

SC6DMBS Modbus Counter/Display Module Rev 1.0

SC6DMBS is a 6 Digits Seven Segment LED Counter and Serial Display Modules that acts as a RTU mode Modbus Slave Device.

1.8 inch digit height red LED makes it visible up to 100 feet away.

It can functions as a counter and display depending on the serial function code it received on its RS485 or RS232 port.

As a counter, it count input pulses and increment the display up to 999,999. The counter value can be read via serial command.

As a serial display, it decodes integer value and display on the LED.

Support:

- Unsigned Integer 0 to 65535
- Signed Integer -32767 to 32768
- Long Integer -99999 to 999999
- ASCII numeric and limited Alphabets

SC6DMBS also features two open collector outputs and on board buzzer that can be controlled via serial command.



Fig 1: Front View

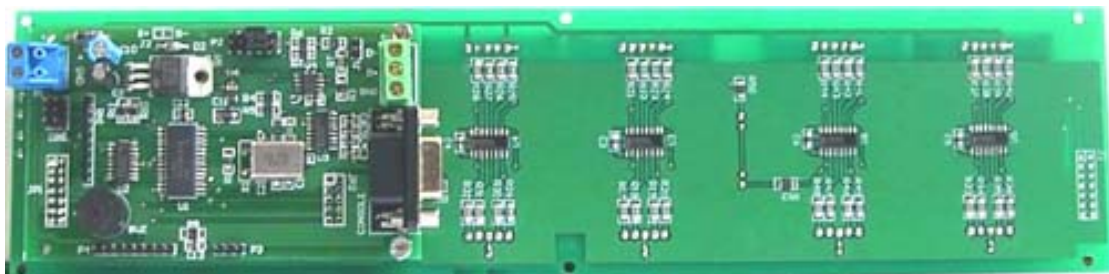


Fig 2: Back View

Features:

- Modbus RTU Slave Protocol
- Programmable baud rate : 4800bps,9600bps,19200bps
- Programmable data format : 8N2,8E1,8O1
- Programmable slave id : 1 to 247
- Configurable RS232 or RS485 Interface.
- Programmable decimal points (display mode) :
d.ddddd,dd.ddddd,ddd.ddddd,dddd.dd,dddd.d
- 2 Open Collector Output
- On Board Piezo Buzzer
- Display mode: Display integers or ASCII texts.
- Counter mode: Count up to 999,999

Configure RS232/RS485

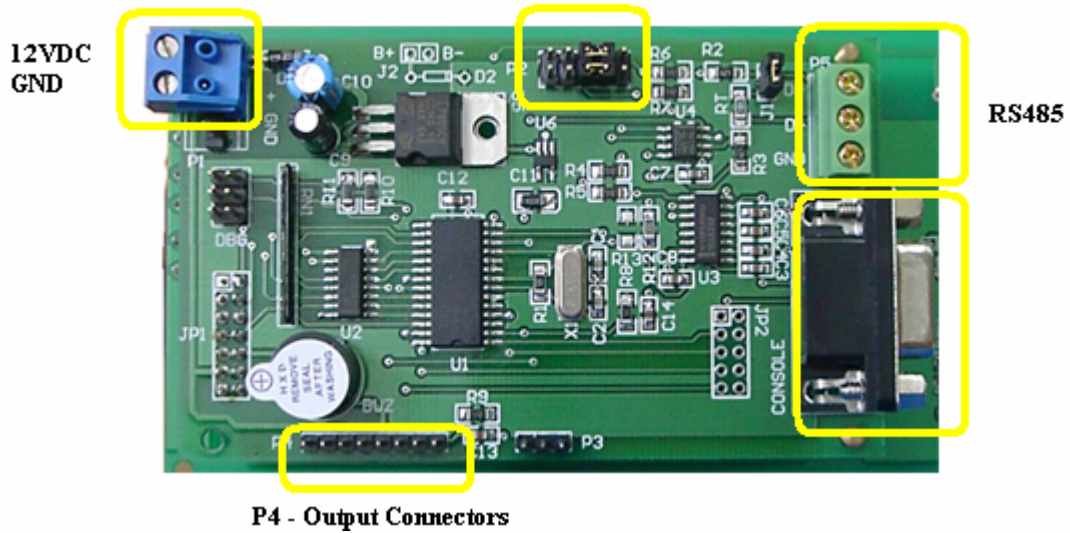


Fig 3 : Connectors

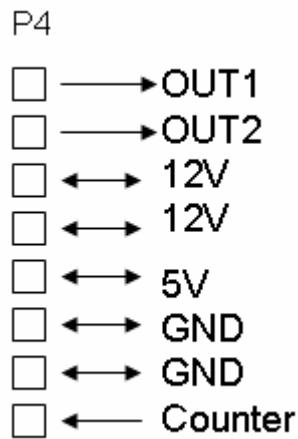


Fig 4 : P4 Pinout

Setting Up

SC6DMBS requires a DC power supply of 12V.

On Power up display shows " - - - - - "

Default settings : 9600bps, 8N2, Slave ID 1, No decimal point.

To change settings, press B1 and B3 simultaneously.

Display shows b 9600

Press B2 or B3 to change the baud rate.

Press B1 to next parameter setting

Display shows 8n2

Press B2 or B3 to change the data format.

Press B1 to next parameter setting

Display shows dddddd

Press B2 or B3 to set decimal point.

Press B1 to next parameter setting

Display shows u 001

Press B2 or B3 to change slave id.

Press B1 when done.

Settings will be saved in the non-volatile memory and retains its value until next setting cycle.

Counter Mode

The display increments its value each time it detects a pulse on the counter input port.

Decimal point on digit 1 lights up indicating the value displayed is the counter value.

The display overwrites counter value when it received display ASCII or display integer command. However, the counter will continue to function at the background.

To display counter value, press B1 once.

Counter can be reset to 0 at any time by pressing B2 and B3 simultaneously or serial command.

To read counter value:

Send Serial Command:

Slave id | 0x03 | 0x00 | 0x00 | 0x00 | 0x02 | CRCHI | CRCLO

Response

Slave Id | 0x03 | 0x04 | 4 Bytes Counter Value | CRCHI | CRCLO

To reset Counter:

Send serial command:

Slave id | 0x05 | 0x00 | 0x02 | 0xFF | 0x00 | CRCHI | CRCLO

Response

Slave id | 0x05 | 0x00 | 0x02 | 0xFF | 0x00 | CRCHI | CRCLO

Display Mode

SC6DMBS receives data from Master device, decode it and displays on the LED.

Four data format supported: signed integer, unsigned integer, long integer and ASCII

Display unsigned integer

Send Serial Command

Slave id | 0x06 | 0x00 | 0x00 | 16 bits unsigned integer | CRCHI | CRCLO

Response

Slave id | 0x06 | 0x00 | 0x00 | 16 bits unsigned integer | CRCHI | CRCLO

Example: To display unsigned integer value of 50000 (0xC350)

Query:

Slave id | 0x06 | 0x00 | 0x00 | 0xC3 | 0x50 | CRCHI | CRCLO

Response:

Slave id | 0x06 | 0x00 | 0x00 | 0xC3 | 0x50 | CRCHI | CRCLO

Display Signed integer

Send Serial Command

Slave id | 0x06 | 0x00 | 0x01 | 16 bits signed integer | CRCHI | CRCLO

Response

Slave id | 0x06 | 0x00 | 0x01 | 16 bits signed integer | CRCHI | CRCLO

Example: To display unsigned integer value of -1000 (0xFC18)

Query:

Slave id | 0x06 | 0x00 | 0x00 | 0xFC | 0x18 | CRCHI | CRCLO

Response:

Slave id | 0x06 | 0x00 | 0x00 | 0xFC | 0x18 | CRCHI | CRCLO

Display long integer

Send Serial Command

Slave id | 0x10 | 0x00 | 0x00 | 0x00 | 0x02 | 0x04 | 32 bits long integer | CRCHI | CRCLO

Response

Slave id | 0x10 | 0x00 | 0x00 | 0x00 | 0x02 | CRCHI | CRCLO

Example: To display long integer value of 98000 (0x00017ED0)

Query:

Slave id | 0x10 | 0x00 | 0x00 | 0x00 | 0x02 | 0x04 | 0x00 | 0x01 | 0x7E | 0xD0 | CRCHI | CRCLO

Response:

Slave id | 0x10 | 0x00 | 0x00 | 0x00 | 0x02 | CRCHI | CRCLO

Display ASCII text

Send Serial Command

Slave id | 0x10 | 0x00 | 0x02 | 0x00 | 0x03 | 0x06 | 6 bytes ASCII | CRCHI | CRCLO

Response

Slave id | 0x10 | 0x00 | 0x00 | 0x00 | 0x03 | CRCHI | CRCLO

Supported ASCII:

Number: 0 to 9

Alphabets: A,C,E,F,H,I,J,L,O,P,S,U,b,c,d,h,n,o,r,t,u,y

Symbol : - , _

Example: To display "HELP99"

Query:

Slave id | 0x10 | 0x00 | 0x02 | 0x00 | 0x03 | 0x06 | 0x48 | 0x45 | 0x4C | 0x50 | 0x39 | 0x39
| CRCHI | CRCLO

Output Control

Turn On output 1,

Slave id | 0x05 | 0x00 | 0x00 | 0xFF | 0x00 | CRCHI | CRCLO

Response

Slave id | 0x05 | 0x00 | 0x00 | 0xFF | 0x00 | CRCHI | CRCLO

Turn Off output 1,

Slave id | 0x05 | 0x00 | 0x00 | 0x00 | 0x00 | CRCHI | CRCLO

Response

Slave id | 0x05 | 0x00 | 0x00 | 0x00 | 0x00 | CRCHI | CRCLO

Turn On output 2,

Slave id | 0x05 | 0x00 | 0x01 | 0xFF | 0x00 | CRCHI | CRCLO

Response

Slave id | 0x05 | 0x00 | 0x01 | 0xFF | 0x00 | CRCHI | CRCLO

Turn Off output 2,

Slave id | 0x05 | 0x00 | 0x01 | 0x00 | 0x00 | CRCHI | CRCLO

Response

Slave id | 0x05 | 0x00 | 0x01 | 0x00 | 0x00 | CRCHI | CRCLO

Turn On buzzer,

Slave id | 0x05 | 0x00 | 0x03 | 0xFF | 0x00 | CRCHI | CRCLO

Response

Slave id | 0x05 | 0x00 | 0x03 | 0xFF | 0x00 | CRCHI | CRCLO

Turn Off buzzer,

Slave id | 0x05 | 0x00 | 0x03 | 0x00 | 0x00 | CRCHI | CRCLO

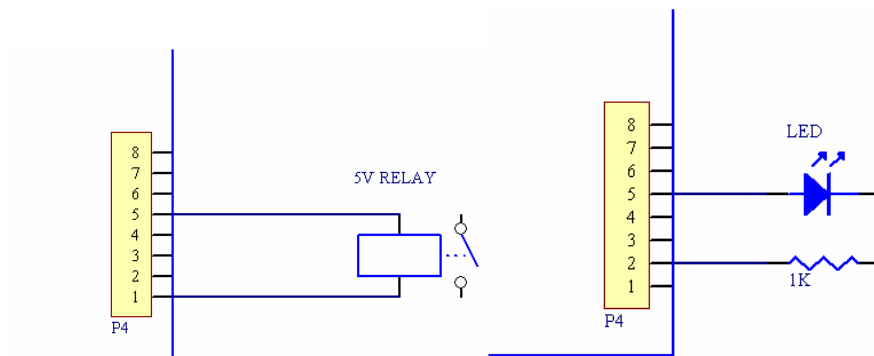
Response

Slave id | 0x05 | 0x00 | 0x03 | 0x00 | 0x00 | CRCHI | CRCLO

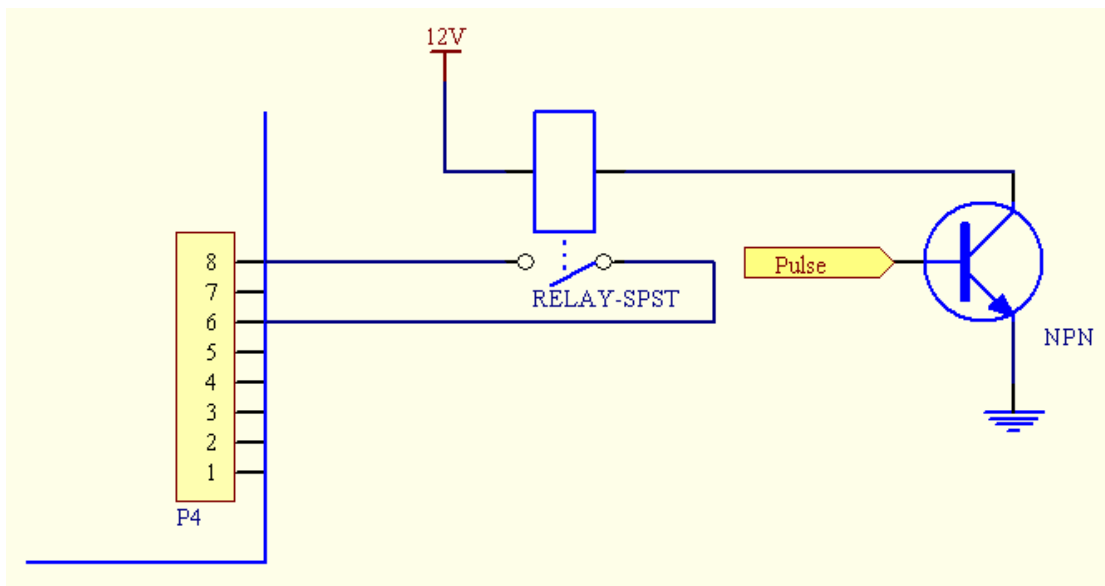
External Output Connection Example

External Relay connection

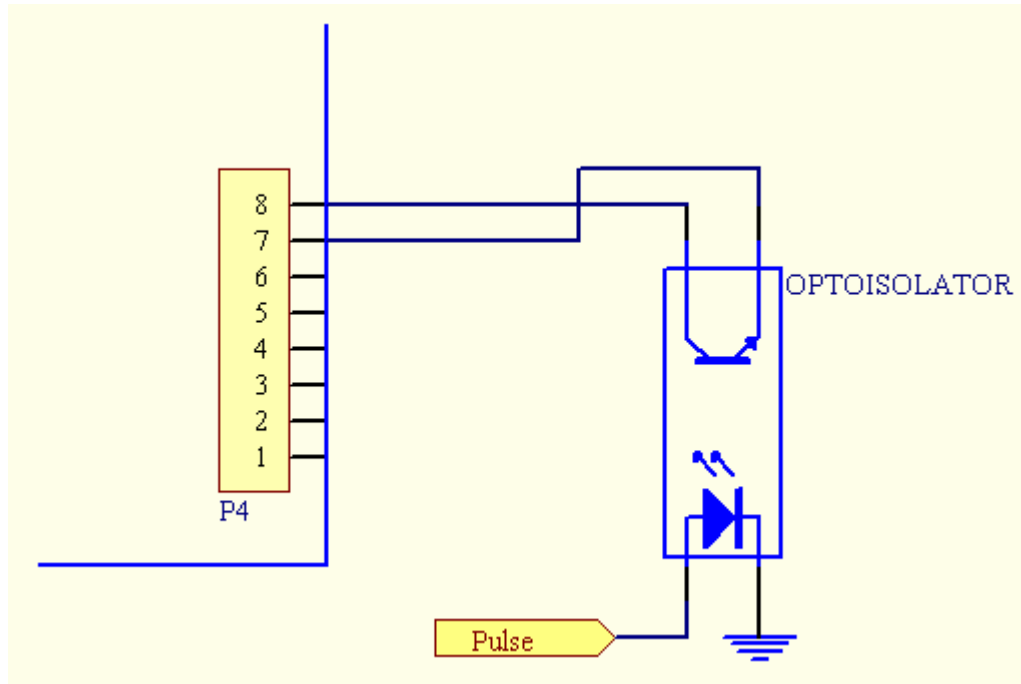
External LED Connection



Counter Input with Relay Isolation



Counter Input with Optoisolator



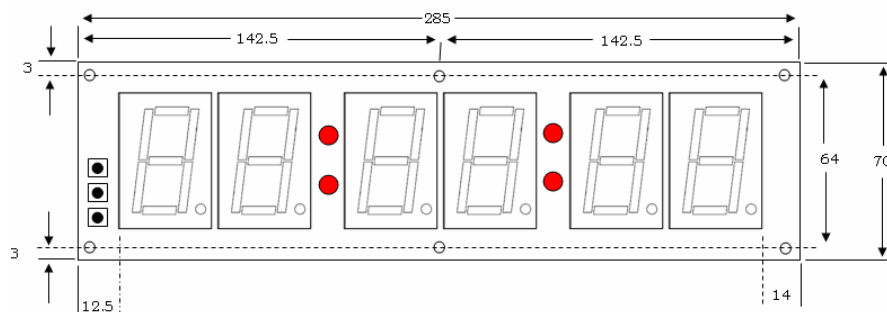
Electrical Specification

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 output 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

Maximum Counter Input Frequency: 10Hz

Mechanical Specification



Mounting Holes Diameter: 3mm



RS232 / RS485 Configuration

SC6DMBS has both RS232 and RS485 interface. Only one can be used at any one time



Header P2 (RS232 Setup)



Header P2 (RS485 Setup)

Support ASCII and its Hexadecimal Value

0	0x30	A	0x41	b	0x62
1	0x31	C	0x43	c	0x63
2	0x32	E	0x45	d	0x64
3	0x33	F	0x46	h	0x68
4	0x34	H	0x48	n	0x6E
5	0x35	I	0x49	o	0x6F
6	0x36	J	0x4A	r	0x72
7	0x37	L	0x4C	t	0x74
8	0x38	O	0x4F	u	0x75
9	0x39	P	0x50	y	0x79
		S	0x53	-	0x2D
		U	0x55	_	0x5F

Application Software

SC6DMBS software is available from www.siliconcraft.net/download to test and evaluate SC6DMBS functionality.