (Interface Reset) the CGDMX-Interface returns to LTP all channels.
- 5 RX/TX DMX512, LTP Merge + message on change**
LTP merge between DMX512-IN and CMP-values to DMX Output.
! every data change on a single DMX512 channel will be transmitted to CMP as an 4 byte XSIG value.
! LTP configuration is changeable by CMP (HTP, LTP, Excl. , each channel separately).
! after Power-On and xFC (Interface Reset) the CGDMX-Interface returns to LTP all channels.
- 6 processing with configuration 0, Merge**
reads complete 512 byte configuration from non volatile memory how to process values from DMX IN with CMP values to DMX Output. (MERGE -HTP, -LTP, -Excl., may set for each channel, see channel processing flags).
! after Power-On and xFC (Interface Reset) the CGDMX-Interface returns to process config stored in "config0".
- 7 processing with configuration 1, Merge**
reads complete 512 byte configuration from non volatile memory how to process values from DMX IN with CMP values to DMX Output. (MERGE -HTP, -LTP, -Excl., may set for each channel, see channel processing flags).
! after Power-On and xFC (Interface Reset) the CGDMX-Interface returns to process config stored in "config1".

MODE select [by rotary code switch S3]

MODE SHORTFORM / DESCRIPTION

8 Auto fade all channel

Test - all DMX channels are fade between 0-100%.

! the values are also send to CMP as 4 Byte XSIG analog values.

9 all channel 75%

Test - all DMX channels will set to 75%.

! the values are also send to CMP as 4 Byte XSIG analog values.

MODE change - volatile [by CMP XSIG digital command]

- active in all Modes (selected by codeswitch)
- active process-bit mask "send selected DMX IN value on change".
- mutual triggering 4086 - 4089

ADR VALUE DESCRIPTION

4086 ~ DMX Out by CMP - complete universe controlled by CMP exclusive.

4087 ~ DMX OUT by DMX IN - complete universe controlled by DMX IN exclusive [CMP special function]

4088 ~ DMX-OUT = DMX-IN <HTP> CMP-OUT
Complete Universe HTP merge between DMX-IN and CMP-OUT values.

4089 ~ DMX-OUT = DMX-IN <LTP> CMP-OUT
Complete Universe LTP merge between DMX-IN and CMP-OUT.

4090 0/1 OFF/ON complete process bit-mask in upper modes [auto send XSIG analog Value to CMP on value change]

Channel processing flags [by XSIG digital command]

(XSIG digital OUT)

| ADR | VALUE | DESCRIPTION |
|-------------|--------------|--|
| 1024 - 1535 | ~ | DMX Out channel 1-512 processed by CMP exclusive |
| 1536 - 2047 | ~ | DMX Out channel 1-512 processed by DMX In only |
| 2048 - 2559 | ~ | DMX Out channel 1-512 as a result of HTP merge of CMP and DMX In channel |
| 2560 - 3071 | ~ | DMX Out channel 1-512 as a result of LTP merge of CMP and DMX In channel |

! These bits has a mutual triggering.

(XSIG digital IN)

| ADR | VALUE | DESCRIPTION |
|-------------|--------------|--|
| 3072 - 3583 | 1/0 | On a value change of the selected DMX IN channel, a 4 byte XSIG analog value is send to CMP. |
| ADR | VALUE | DESCRIPTION |
| 4091 | ~ | request all process flags 1024-3683 as an XSIG digital value. |

Channel processing flag registers [by XSIG digital command]

Additional process configuration register [config0] and [config1]

These non volatile registers contains an individual processing configuration for each of the 512 channels between CMP and DMX In. (see “single channel processing options”)

! On Power On and interface reset the CGDMX-512BI starts with the configuration as given in the selected Mode.

[Mode 6 uses config0, Mode 7 uses config1]

| ADR | VALUE | DESCRIPTION |
|------|-------|--|
| 4082 | ~ | copy the configuration bits from config0 to “process config” work register. (sets the bits from Address 1024-3683) |
| 4083 | ~ | Write current “process config flags” to the config0 register in non volatile Memory. |
| 4084 | ~ | Copy the configuration bits from config1 to “process config” work register. (sets the bits from Address 1024-3683) |
| 4085 | ~ | Write current “process config flags” to the config1 register in non volatile Memory. |

Basic commands

- xFC Interface Reset by CMP
 ! reset volatile changes to selected Mode (switch S3)
- xFD send all DMX512 IN data, channel by channel, as 4 byte
 XSIG analog values to CMP.
 Transmission time depends from CMP interface speed.

| ADR | VALUE | DESCRIPTION |
|------------|--------------|---|
| 0 - 511 | 1/0 | switches DMX out channel 1 - 512 to 100% / 0% |
| 512 - 1023 | 1/0 | switches DMX channel 1 - 512 in AUX buffer to 100% / 0% |
| 4095 | ~ | request valid DMX512 Input Signal and respond as XSIG digital value on Address 4095 [0 = no DMX512, 1 = valid DMX512] |

Special functions [by XSIG digital command]

(see flow chart on page 13)

DMX-OUT buffer:

It contains the 512 bytes of the result of the processed CMP-OUT and DMX IN values.

CMP-OUT buffer:

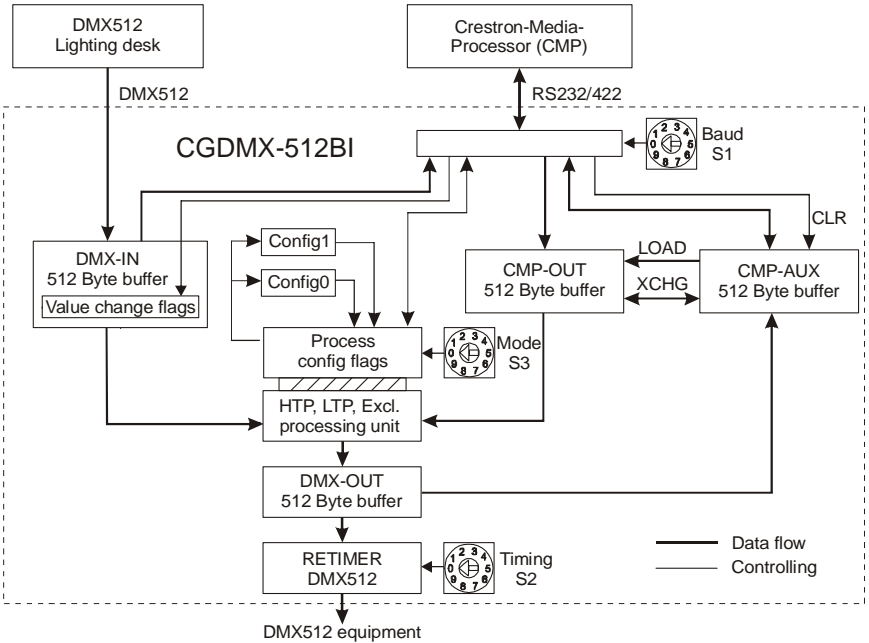
It contains 512 bytes set by CMP to be processed with the DMX In data.

CMP-AUX buffer:

It contains 512 bytes for an individual use by CMP. Fast exchange with CMP-OUT buffer, fast load to CMP-Out buffer and as transfer buffer from fast DMX to slower COM interface.

[“Snapshot” of DMX Out to CMP means copy of 512 bytes while incoming data from DMX In, CMP-AUX may have data of more than 1 frame.] (see section 5 on page 3)

| ADR | VALUE | DESCRIPTION |
|------------|--------------|--|
| 4080 | | copies the DMX512-OUT buffer to the CMP-AUX buffer (512 bytes). |
| 4081 | | copies the CMP-AUX buffer to the CMP buffer (512 bytes). |
| 4079 | | Exchange the two buffers CMP-AUX and CMP-Out. |
| 4077 | | Clear CMP-OUT buffer. |
| 4078 | | Clear CMP-AUX buffer. |
| 4092 | ~ | send DMX-IN buffer to CMP as XSIG analog values (512 x 4 bytes) |
| 4093 | ~ | send CMP-AUX buffer to CMP as XSIG analog values (512 x 4 bytes) |
| 4094 | ~ | clear all DMX buffers |



RETIMER DMX512 [adjustable DMX512 output timing, set by S2]

The DMX512 data are processed by the CGDMX-512BI interface with an optimal and standard-compliant DMX512 timing (as recommended in USITT DMX512A, American National Standard E1.11–2004 / 8.11 table 6 & 7 and DIN 56930-2 / 4.4.1.).

If problems should appear like flickering or short black outs, the connected lighting devices may be not able to receive DMX512 data with optimum timing..

In this case the CGDMX-512BI includes a RETIMER section to adjust the DMX512 timing to slower DMX devices.

You will find a DMX512 timing diagram on next site.

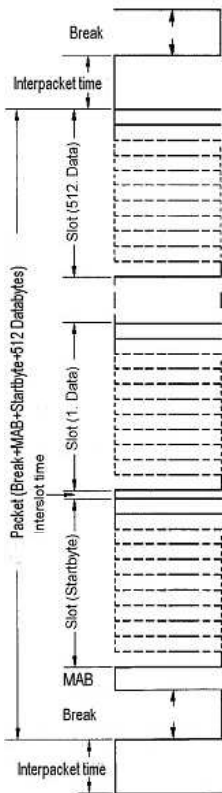
| S2 | BREAK (μ s) | MAB (μ s) | DATA (μ s) | MBB (μ s) | description |
|----------|---------------------|-------------------|--------------------|-------------------|--|
| 0 | 176 | 12 | 44 | 0 | B2B 22,8ms ! |
| 1 | 176 | 12 | 48 | 0 | 48 μs per byte |
| 2 | 176 | 12 | 48 | 176 | 48 μ s & MBB 176 μ s |
| 3 | 176 | 12 | 52 | 0 | 52 μ s |
| 4 | 176 | 18 | 52 | 176 | 52 μ s & MBB 176 μ s |
| 5 | 176 | 18 | 56 | 0 | 56 μ s |
| 6 | 176 | 18 | 56 | 352 | 56 μ s & MBB 352 μ s |
| 7 | 176 | 18 | 64 | 352 | 64 μ s & MBB 352 μ s (30 frames / second) |
| 8 | 176 | 18 | 77 | 528 | 77 μ s & MBB 528 μ s (25 frames / second) |
| 9 | 176 | 18 | 96 | 528 | 96 μ s & MBB 528 μ s (20 frames / second) |

MAB = Mark after Break

MBB = Mark before Break

B2B = Break to Break

RETIMER DMX512 [adjustable DMX512 output timing, set by S2]



DMX512 timing

Packet (22,7ms):

includes Break, MAB, startbyte and up to 512 data bytes.

Interpacket time:

time between two frames

Slot (44µs):

1 start-bit, data-byte (8Bit), 2 stop-bits

Interslot time:

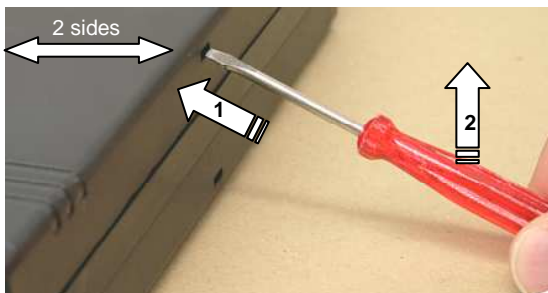
time between two data bytes

Technical data

| | |
|----------------------|---|
| Supply voltage: | 85 - 265V~, 47-63Hz |
| Power consumption: | approx. 5W |
| Fuse: | slow 0,63A -Type TR5 |
| I/O 1: | RS232/422 (selectable) |
| I/O 2: | DMX512-A, terminated, 120ohm automatic switch after power on |
| Timing: (adjustable) | Break: 179µs Mark: 14µs B2B: 22,8ms (S2=0) |
| Isolation: | all I/O (DIN56930-2/4.2.3) |
| Weight: | approx. 480g |
| Dimensions: | 200 x 110 x 57 mm (without plug connectors) |
| Case material: | UL-94-V-0, heavily inflammable |
| Revision: | B, V2.0 - starts with S/N:08.0902 |

Before opening, disconnect mains !

How to open CGDMX-512BI cover



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