SC2004Pro – 20x4 Characters RS485 LCD Module User' Guide

Features

- 20 x 4 Characters
- RS485 Interface
- Programmable Device Address
- Programmable Baud Rate (4800 or 9600)
- Simple Serial Command
- 8 Programmable I/Os
- Programmable Startup Screen
- 100 bytes Receive Buffer eliminates delay requirement
- 8 User's Defined Characters
- 8 User's Text Memory Page (20 Characters Each)
- Back light Control (On/Off/Flash)
- Addressing and Broadcast Mode Support
- 12 V / 5V Operation

Communication

RS485 link
Data format 8N1 (8 Data bits, No Parity , 1 Stop Bit)
Baud Rate: 4800 or 9600* (Programmable)
Maximum Cable Length : 1000m
Maximum Device on bus : 32
Device addressing range : 101* to 132

Baud Rate and Device Address is briefly displayed during startup

   *Factory Default

Serial Command

To initiate communication with SC2004Pro, send START BYTE and Device ID
START BYTE is defined as 0xEF (239 in decimal)

Example : [0xEF] [0x65] if the device address is 101.

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LCD will response with [0xEE] [0x65]

The LCD is then ready to accept command or characters to be displayed.

Example : Sending " SC2004 Test " string to has this displayed on the LCD.
STOP BYTE must be send to end the session with currently connected LCD. Stop byte is 0xEA (234)
LCD will also response with [0xEE] [UID] when STOP BYTE is received.

Supported ASCII characters is listed below :

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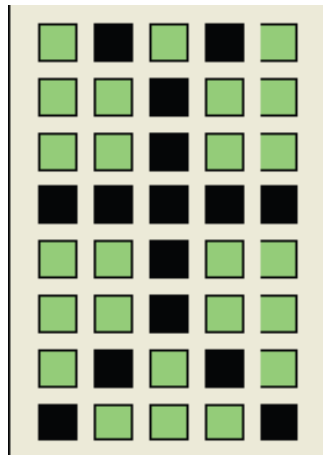
User's Defined Characters

Apart from the ASCII characters listed above, user can define additional 8 characters.
Defined characters can be displayed by sending 0 to 7 (Decimal)
Example : Sending "0x00" or 0 to display user's defined character 1 on
the current cursor position.

Character Bitmap
Each character consist of 8 bytes bitmap

Byte 1 : 0x0A (00001010)
Byte 2 : 0x04 (00000100)
Byte 3 : 0x04 (00000100)
Byte 4: 0x1F (00011111)
Byte 5: 0x04 (00000100)
Byte 6 : 0x04 (00000100)
Byte 7 : 0x0A (00001010)
Byte 8 : 0x11 (00010001)

To define the characters send command
[0xFE] [0x64] [0x0A] [0x04] [0x04] [0x1F] [0x04] [0x04] [0x0A] [0x11]
Followed by the remained 56 bytes bitmap for user's defined character 2 to 8.
The bitmap is saved onto the non volatile memory.
User's needs to load the bitmap onto the LCD RAM before you can utilize this characters. This
is done by sending command
[0xFE] [0x08]

Backlight Control

After power up, the backlight is turned on.
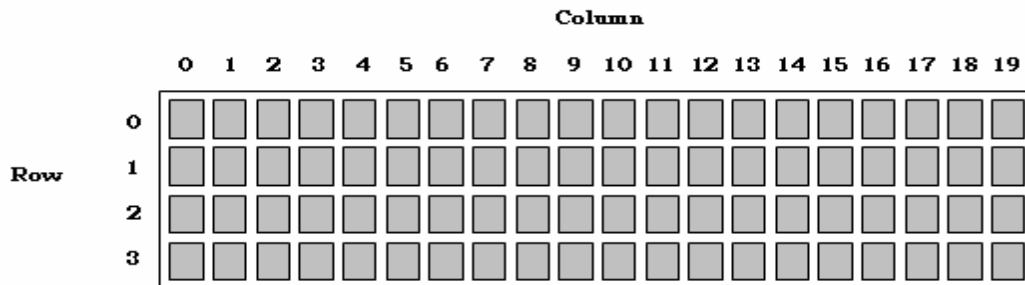To turn off send command [0xFE] [0x07]
To turn back on send command [0xFE] [0x06]

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The backlight can be made to flash too. This is done using command [0xFE] [0x0B]
Sending turn off or turn on command stops the flashes.

Cursor Control

Cursor position can be moved by command [0xFE] [0x32] [row position] [column
position]

User's Defined Text

8 memory locations is available to store commonly used text.
Each is 20 characters wide.
Text stored in these memory locations can be recalled and displayed on the LCD with
command
[0xFE] [0x34] [text location] [row to be displayed]
Where [text location] is which text to be displayed
101 to 108. [row to be displayed] is 0 - 3 depending on which row you want the text to be
displayed.
Example:
*Text Stored in memory location 101 is "SC2004Pro Test". To display this, instead of sending
the text string, you can display the text by sending command*
[0xFE] [0x34] [0x65] [0x00] to have "SC2004Pro Test" displayed on row 0

I/Os Port (P2)

8 I/Os ports is available on header P2.
Each can be individually configure as input or output
When configured as input , the port is internally pulled high.

Output port is able to source / sink max current of 20 mA

To configure I/O direction send command

[0xFE] [0x31] [I/O Directions]

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Set bit to 1 for output
Set bit to 0 for input

*Example :   To set Port 0 to 3 as inputs, Port 4 to 7 as outputs
            Send [0xFE] [0x31] [0x0F]*

Broadcasting Command

Broadcast command enable all the LCD on the RS485 bus to receive the command.
When broadcasting command replace UID with 100 when sending command.
Note : LCD will not response with [0xEE] [UID] when broadcasting command is use.

SC2004ProApp Software

This software is use to test and configure SC2004Pro LCD module.
Available for download at www.siliconcraft.net/download.htm
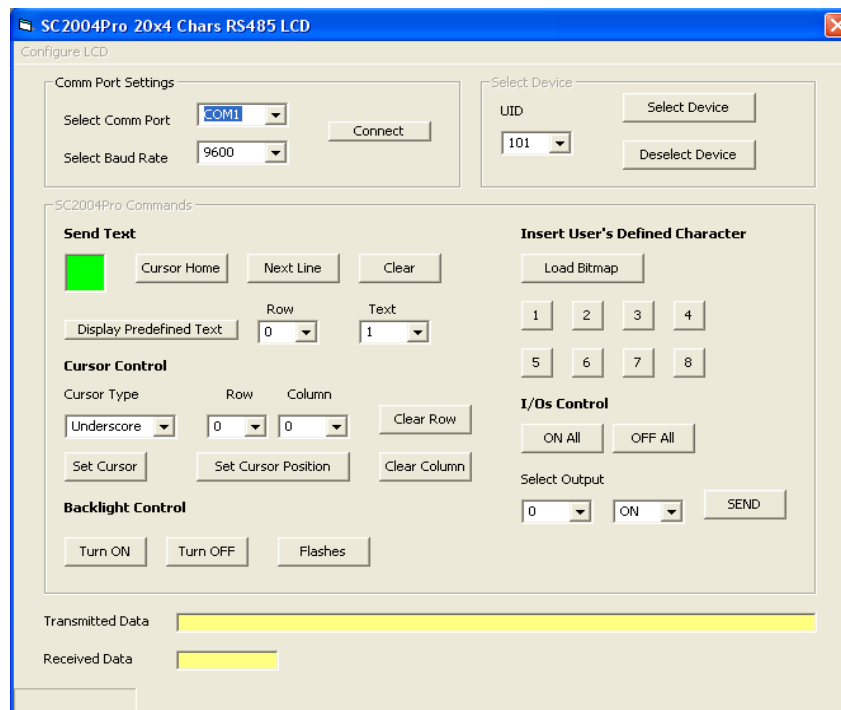


Command Summary

Command	Code in Decimal
Insert Custom Character	0 to 7
Send Cursor Home	11

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Move Cursor to the next row	12
Clear LCD & Send Cursor Home	13
Turn On Underlined Cursor	254 , 1
Turn On Blinking Cursor	254 , 2
Turn Off Cursor	254 , 3
Load User's Characters bitmaps	254 , 8
Turn On Backlight	254 , 6
Turn Off Backlight	254 , 7
Flashes Backlight	254 , 11
Turn On All I/Os outputs	254 , 12
Turn Off All I/Os outputs	254 , 13
Read I/Os inputs	254 , 14
Show Startup Screen	254 , 20
Display Startup Screen on Power up	254 , 15
Hide Startup Screen on Power up	254 , 16
Set Baud to 9600	254 , 30
Set Baud to 4800	254 , 31
Save Settings on memory	254 , 32
Clear Row	254 , 45 , [row number (0 – 3)]
Clear Column	254 , 46 , [column number (0 to 19)]
Set Device Address	254 , 48 , [Device ID (101 to 132)]
Set I/O Direction	254 , 49 , [I/O Direction]
Set Individual I/O output	254 , 51 , [Output Port (0 to 7)] , [On / Off ('H' / 'L')]
Set Cursor Position	254 , 50 , [row number] , [column number]
Display User's Text	254 , 52 , [Text Page (0 to 7)] , [row number]
Define User's Text	254 , [Page ID (101 to 108)] , [20 Bytes Text]
Define User's Characters	254 , 100 , [64 Bytes Bitmaps]

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Character size and spacing
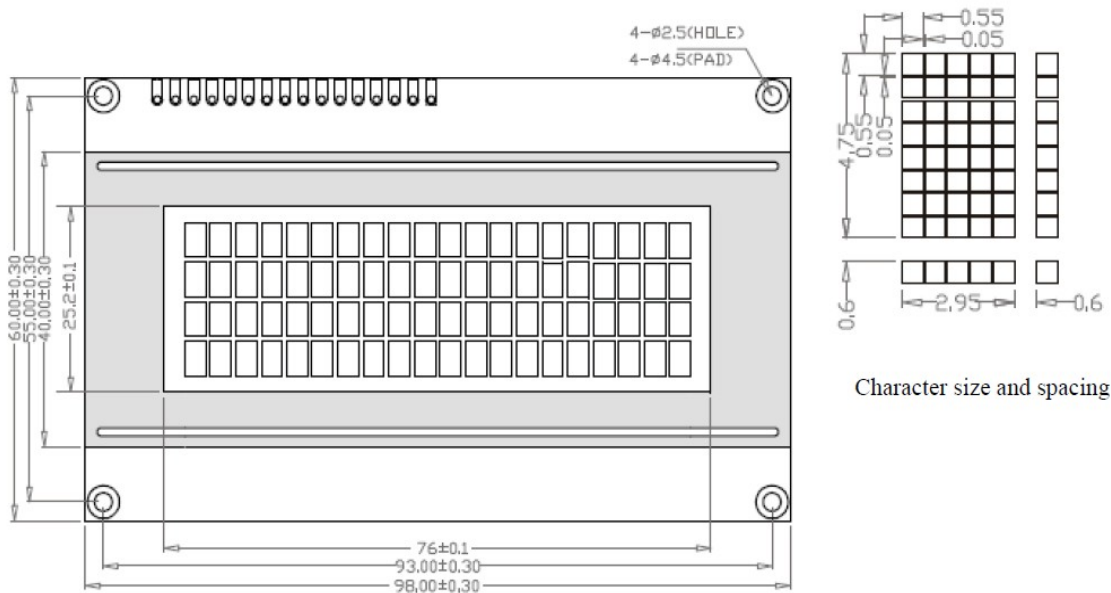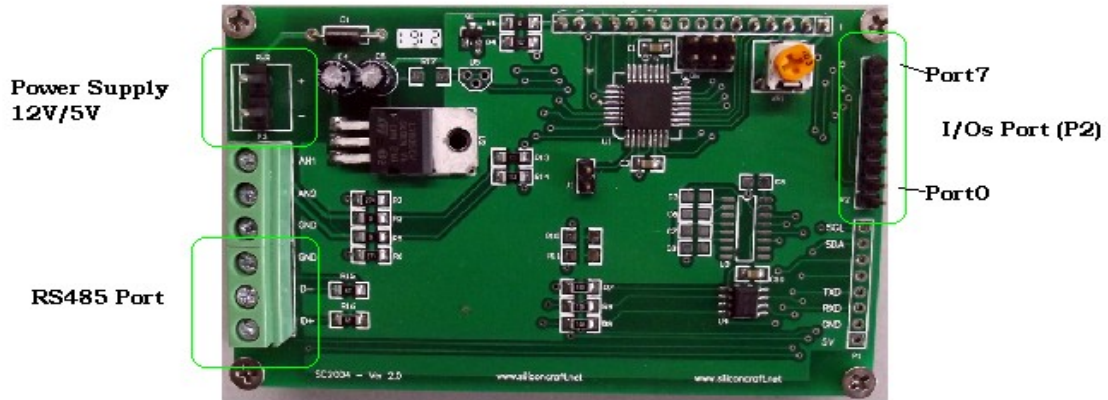
Electrical Specification

Power Supply	12V Version	Max – 15V	Nominal – 12V	Min – 9V
	5V Version	Max – 5V	Nominal – 5V	Min – 4.5V

Power Consumption	Backlight Off	- 25mA		
	Backlight On	Max 300mA	Min 150mA	Green
		Max 50mA	Min 30mA	Blue

Operating Temperature : 0 to 50 C
Storage Temperature : -10 to 60 C