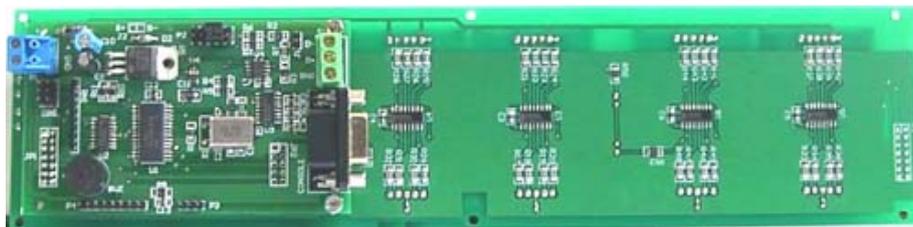
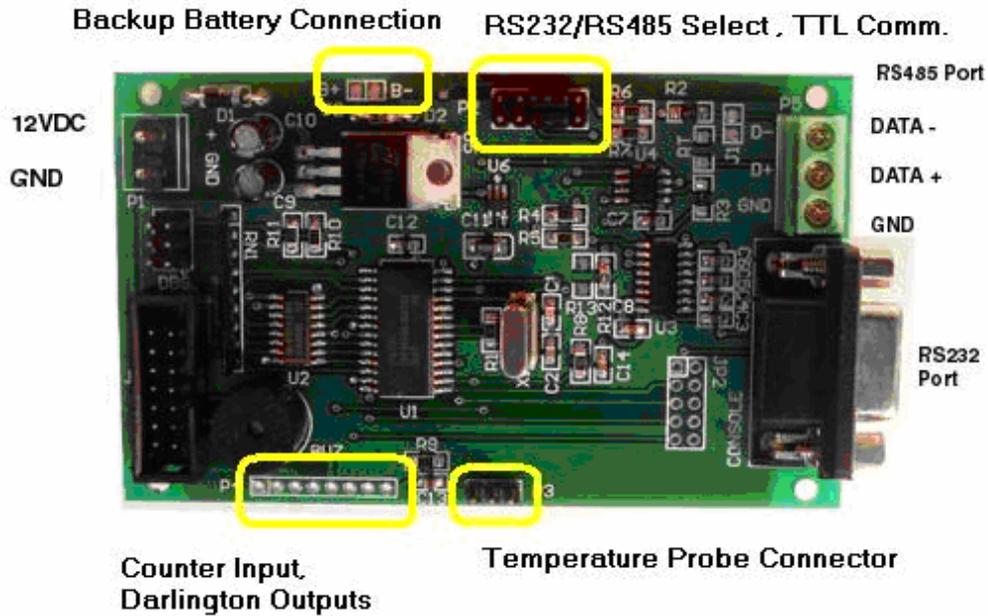


USER'S MANUAL Rev2.0**5 Operational Modes in 1 module:**

- Display 6 ASCII characters or an unsigned integer number.
- 24 Hours Format or 12 Hours Format Real Time Clock.
- Count down Timer.
- Temperature Sensor.
- Event Counter.

Features:

- Display 6 ASCII characters or 32bits long integer.
- RS232, RS485 or TTL interface.
- Programmable baud rate. (1200bps,2400bps,4800bps,9600bps & 19200bps)
- Real Time Clock with Time Stamp Function.
- 3 Multi Function Push Buttons.
- Two Darlington Output.
- On Board Piezo Buzzer.
- One Digital Input Port for event counting
- NTC Thermistor input port
- Up to 255 modules can be separately addressed with programmable device address feature.
- Free Demo & setup software.



Connection Diagram

1.1 Setup SC6D for testing

- Step 1 – Download sc6d.exe freeware from www.siliconcraft.net/download.
- Step 2 – Connect RS232 Serial Cable (not included) to any available serial port on PC.
- Step 3 – Connect the temperature probe to P3
- Step 4 - Power up the device, you should see the baud rate being display for 2 seconds.
By default, the display will show b 9600 indicating baud rate of 9600bps follow by
F1 – Real Time Clock Function
- Step 5 – Start sc6d program on PC and set the correct COM port.

If this is done correctly, the display goes blank and waits for command.

1.2 Changing device baud rate

Programmable baud rate of 1200bps,2400bps,4800bps,9600bps and 19200bps.
Data format is always 8 data bits, no parity and 1 stop bit.

To change the baud rate, select from menu " set module baud rate" and click on it.
The new baud rate will be display on the module.

Make sure the PC baud rate also change to the same device baud rate.

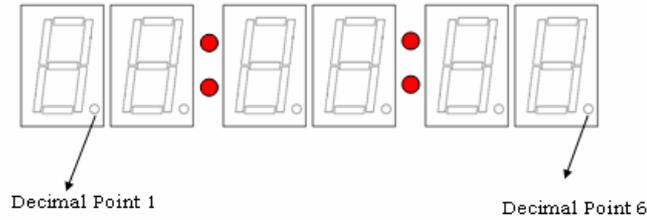
1.3 Display Mode

In this mode, the module displays 4 ASCII characters or an unsigned integer number it received from the serial port.

Supported characters are numbers **0,1,2,3,4,5,6,7,8,9** and alphabets **A,b,C,c,d,E,F,H,h,I,J,L,n,o,P,r,S,U,u,y** as well as "SPACE" and " - " characters.

Sending an unsupported character will result in blank display.
For example; sending 12AG, display will show 12A .

Each digit decimal point can be turned on or off individually.



Example:

Serial Display

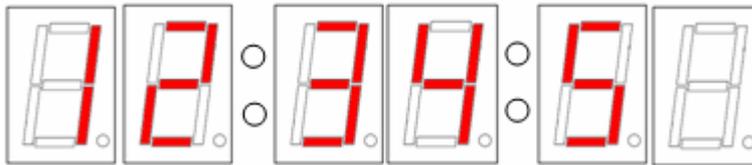
Key in ASCII characters to be displayed. (MAX 6).

123456

Valid Characters are 0 to 9, A,b,C,c,d,E,F,H,h,i,j,L,n,o,P,r,S,U,u,y,- and SPACE

Decimal Point 1 Decimal Point 2
 Decimal Point 3 Decimal Point 4
 Decimal Point 5 Decimal Point 6
 OFF All Decimal Point

Click Send ASCII, Display will show



An unique code will be transmitted via the serial port each time the push button is pressed.

- button = 0x10 B1 Pressed
- button = 0x20 B2 Pressed
- button = 0x08 B3 Pressed
- button = 0x30 B1 + B2 Pressed
- button = 0x18 B1 + B3 Pressed
- button = 0x28 B2 + B3 Pressed
- button = 0x38 B1 + B2 + B3 Pressed

MSB	LSB		
UID	0x03	button	0xFF

*MSB transmitted first.
 *UID – Unit ID (address)

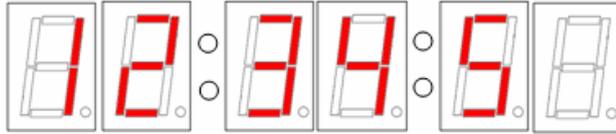
Command List:

Display 4 digits ASCII characters:

0xFE	0x03	ASCII-6	ASCII-5	ASCII-4	ASCII-3	ASCII-2	ASCII-1	0xFF
------	------	---------	---------	---------	---------	---------	---------	------

Example:

Sending 0xFE 0x03 0x31 0x32 0x33 0x34 0x35 0x20 0xFF



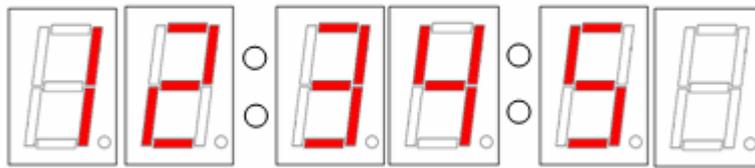
Display shows:

Display an unsigned long integer number (maximum 999999)

0xFE	0x23	Bvte 4	Bvte 3	Bvte 2	Bvte 1	0xFF
-------------	-------------	---------------	---------------	---------------	---------------	-------------

Example:

Sending 0xFE 0x23 0x00 0x00 0x30 0x39 0xFF



Display shows:

Hex Value of 12345 is 0x00003039

Turn On Decimal Point

0xFE	0x13	DP	0xFF
-------------	-------------	-----------	-------------

*DP – decimal point to turn on.

- DP = 0x01 Decimal Point 1
- DP = 0x02 Decimal Point 2
- DP = 0x03 Decimal Point 3
- DP = 0x04 Decimal Point 4
- DP = 0x05 Decimal Point 5
- DP = 0x06 Decimal Point 6

DP = 0x00 Off all Decimal Points

Toggle Flashing Mode

This will cause the display to turn on and off in 0.6s interval

0xFE	0xFC	0xFF
-------------	-------------	-------------

1.3 Real Time Clock mode

Selectable 24 hours/12 Hours display format.

The time is set at 00.00 at power up or reset.

Current time can be set using the SC6D Application Software ,the push buttons or serial command.

Setup Real Time Clock Using SC6D Application Software

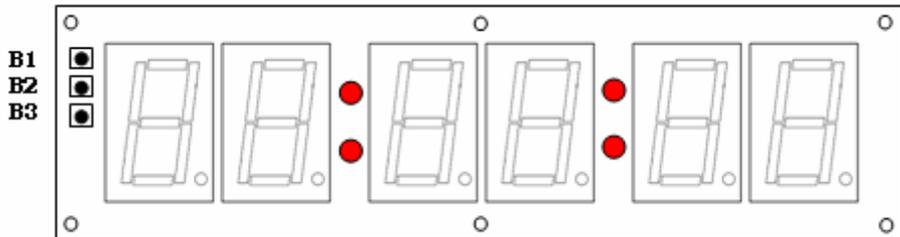


Clicking on the " Set Current Time " button to set up the real time clock using the PC system time.

Setup Real Time Clock Using the Push Buttons

To set the time via push buttons, pressed B1 once. Press B2 to increment hour or press B3 to decrement. Press B1 again to set minute. Press B1 again to set second. Press B2 will reset second to 0. Pressing B1 for the fourth time will exit time setting mode.

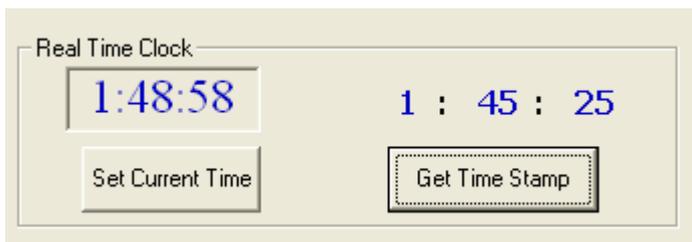
Press B2 & B3 simultaneously to toggle between 24Hrs and 12Hrs Mode.



Time Stamp Function

The module will transmit its time information when requested via serial command. Information includes Hour , minute and second.

To demonstrate this function , click on "GET TIME STAMP"



Command List:

Set Real Time Clock

0xFE	0x10	Sec	Min	Hour	0xFF
-------------	-------------	------------	------------	-------------	-------------

Display Real Time Clock

0xFE	0x00	0xFF
-------------	-------------	-------------

Get Time Stamp.

0xFE	0x13	0xF7	0xFF
------	------	------	------

Reply:

0xFE	0x01	second	minute	hour	0xFF
------	------	--------	--------	------	------

1.4 Count Down Timer Mode

Maximum interval is 99 hours ,99 minutes and 59 seconds (99:99:59)

The operation can be controlled using the SC6D application software or the push buttons. When count down timer reaches 00:00:00, buzzer will sound and darlington output 1 turns on.

The display flashes.

Using Count Down Timer with SC6D application software



Key in Hours (0-99) ,minutes (0-99) and seconds value (0-59). Click on "Set Interval". "Start/Stop" and "Reset" button will be enabled.

Click Start/Stop to start or stop the timer.

Click Reset will cause timer to reset to set interval and stop the timer. Buzzer and output 1 will be turned off if the timer already reaches 00:00:00.

Using Count Down Timer with push buttons

To set the count down interval via push buttons, pressed B1 once. Press B2 to increment seconds or press B3 to decrement. Press B1 again to set minutes. Press B1 again to set hour Pressing B1 for the fourth time will exit interval setting mode.

Press B2 to start or stop counting. Press B3 to reset count down timer.

When the timer counts down to 00:00:00, the display will flash and the Darlington output port 1 turn on. This port can be used to control external device like relay etc.

Pressing B3 will reset the timer, turn off the Darlington output 1 and stop display from flashing.

Command List:

Set Count Down Interval

0xFE	0x01	second	minute	hour	0xFF
------	------	--------	--------	------	------

Start or Stop Timer

0xFE	0x11	0xFF
------	------	------

Reset Timer

0xFE	0x21	0xFF
------	------	------

1.5 Thermometer mode

This module works with the supplied 10K NTC Probe. Upon activation, the module sample the temperature sensor every 1s, and update the display. Measurement is shown in unit Celsius.

Measured temperature can be read out via serial command.

0xFE	0x04	0xFF
------	------	------

Reply:

UID	0x04	sign	temperature	0xFF
-----	------	------	-------------	------

Sign = 4 if temperature is positive.
 Sign = 6 if temperature is negative.
 Temperature reading in CELSIUS

1.6 Event Counter Mode

Count up to 999999 input events. <10kHz Pulsed or Contact.
 Code transmission on each event.

UID	0x05	0x05	0xFF
-----	------	------	------

Pressing B3 will reset counter to 000000

1.7 Miscellaneous Command

Turn On Buzzer

0xFE	0xFA	0xFF
------	------	------

Turn Off Buzzer

0xFE	0xFB	0xFF
------	------	------

Turn On Output 1

0xFE	0xF9	0xFF
------	------	------

Turn Off Output 1

0xFE	0xF8	0xFF
------	------	------

Turn On Output 2

0xFE	0xF6	0xFF
------	------	------

Turn Off Output 2

0xFE	0xF5	0xFF
------	------	------

2 Standalone Mode

5 modes are available in application where serial port is not connected.

Press B1 & B3 simultaneously to switch to next mode.

- F1 – Real Time Clock Mode
- F2 – Count down Timer Mode
- F3 – Show Temperature Mode
- F4 – Show Temperature & Clock Alternately mode
- F5 – Event Counter mode.

3 RS485 Setup

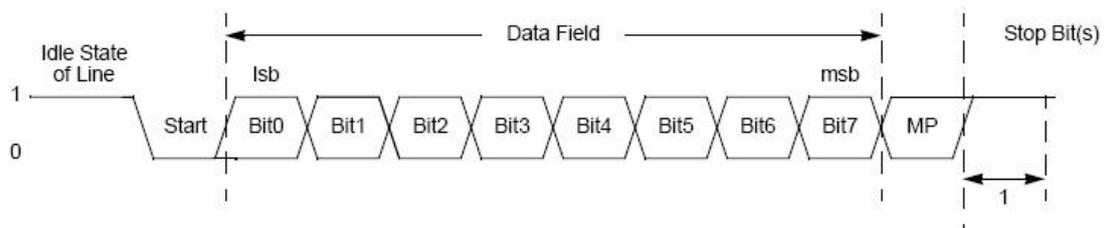
Point to Point – UID always 254
8,N,1 data format



Header P2 setting for RS485

Multipoint – each device with unique UID

9,N,1 data format



Bit 9 (MP) – "0" data byte
Bit 9 (MP) = "1" address byte

To send command to specific device, send UID first with MP set to 1 , follow by the command with MP set to 0.

To change the UID, Power off the module. Press & Hold Button B1 and B3. Power up the module. You should see the module ID displayed (Example : u254)

Change the UID by using B2 to increase and B3 to decrease.

Press B1 when done.

Note: Changing UID other than 254 will cause the module set at 9,N,1 data format.

4 Start Up Function

By default, the module starts in Real Time Clock Mode.
You can change that by selecting "Startup Function" from the menu



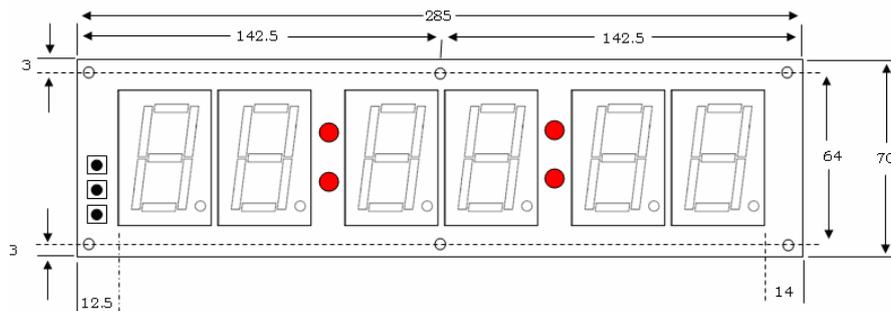
5 Specification

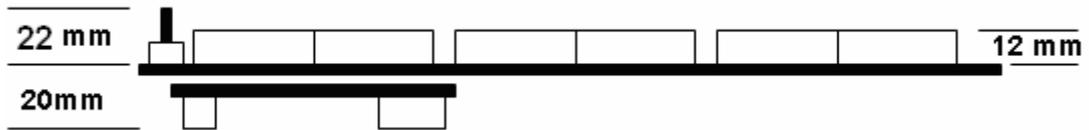
Operating Temperature : 0°C to 70°C
Storage Temperature : -20°C to 80°C
Operating Relative Humidity : 90% max non-condensing
Supply Voltage: 10-12VDC (1A)
Supply Current: 600mA typical
Maximum Sink Current into PWM port: 500mA
Maximum Sink Current into Darlington Port: 500mA
Maximum Current into Event Counter Port: 20mA
Maximum Voltage into Event Counter Port: 3.3VDC
Maximum Voltage into TTL UART Port: 5.5VDC
Maximum RS232 cable length: 5 meters.
Maximum RS485 cable length: 1000 meters

Maximum Current draw from 5VDC Pin: 500mA

Temperature Probe operating range -10°C to 100°C
Temperature Probe accuracy +/- 1%

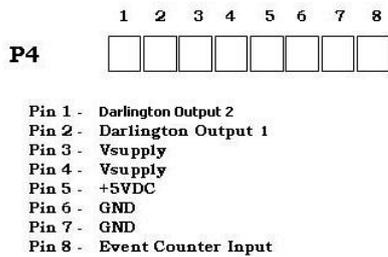
Mechanical Dimension



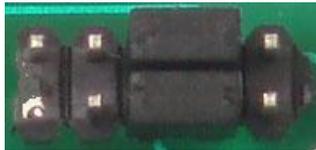
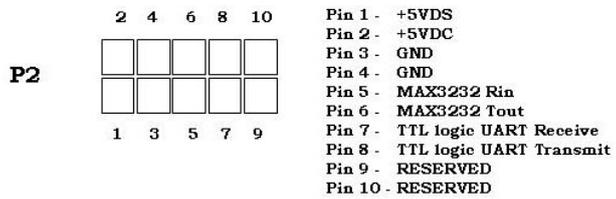


All dimension in mm.
Mounting holes diameter is 3mm

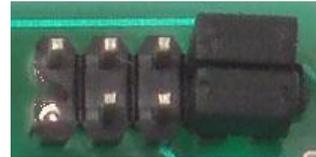
P4 Header Pinout Description



P2 Header Pinout Description

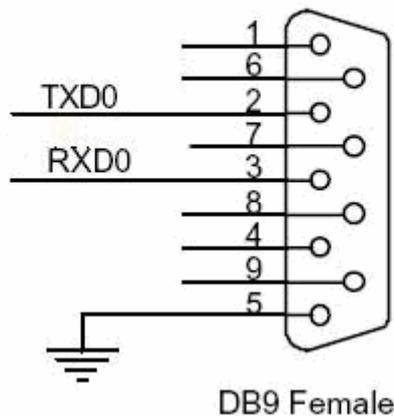


Header P2 (RS232 Setup)



Header P2 (RS485 Setup)

CONSOLE



RS232 Port