

MULTICOLOR LED DISPLAY

COMMUNICATION PROTOCOL

Version: 1.04

A command session consist of one start tag <C>, <CA> or <CD> some command tags and one end tag </C>. Each command tag is encapsulated by "<" and ">". All white spaces (space tab CR LF etc.) are ignored, except in binary data. The display build up the display content during the communication and displays it as soon as possible.

Communication settings

Baudrate	9600 19200 38400 57600
Parity	None
Databits	8
Stopbits	1

Communication control tags

Start of command session

<C:aa₁:aa₂:...:aa_n> or <CA:aa₁:aa₂:...:aa_n>

Indicate the start of one command session.

It is possible to address one ore more displays by the address parameters.

If address is omitted or address equals zero communication session is intended to all displays (broadcast).

If the <CA...> tag is used and the display is single addressed an answer is returned.

The answer could be <OK> after the end tag or a short description of an error after a command tag.

Parameter	Type	Description
aa _x	\$0 - \$FF 8-Bit unsigned	Display address

Start of command session with debug

<CD>

Indicate the start of one command session with debug information sent back.

NOTE₁ No address is supported in debug mode.

NOTE₂ Debug is not recommended in half duplex mode (RS485).

In booth cases the debug information will garble the communication.

End of command session

</C>

Indicate the end of one command session. All communication must end with a end of command session.

Command tags

Text Set position

<TSP :xxxx :yyyy>

Sets the current text position on the display.

Parameter	Type	Description
xxxx	\$0 - \$FFFF 4,8,12,16-Bit signed	X-coordinate of bitmap. Negative values must be 16-bit.
yyyy	\$0 - \$FFFF 4,8,12,16-Bit signed	Y-coordinate of bitmap. Negative values must be 16-bit.

Text Set font

<TSF :nn>

Sets the current text font of the display.

Parameter	Type	Description
nn	\$1 - \$2 4-Bit unsigned	Font number 1- 2

Text Set color

<TSC :nn>

Sets the current text color of the display.

Parameter	Type	Description
nn	\$0 - \$FF 8-Bit unsigned	Color information

Color information byte

RED ₃	RED ₂	RED ₁	RED ₀	GREEN ₃	GREEN ₂	GREEN ₁	GREEN ₀
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Write text

Any text outside a command tag and between communication session tags will be written to the display at the current position, font and color.

Example:

<C><SP:0:0><SF:1><SC:F0>Hallo World</C>

Writes "Hallo World" at position 0,0 with font 1 and color full red.

Bitmap Define Binary

<BDB:nn:xxxx:yyyy>B₁B₂B₃... B_n

This command defines a bitmap for later use.

In MS Windows™ it could be a problem transmitting binary \$00 over the serial line. In this case use ASCII mode instead.

Parameter	Type	Description
nn	\$0 - \$14 8-Bit unsigned	Bitmap number 0 - 19
xxxx	\$0 - \$FFFF 4,8,12,16-Bit unsigned	Width of bitmap
yyyy	\$0 - \$FFFF 4,8,12,16-Bit unsigned	Height of bitmap
B _x	\$00 - \$FF 8-Bit binary	Color information in binary format. Ea. not ASCII format. NOTE no ":" between bytes! Number of bytes (n) = Width * Height

Color information byte

RED ₃	RED ₂	RED ₁	RED ₀	GREEN ₃	GREEN ₂	GREEN ₁	GREEN ₀
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Bitmap Define ASCII

<BDA:nn:xxxx:yyyy:BB₁BB₂BB₃... BB_n>

This command defines a bitmap for later use.

Due to the fact that each byte in ASCII mode requires two ASCII characters to be transmitted this mode will take approximately twice as long as binary mode.

Parameter	Type	Description
nn	\$0 - \$14 8-Bit unsigned	Bitmap number 0 -19
xxxx	\$0 - \$FFFF 4,8,12,16-Bit unsigned	Width of bitmap
yyyy	\$0 - \$FFFF 4,8,12,16-Bit unsigned	Height of bitmap
BB _x	\$00 - \$FF 8-Bit unsigned	Color information in ASCII format. NOTE! No ":" between bytes! NOTE! Every byte must consist of the characters '0' to 'F' Number of bytes (n) = Width * Height

Color information byte

RED ₃	RED ₂	RED ₁	RED ₀	GREEN ₃	GREEN ₂	GREEN ₁	GREEN ₀
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Bitmap Display

<BDI:nn:xxxx:yyyy>

Displays a bitmap at specified coordinates.

Parameter	Type	Description
nn	\$0 - \$9 4-Bit unsigned	Bitmap number
xxxx	\$0 - \$FFFF 4,8,12,16-Bit signed	X-coordinate of bitmap. Negative values must be 16-bit.
yyyy	\$0 - \$FFFF 4,8,12,16-Bit signed	Y-coordinate of bitmap. Negative values must be 16-bit.

Display Set Color

<DSC:cc>

Set the entire display to a specified color. Also sets current position to 0,0

Parameter	Type	Description
cc	\$0 - \$FF 4,8-Bit unsigned	Color information

Color information byte

RED ₃	RED ₂	RED ₁	RED ₀	GREEN ₃	GREEN ₂	GREEN ₁	GREEN ₀
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Activate Digital Output

<ADO:nn:tttt>

Activates a digital output for a specified time. (Special hardware required).

Parameter	Type	Description
nn	\$0 - \$FF 4,8-Bit unsigned	Digital output number (currently only 0 is supported)
tttt	\$0 - \$FFFF 4,8,12,16-Bit unsigned	Activation time in ms.

Display Set Baudrate

<DSB:nnnn>

Sets the communication baudrate.

Note, any answer from the display will be in the new baudrate.

Parameter	Type	Description
nnnn	\$0 - \$FFFF 4,8,12,16-Bit unsigned	New baudrate. Valid Baudrates: 9600 19200 38400 57600 (Default if illegal baudrate is given)

Display Set Address

<DSA:nn>

Sets the communication address.

Note, ignored during a broadcast session.

Note, address 0 is reserved and could not be set.

Parameter	Type	Description
nn	\$0 - \$FFFF 4,8-Bit unsigned	New communication address.