



Fixed & User-Defined Character Sets Application Note

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GENERAL DESCRIPTION

The CC0064 Controller allows you to control Sxnnnn switches. Besides downloading bitmap images you may wish to write text directly to the display or a portion thereof. To allow this the CC0064 controller contains four character sets, 2 fixed and up to 2 user-defined.

The fixed internal character sets are called **Charset0** and **Charset1**. The two optional user-defined character sets are designated **Charset2** and **Charset3**.

The character sets allow you to write text strings of a given length to a specific location on the LCD display by using the 0x64 command (see below).

CHARACTER SETS

Character sets are defined as fixed segment text displays within the LCD pixel matrix as either a 5x8 or 10x16 pixel font. Characters are written in the position specified with the increment value of the command (default increment = 0 must be specified as part of the 0x64 command) and auto-incremented. See Command Examples below.

The character sets are valid for all Sxnnnn LCD keys regardless of resolution. Consequently, you can fit 6 characters of Charset0 and Charset2 into the 36x24 pixel matrix of a SA3624 key while 10 characters of the same character sets fit into the matrix of a SA6432 switch.

Fixed Character Sets 0 and 1

| | |
|--|--|
| !"#\$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{ }~ ¡¢£¥¦§¨©ª«¬®¯ °±²³´µ¶·¸¹º»¼½¾¿ ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎ ÏÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞß | !"#\$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{ }~ ¡¢£¥¦§¨©ª«¬®¯ °±²³´µ¶·¸¹º»¼½¾¿ ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎ ÏÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞß |
|--|--|

Character sets 0 and 1 (see below) are fixed and cannot be changed. The 0x64 command (see Command Examples) is used to write the text to the specified location in the switch.

Set Key:1

Transmit Bitmap: M:\E3 GmbH\Marketing - RW\Documentation\Character Sets\charset2_EB.bmp

```
0x40 * Set Display address and write display data
; * Data Bytes to follow 512 each containing just one nibble
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x04 0x01 0x08 0x00 0x00 0x00 0x00 0x00 ;* - # # #
0x04 0x01 0x0B 0x03 0x0E 0x03 0x02 0x03 ;* - ##### # ## # # ## ##
0x04 0x01 0x0A 0x04 0x01 0x04 0x0D 0x04 ;* - # # # ## # # # # # #
0x04 0x01 0x01 0x04 0x00 0x00 0x09 0x04 ;* - # # # # # # # #
0x04 0x01 0x0E 0x03 0x00 0x00 0x01 0x04 ;* - # # # # # #####
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x02 0x02 0x03 0x00 0x00 0x00 0x00 0x00 ;* - # # ##
0x04 0x01 0x0D 0x01 0x00 0x00 0x0E 0x06 ;* - ### ## # # # ##
0x04 0x01 0x09 0x04 0x01 0x04 0x01 0x05 ;* - # # # # # # # #
0x04 0x01 0x0F 0x07 0x0E 0x03 0x01 0x06 ;* - ##### # ## # # #####
0x08 0x00 0x01 0x04 0x00 0x00 0x02 0x04 ;* - # # # # #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x03 0x06 0x00 0x00 0x00 0x00 ;* - ## ##
0x00 0x00 0x0D 0x05 0x00 0x00 0x00 0x04 ;* - # # ## #
0x04 0x06 0x09 0x04 0x07 0x00 0x0F 0x07 ;* - ### ##### # ## # #
0x00 0x0A 0x0F 0x07 0x00 0x00 0x01 0x04 ;* - # # # #####
0x00 0x00 0x01 0x04 0x00 0x00 0x00 0x00 ;* - # #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x0C 0x01 0x0C 0x04 0x00 0x00 ;* - ## # ##
0x00 0x00 0x02 0x02 0x03 0x03 0x0E 0x03 ;* - ## ## ##### # #
0x04 0x04 0x01 0x04 0x0D 0x05 0x01 0x04 ;* - # ## # # # # # #
0x00 0x00 0x0F 0x07 0x0E 0x04 0x01 0x04 ;* - ### # # # #####
0x00 0x00 0x01 0x04 0x00 0x03 0x0E 0x03 ;* - ## ##### # #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x03 0x02 0x00 0x03 0x00 0x00 ;* - ## ## ## #
0x0E 0x01 0x02 0x04 0x03 0x03 0x03 0x00 ;* - ## ## ## ##### # #
0x01 0x03 0x01 0x04 0x0C 0x00 0x0C 0x01 ;* - ## ## ## # ## # #
0x01 0x05 0x01 0x04 0x06 0x03 0x00 0x06 ;* - ## ## ## # # # # #
0x0E 0x04 0x0E 0x03 0x06 0x04 0x00 0x00 ;* - ## # ## # #####
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x06 0x03 0x04 0x02 0x00 0x00 ;* - # # ## ##
0x06 0x03 0x09 0x04 0x02 0x05 0x00 0x00 ;* - # # # ## # # #
0x09 0x04 0x09 0x04 0x0F 0x0F 0x00 0x04 ;* - ##### # # # # # #
0x09 0x04 0x0F 0x07 0x0A 0x04 0x00 0x00 ;* - # # # # # # #####
0x06 0x03 0x01 0x04 0x0C 0x02 0x00 0x00 ;* - ## # ## # #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* - ##### #
0x03 0x00 0x0E 0x01 0x0C 0x07 0x08 0x00 ;* - ##### # ## #####
0x0D 0x01 0x01 0x01 0x04 0x01 0x08 0x00 ;* - # # # # ## # #
0x01 0x06 0x0E 0x01 0x0F 0x01 0x08 0x00 ;* - ##### # # ## #####
0x02 0x00 0x00 0x00 0x07 0x04 0x07 0x00 ;* - # ## # # ##
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x0E 0x05 0x00 0x00 0x00 0x00 ;* - ##### #
0x09 0x03 0x05 0x05 0x07 0x00 0x00 0x00 ;* - ### # ## # # #
0x05 0x04 0x09 0x05 0x00 0x00 0x00 0x06 ;* - ## # # # # ## #
0x06 0x04 0x02 0x02 0x07 0x00 0x00 0x0A ;* - ### # # ## # # #
0x0C 0x03 0x0C 0x01 0x00 0x00 0x00 0x00 ;* - ##### ##
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x00 0x00 0x08 0x00 ;* - #
0x09 0x03 0x06 0x00 0x00 0x00 0x08 0x00 ;* - # # ## ##
0x05 0x04 0x09 0x05 0x0F 0x05 0x0E 0x03 ;* - ##### # ##### # # # # # #
0x06 0x04 0x02 0x00 0x00 0x00 0x08 0x00 ;* - # ## # #
0x00 0x04 0x00 0x00 0x00 0x00 0x08 0x00 ;* - # #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x08 0x00 0x00 0x00 0x0A 0x00 ;* - # # #
0x00 0x01 0x04 0x01 0x00 0x00 0x04 0x00 ;* - # # # #
0x0F 0x07 0x04 0x01 0x00 0x00 0x0F 0x00 ;* - ##### ##### # #
0x06 0x01 0x04 0x01 0x00 0x00 0x04 0x00 ;* - # ## # #
0x08 0x01 0x02 0x02 0x00 0x00 0x0A 0x00 ;* - # # ## # #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
* - End of Bitmap
```

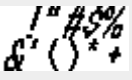
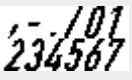



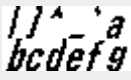
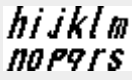
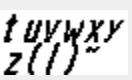
0xF5 0xEB 0xFE ; store image in display buffer in bitmap library location 0xEB and terminate command

Repeat for the other bitmaps of the character set to store them in the respective memory locations..

User-Defined Character Set 3

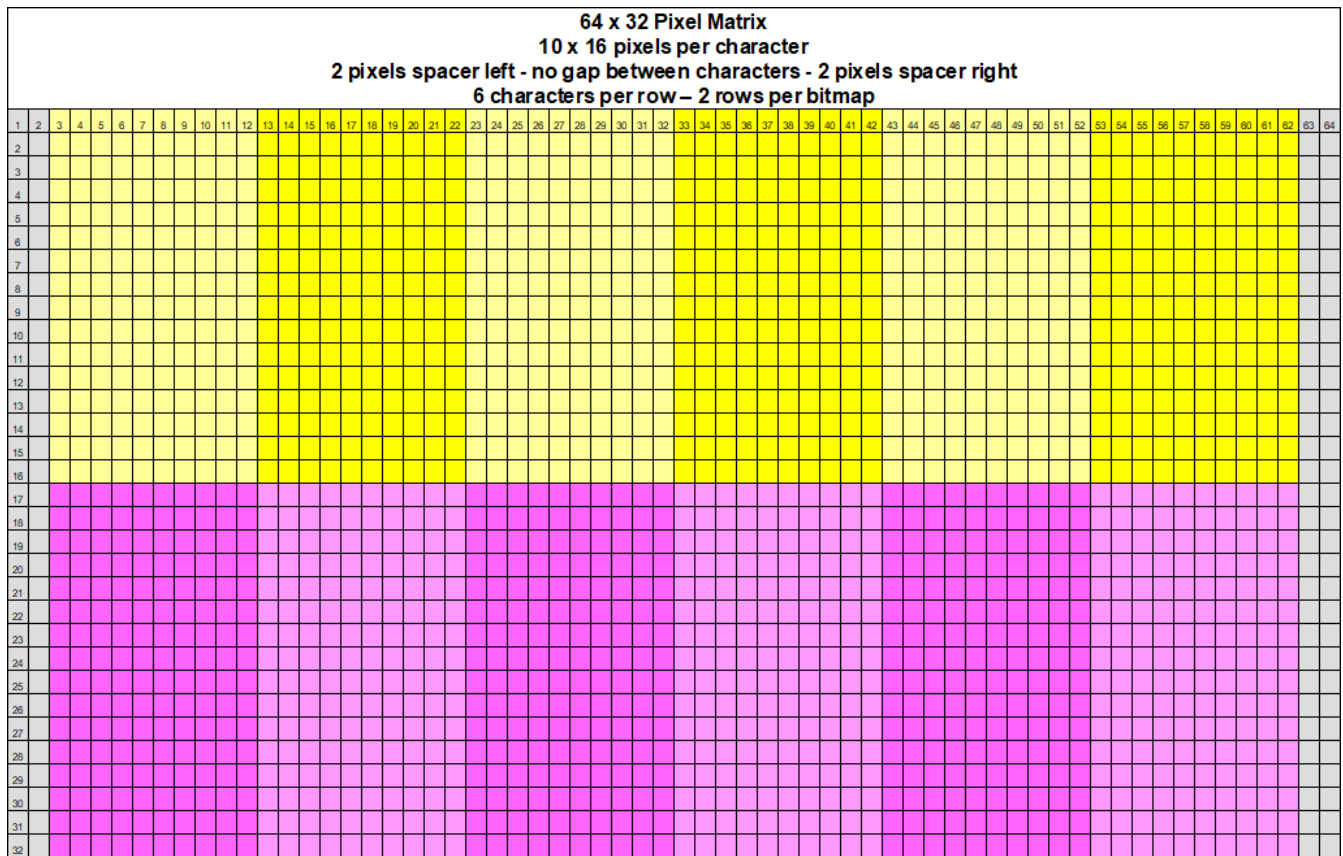
The **Charset3** is defined as a 10 x 16 pixel character set and uses memory locations 0xF0...0xFF to store up to 192 ASCII characters from the **ISO/IEC 8859-1 (Latin-1) code page**.

The characters for **Charset3** are assigned by their position within a 64 x 32 pixel black & white monochrome bitmap stored in the corresponding memory locations of the controller. In the example below, the 192 characters are defined based on the *Bahnschrift SemiBold Condensed Italic* font and saved in bitmaps Charset3_F0.bmp to Charset3_FF.bmp.

| Bitmap | | | | | | | |
|---|---|---|---|---|---|---|---|
| Charset3_F0.bmp | Charset3_F1.bmp | Charset3_F2.bmp | Charset3_F3.bmp | Charset3_F4.bmp | Charset3_F5.bmp | Charset3_F6.bmp | Charset3_F7.bmp |
|  |  |  |  |  |  |  |  |
| Memory Location | | | | | | | |
| 0xF0 | 0xF1 | 0xF2 | 0xF3 | 0xF4 | 0xF5 | 0xF6 | 0xF7 |

| Bitmap | | | | | | | |
|---|---|---|---|---|---|---|---|
| Charset3_F8.bmp | Charset3_F9.bmp | Charset3_FA.bmp | Charset3_FB.bmp | Charset3_FC.bmp | Charset3_FD.bmp | Charset3_FE.bmp | Charset3_FF.bmp |
|  |  |  |  |  |  |  |  |
| Memory Location | | | | | | | |
| 0xF8 | 0xF9 | 0xFA | 0xFB | 0xFC | 0xFD | 0xFE | 0xFF |

The layout of the bitmap follows the following pattern:



Here is an enlarged view at the corresponding bitmaps that define this character set:



Charset3_F0.bmp



Charset3_F1.bmp



Charset3_F2.bmp



Charset3_F3.bmp



Charset3_F4.bmp



Charset3_F5.bmp


```

0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x03 0x00 0x00 0x00 ;* - ##
0x00 0x00 0x00 0x00 0x0E 0x00 0x0E 0x00 ;* - ###
0x00 0x08 0x01 0x00 0x0C 0x01 0x0E 0x07 ;* - #####
0x00 0x0F 0x01 0x00 0x00 0x03 0x06 0x0E ;* - ## ## ## #####
0x00 0x0F 0x03 0x00 0x00 0x0E 0x0E 0x0C ;* - ### ## ## #####
0x00 0x0C 0x0F 0x00 0x0F 0x0C 0x0D 0x0F ;* - ##### ## #####
0x00 0x08 0x0F 0x00 0x0F 0x03 0x03 0x0E ;* - ##### ## ## #####
0x00 0x08 0x01 0x00 0x03 0x06 0x0E 0x00 ;* - ## ## ## ##
0x00 0x00 0x00 0x00 0x0E 0x07 0x0C 0x01 ;* - ##### ## ##
0x00 0x00 0x00 0x00 0x0C 0x07 0x00 0x03 ;* - ##### ##
0x00 0x00 0x00 0x00 0x08 0x03 0x00 0x0E ;* - ## ## ##
0x00 0x00 0x00 0x00 0x0D 0x07 0x00 0x00 ;* - # #####
0x00 0x00 0x00 0x00 0x0F 0x07 0x02 0x00 ;* - ##### #
0x04 0x00 0x00 0x00 0x00 0x0F 0x00 0x07 ;* - ##### ## #
0x07 0x03 0x00 0x00 0x0C 0x00 0x0F 0x00 ;* - ## ##### ## #
0x0F 0x03 0x00 0x00 0x08 0x01 0x09 0x01 ;* - ## # ## #####
0x0C 0x01 0x00 0x00 0x00 0x08 0x0F 0x01 0x03 ;* - ##### ## ##
0x04 0x03 0x00 0x00 0x00 0x0E 0x00 0x07 ;* - ## ## # ##
0x00 0x00 0x00 0x00 0x00 0x00 0x04 0x0F ;* - # #####
0x00 0x00 0x00 0x00 0x00 0x00 0x0C 0x0F ;* - #####
0x00 0x00 0x00 0x00 0x07 0x03 0x0C 0x01 ;* - ## ## ##
0x00 0x00 0x00 0x00 0x0E 0x07 0x00 0x00 ;* - #####
0x00 0x00 0x00 0x00 0x09 0x0F 0x0D 0x00 ;* - # #####
0x00 0x0C 0x03 0x00 0x07 0x0B 0x0F 0x00 ;* - ## ## #####
0x08 0x0F 0x0F 0x01 0x0E 0x03 0x0E 0x01 ;* - ##### ## #####
0x0E 0x03 0x0C 0x07 0x08 0x07 0x0C 0x07 ;* - ##### ##### #####
0x0F 0x00 0x00 0x0E 0x00 0x0F 0x0D 0x0E ;* - ##### ## #####
0x01 0x00 0x00 0x08 0x00 0x0B 0x0F 0x08 ;* - ## ##### ## #
0x00 0x00 0x00 0x00 0x00 0x00 0x0E 0x01 ;* - #####
0x00 0x00 0x00 0x00 0x00 0x00 0x0C 0x0F ;* - #####
0x00 0x00 0x00 0x00 0x00 0x00 0x0C ;* - ##
0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x03 0x00 0x00 0x00 ;* - ##
0x01 0x00 0x00 0x08 0x0F 0x01 0x00 0x00 ;* - ##### # #
0x0F 0x00 0x00 0x0E 0x0E 0x01 0x00 0x00 ;* - ##### #####
0x0E 0x03 0x0C 0x07 0x03 0x01 0x00 0x00 ;* - ## # #####
0x08 0x0F 0x0F 0x01 0x0F 0x01 0x00 0x00 ;* - ##### #####
0x00 0x0C 0x03 0x00 0x0E 0x01 0x00 0x00 ;* - #####
0x00 0x00 0x00 0x00 0x00 0x01 0x00 0x00 ;* - #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* - #
0x00 0x00 0x00 0x00 0x0F 0x00 0x00 0x00 ;* - #####
0x03 0x00 0x00 0x00 0x0F 0x07 0x00 0x00 ;* - ##### ##
0x0F 0x01 0x00 0x00 0x00 0x08 0x0F 0x03 0x00 ;* - ##### #####
0x0E 0x01 0x00 0x00 0x00 0x0C 0x0F 0x00 ;* - ##### #####
0x00 0x01 0x00 0x00 0x00 0x00 0x0E 0x0C ;* - ## ## #
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0C ;* - ##
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0C ;* - ##
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
0x0F 0x01 0x07 0x00 0x00 0x00 0x00 0x00 ;* - ##### ##
0x0F 0x01 0x0F 0x09 0x00 0x00 0x00 0x00 ;* - ##### ##### #
0x03 0x00 0x08 0x0F 0x00 0x00 0x00 0x00 ;* - ## #####
0x0E 0x00 0x0F 0x0F 0x00 0x00 0x00 0x00 ;* - ## #####
0x0E 0x0F 0x0F 0x07 0x00 0x00 0x00 0x00 ;* - #####
0x08 0x0F 0x07 0x0C 0x00 0x00 0x00 0x00 ;* - ##### ##
0x00 0x00 0x03 0x0C 0x00 0x00 0x00 0x00 ;* - ## ##
0x00 0x00 0x06 0x0C 0x00 0x00 0x00 0x00 ;* - ## ##
0x00 0x00 0x0E 0x0F 0x00 0x00 0x00 0x00 ;* - #####
0x00 0x00 0x08 0x0F 0x00 0x00 0x00 0x00 ;* - #####
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 ;* -
* - End of Bitmap
0xF5 0xF0 0xFE ; store image in display buffer in bitmap library location 0xEB and terminate command

```

Repeat for the other bitmaps of the character set to store them in the respective memory locations.

You can now use the characters stored in the bitmaps to write text to the LCD keys using the 0x64 command as described in the Command Examples below. The following tables show the ASCII characters, hex codes as well as the memory locations and bitmap names for this Charset2. Please note that in the **ISO/IEC 8859-1 (Latin-1)** code page, Hex codes 80 to 9F are not defined and the corresponding characters, therefore, shifted to addresses A0 to FF

| | | | | | | | | | | | | | | | |
|----|----|------|-----------------|----|---|------|-----------------|----|---|------|-----------------|----|---|------|-----------------|
| 20 | | | | 2C | , | | | 38 | 8 | | | 44 | D | | |
| 21 | ! | | | 2D | - | | | 39 | 9 | | | 45 | E | | |
| 22 | " | | | 2E | . | | | 3A | : | | | 46 | F | | |
| 23 | # | | | 2F | / | | | 3B | ; | | | 47 | G | | |
| 24 | \$ | | | 30 | 0 | | | 3C | < | | | 48 | H | | |
| 25 | % | | | 31 | 1 | | | 3D | = | | | 49 | I | | |
| 26 | & | 0xF0 | | 32 | 2 | 0xF1 | | 3E | > | 0xF2 | | 4A | J | 0xF3 | |
| 27 | ' | | charset3_F0.bmp | 33 | 3 | | charset3_F0.bmp | 3F | ? | | charset3_F0.bmp | 4B | K | | charset3_F0.bmp |
| 28 | (| | | 34 | 4 | | | 40 | @ | | | 4C | L | | |
| 29 |) | | | 35 | 5 | | | 41 | A | | | 4D | M | | |
| 2A | * | | | 36 | 6 | | | 42 | B | | | 4E | N | | |
| 2B | + | | | 37 | 7 | | | 43 | C | | | 4F | O | | |
| | | | | | | | | | | | | | | | |
| 50 | P | | | 5C | \ | | | 68 | h | | | 74 | t | | |
| 51 | Q | | | 5D |] | | | 69 | i | | | 75 | u | | |
| 52 | R | | | 5E | ^ | | | 6A | j | | | 76 | v | | |
| 53 | S | | | 5F | | | | 6B | k | | | 77 | w | | |
| 54 | T | | | 60 | | | | 6C | l | | | 78 | x | | |
| 55 | U | 0xF4 | | 61 | a | 0xF5 | | 6D | m | 0xF6 | | 79 | y | 0xF7 | |
| 56 | V | | charset3_F0.bmp | 62 | b | | charset3_F0.bmp | 6E | n | | charset3_F0.bmp | 7A | z | | charset3_F0.bmp |
| 57 | W | | | 63 | c | | | 6F | o | | | 7B | { | | |
| 58 | X | | | 64 | d | | | 70 | p | | | 7C | | | |
| 59 | Y | | | 65 | e | | | 71 | q | | | 7D | } | | |
| 5A | Z | | | 66 | f | | | 72 | r | | | 7E | ~ | | |
| 5B | [| | | 67 | g | | | 73 | s | | | 7F | | | |
| | | | | | | | | | | | | | | | |
| A0 | € | | | AC | œ | | | B8 | ˆ | | | C4 | ˆ | | |
| A1 | | | | AD | | | | B9 | ™ | | | C5 | ¥ | | |
| A2 | | | | AE | ž | | | BA | š | | | C6 | ı | | |
| A3 | f | | | AF | | | | BB | › | | | C7 | š | | |
| A4 | „ | | | B0 | | | | BC | œ | | | C8 | ı | | |
| A5 | … | | | B1 | | 0xF9 | | BD | œ | 0xFA | | C9 | © | 0xFB | |
| A6 | † | | charset3_F0.bmp | B2 | ' | | charset3_F0.bmp | BE | ž | | charset3_F0.bmp | CA | ˆ | | charset3_F0.bmp |
| A7 | ‡ | | | B3 | „ | | | BF | Y | | | CB | « | | |
| A8 | ˆ | | | B4 | „ | | | C0 | | | | CC | ı | | |
| A9 | ‰ | | | B5 | • | | | C1 | ı | | | CD | - | | |
| AA | Š | | | B6 | — | | | C2 | € | | | CE | ® | | |
| AB | ‹ | | | B7 | — | | | C3 | £ | | | CF | ı | | |
| | | | | | | | | | | | | | | | |
| D0 | ° | | | DC | ¼ | | | E8 | È | | | F4 | Ó | | |
| D1 | ± | | | DD | ½ | | | E9 | É | | | F5 | Ô | | |
| D2 | ² | | | DE | ¾ | | | EA | Ê | | | F6 | Ö | | |
| D3 | ³ | | | DF | ¿ | | | EB | Ë | | | F7 | × | | |
| D4 | ´ | | | E0 | À | | | EC | Ì | | | F8 | Ø | | |
| D5 | µ | 0xFC | | E1 | Á | 0xFD | | ED | Í | 0xFE | | F9 | Ù | 0xFF | |
| D6 | ¶ | | charset3_F0.bmp | E2 | Â | | charset3_F0.bmp | EE | Î | | charset3_F0.bmp | FA | Ú | | charset3_F0.bmp |
| D7 | · | | | E3 | Ã | | | EF | Ï | | | FB | Û | | |
| D8 | ¸ | | | E4 | Ä | | | F0 | Ð | | | FC | Ü | | |
| D9 | ¹ | | | E5 | Å | | | F1 | Ñ | | | FD | Ý | | |
| DA | º | | | E6 | Æ | | | F2 | Ò | | | FE | Þ | | |
| DB | » | | | E7 | Ç | | | F3 | Ó | | | FF | ß | | |

You can download this Charset3 [here](#) together with an e3t file that transmits the bitmaps to the corresponding library address.

COMMAND EXAMPLES


| Write Text: 01100100(0x64) | |
|--|--|
| HEX | Comments |
| (0x64) | Write text string of a given length with specified offset from character set to selected key. |
| 0xFF 0x01 0x64 0x04 0x02 0x01 0x61 0x62 0x63 0x64 | Select key 1 and Write 4 characters long text “abcd” with 2 characters offset using Charset1 |
| 0xFF 0x02 0x64 0x0C 0x00 0x03 0x48 0x65 0x6C 0x6C 0x6F 0x20 0x57 0x6F 0x72 0x6C 0x64 0x21 | Select key 2 and Write 12 characters long text “Hello World!” with 0 offset using Charset3 |
| 0xFF 0x03 0x64 0x05 0x00 0x01 0x48 0x65 0x6C 0x6C 0x6F 0x64 0x06 0x06 0x03 0x57 0x6F 0x72 0x6C 0x64 0x21 | Select key 3 and Write 5 characters long text “Hello” with 0 offset using Charset1 and 6 characters long text “World!” with 6 offset using Charset3 |

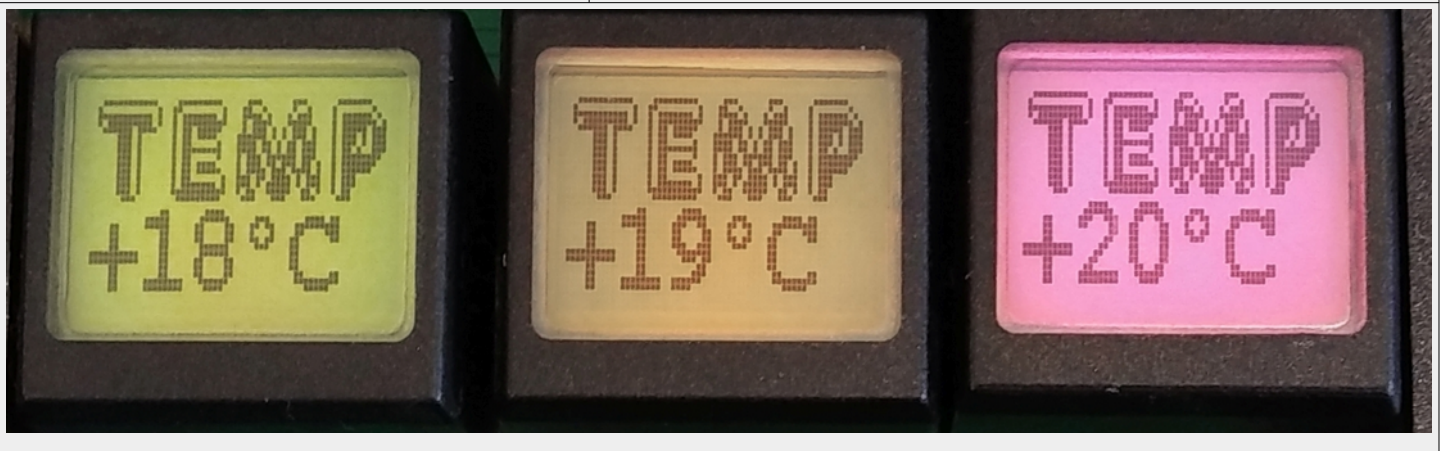
COMBINING TEXT AND GRAPHICS

When transmitting bitmaps or text to the LCD keys the data is first stored in the graphics buffer of the controller and then sent to the LCD display of the keys. The data remains in the graphics buffer after transmission until it is overwritten. This means that you can overwrite a portion of that bitmap with text characters. The offset will not affect the previous bitmap “background”.

Below is an example of a bitmap creating a label for a temperature readout. The bitmap has previously stored in the bitmap library using the 0xF5 command. The TEMP.bmp defines a label *top part of the bitmap) and the readout in degrees Centigrade (bottom right half of bitmap) as a graphic leaving an open area in the bottom left of the bitmap for the actual temperature readout, which can be changed dynamically.

In our example, the bitmap is stored in the image library and the incremental readings “+18”, “+19” and “+20” are written into the display after the TEMP bitmap has been displayed. We are also incrementally changing the background color to provide color context for the increase in temperature. You may want to add a delay to better see the change.

| HEX | Comments |
|------------------------------------|---|
| 0xFF 0x04 | select key 4 |
| 0x42 0x7F 0x7F 0x7F 0x43 | change color |
| 0xF4 0x45 0xFE | write bitmap from memory location 0x45  |
| 0x42 0x40 0x40 0x00 0x43 | change color |
| 0x64 0x03 0x06 0x03 0x2B 0x31 0x38 | write “+18” with 6 char offset in charset3 |
| 0x42 0x40 0x10 0x00 0x43 | change color |
| 0x64 0x03 0x06 0x03 0x2B 0x31 0x39 | write “+19” with 6 char offset in charset3 |
| 0x42 0x7F 0x01 0x01 0x43 | change color |
| 0x64 0x03 0x06 0x03 0x2B 0x32 0x30 | write “+20” with 6 char offset in charset3 |



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CHANGE HISTORY

| Version | Date | Comments |
|---------|----------|-----------------------------|
| 0.1 | 10/30/19 | Draft document |
| 0.2 | 06/30/20 | Updated formatting |
| 1.0 | 01/25/22 | Release version |
| 1.1 | 02/04/22 | Bitmaps, ASCII tables added |
| 1.2 | 02/10/22 | Command examples added |
| 2.0 | 06/16/22 | Updated release version |
| 2.0 | 10/24/24 | New corporate address |

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