

**SC100 ISOLATED RS-232 BAUD RATE
CONVERTER INTERFACE
INSTRUCTION MANUAL**

REVISION: 8/96

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SC100 ISOLATED RS-232 BAUD RATE CONVERTER INTERFACE

The SC100 interface is an updated version of the SC7638 interface. The device has signal and power isolation and is powered by the datalogger. A male 9 pin D-type connector on one side connects to a CR10(X) or 21X, and a female 9 pin D-type connector connects to an RS232 device (computer or sensor (jumper configurable DTE or DCE)). Features programmed to this point include:

- Burst mode: (from datalogger to computer)
In this mode the SC100 can receive burst data from the datalogger at 76.8k baud, then buffer the data and transmit to the computer at 38.4k baud.
- Instruction 15 mode: The SC100 can be configured to support the datalogger Instruction 15 as a transducer RS232 communication interface. The SC100 function is to insure data synchronization and to support baud rates other than 300 or 1200 baud. In this mode the SC100 has a configurable record structure which can be initialized by the datalogger. This configurable information is volatile and requires re-initialization if the SC100 is powered down. By default (without datalogger initializing the SC100) the SC100 simply buffers the data coming from a sensor or computer until a carriage return, then flags the datalogger that data is present. The SC100 then transmits the data to the datalogger when Instruction 15 asserts the DTR line. In a given record structure, the SC100 searches for a specified string then buffers all of the data following the string until it encounters a termination character (the search string and termination characters are user specified through the optional initialization sequence). Some data conversion (e.g., alpha characters to number equivalents) can also be performed.

Command sequences from the datalogger (CR10(X) only). This is the optional initialization sequence.

Command for initializing search/find & replace structure:

ctrl-Q(17), I (73), 1 (49)

Following these three command bytes the SC100 will expect:

Structure initialization information:

- 1) search byte 1 (range from 1-127; must be 0 if not used)
- 2) search byte 2 (range from 1-127; must be 0 if not used)
- 3) search byte 3 (range from 1-127; must be 0 if not used)
- 4) search byte 4 (range from 1-127; must be 0 if not used)
- 5) search byte 5 (range from 1-127; must be 0 if not used)
- 6) search byte 6 (range from 1-127; must be 0 if not used)
- 7) byte --> 0 (this location must always be 0)
- 8) find and replace with 0 (range from 1-126; must be 127 if not used)
- 9) find and replace with 1 (range from 1-126; must be 127 if not used)
- 10) find and replace with 2 (range from 1-126; must be 127 if not used)
- 11) find and replace with 3 (range from 1-126; must be 127 if not used)
- 12) termination character (range from 1-127)

NOTE: Within the CR10(X) Instruction 15 parameter 06 (number of locations to send) must be 15. Also parameter 03 (cts/delay before send) must be 1.

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Command to enter transparent mode:

ctrl-Q(17), I (73), S (83)

Command to exit transparent mode:

either

- 1) change the baud rate, parity status
- 2) change the initialize structure

Command for changing the baud rate, parity, and error reporting:

ctrl-Q(17), I (73), B (66)

Following these three command bytes the SC100 will expect:

Structure initialization information:

byte 1) 1 byte COMPUTER/SENSOR Baud Rate:
16 - 38.4k baud
17 - 19.2k baud
18 - 9600 baud
19 - 4800 baud
20 - 2400 baud
21 - 1200 baud

Values other than these listed will result in non-standard baud rates.

Buffering in one direction only (appropriate delays should be programmed with baud rates under 1200 baud when the datalogger transmits character to the computer/sensors).

byte 2) 1 byte for parity (computer/sensor side), full or half duplex (datalogger side), error messages (computer/sensor side).

Example

01010100 binary --> 54 hex -->84 decimal -->
send errors, even parity, full duplex

Bit6 (error/no error) - If set to 1 the SC100 will report any framing, overrun, or parity errors from the computer/sensor side. This information will be added to the end of the buffered data sent to the datalogger, and will either be zero (0) for no errors, or one through nine (1-9) for number of errors detected.

Bit4 (even/odd) - Even or odd parity if parity bit2 is set to one.

Bit3 (half/full) - There are two different versions of Instruction 15 for the CR10 datalogger. Half duplex, or full duplex. The PROM installed in the CR10 determines the version. The CR10X uses full duplex. Whenever the datalogger executes Instruction 15, the DTR line goes high. The DTR line remains high for transmitting and goes low for receiving. With the full duplex version, data can be received before the transmitting has been completed (data can not be received before the delay time entered in parameter 3).

The SC100 will delay 12 msec before transmitting the buffered data (parameter 3 must be 1 --> 10 msec).

Three out of the five different Input/Output Configurations for Instruction 15 can be used with the SC100 and they are 1, 2 and 4.

x	1=error 0=no error	x	1=even 0=odd	1=half 0= full	1=parity 0= none	x	x
bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0

x-don't care

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Configuration number	Parameters				Port Function				
	3	6	8		DTR	CTS	TX	RX	
	1. DTR, RX	1	0	NZ		C	NC	NC	C+1
	2. DTR,TX	1	NZ	0		C	NC	C+1	NC
	4. DTR, TX, RX	1	NZ	NZ		C	NC	C+1	C+2

NOTE: Configuration numbers 2 & 4 have transmit (Tx) on the same control port (c+1). This is useful if you plan to initialize the SC100 and receive data without having to change the control port functions.

Choosing value for bit3 (half/full):

- 1) If the half duplex version and configuration number 2 or/and 4 are used, then bit3 must be 1.
- 2) If the full duplex version and configuration number 2 or /and 4 are used, then bit3 must be 0.
- 3) If configuration number 1 is used, then bit3 must be 0 for either half or full duplex.

Bit2 (parity/none) when this bit is set to one, then either even or odd parity (depending on bit 4) will be enabled for the computer/sensor side.

Pig tail to DB 9 pin cable

Red supply volts (jumper configurable to either +12 V or +5 V)
 Black Gnd
 Blue DTR input
 Orange TXD input
 Brown RXD output
 Green FLAG output (SC100's output that indicates buffered information ready)
 Yellow Power Down wire (+5 V will power down the SC100 if internal jumper is connected, connect to gnd if not used). There are three different power modes.
 1) Yellow wire tied low (gnd) normal operation mode ~55ma.

Examples of connecting Pig tail cable to datalogger

Instruction 15 input/output configurations
 Number 4 (refer to "15 control port serial" manual, table 1) DTR, TX, RX with first control port parameter 4 = 1

Red	+12 V or +5 V (check jumpers in the SC100)
Black	Gnd
Blue	C1
Orange	C2
Brown	C3
Green	C4
Yellow	GND

Instruction 15 input/output configurations
 Number 1 DTR, RX with first control port parameter 4 = 1

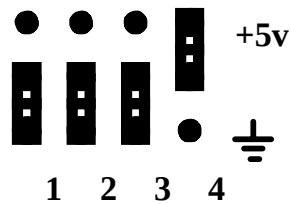
Red	+12 V or +5 V
Black	Gnd
Blue	C1
Orange	no connect
Brown	C2
Green	C3
Yellow	GND

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On board jumper setting

4	3	2	1	Modes
0	0	0	0	Burst Mode
0	0	1	0	P15, 9600, Half, None
0	1	0	0	P15, 9600,Full,None
0	1	1	0	P15, 4800, Half, None
1	0	0	0	P15, 4800, Full, None
1	0	1	0	P15, 9600, Full, Even
1	1	0	0	P15, 9600, Full, Odd
1	1	1	0	P15, 1200, Full, None

Example of jumper setting p15,4800,full,none ----->



Computer/Sensor DB9 pin configuration:

jumpers located around the computer/sensor DB9 pin connector.

DCE mode to connect to computer



DTE mode to connect to sensor



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Example of how to configure the SC100 to set up baud rate, parity and error detection

03:	P91	If Flag/Port	
01:	26	Do if flag 6 is low	
02:	30	Then Do	
04:	P30	Z=F	
01:	17	F	<u>command character (ctrl Q)</u>
02:	00	Exponent of 10	
03:	10	Z Loc :	
05:	P30	Z=F	
01:	73	F	<u>command character (I)</u>
02:	00	Exponent of 10	
03:	11	Z Loc :	
06:	P30	Z=F	
01:	66	F	<u>command character (B)</u>
02:	00	Exponent of 10	
03:	12	Z Loc :	
07:	P30	Z=F	
01:	18	F	<u>byte 1 (baud rate --> 9600)</u>
02:	00	Exponent of 10	
03:	13	Z Loc :	
08:	P30	Z=F	
01:	08	F	<u>byte 2 (no error, no parity, half duplex)</u>
02:	00	Exponent of 10	
03:	14	Z Loc :	
10:	P15	Port Serial I/O (Special)	
01:	1	Rep	
02:	01	Configuration code	
03:	1	CTS/Delay	
04:	1	First control port	
05:	10	Output Loc	
06:	5	No. of locs to send	
07:	13	Termination character	
08:	0	Maximum characters	
09:	20	CTS/Input wait	
10:	3	Loc :	
11:	1	Mult	
12:	0	Offset	
11:	P86	Do	
01:	16	Set high Flag 6	
12:	P95	End	

Example of how to configure the SC100 to transparent mode

13:	P91	If Flag/Port
01:	11	Do if flag 1 is high
02:	30	Then Do

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14:	P30	Z=F	
01:	17	F	<u>command character (ctrl Q)</u>
02:	00	Exponent of 10	
03:	10	Z Loc :	
15:	P30	Z=F	
01:	73	F	<u>command character (I)</u>
02:	00	Exponent of 10	
03:	11	Z Loc :	
16:	P30	Z=F	
01:	83	F	<u>command character (S)</u>
02:	00	Exponent of 10	
03:	12	Z Loc :	
17:	P15	Port Serial I/O (Special)	
01:	1	Rep	
02:	01	Configuration code	
03:	1	CTS/Delay	
04:	1	First control port	
05:	10	Output Loc	
06:	3	No. of locs to send	
07:	13	Termination character	
08:	0	Maximum characters	
09:	1	CTS/Input wait	
10:	2	Loc :	
11:	1	Mult	
12:	0	Offset	
18:	P86	Do	
01:	21	Set low Flag 1	
19:	P95	End	

Example of how to initialize the SC100's search/find & replace structure

20:	P91	If Flag/Port	
01:	13	Do if flag 3 is high	
02:	30	Then Do	
21:	P30	Z=F	
01:	17	F	<u>command character (ctrl Q)</u>
02:	00	Exponent of 10	
03:	10	Z Loc :	
22:	P30	Z=F	
01:	73	F	<u>command character (I)</u>
02:	00	Exponent of 10	
03:	11	Z Loc :	
23:	P30	Z=F	
01:	49	F	<u>command character (1)</u>
02:	00	Exponent of 10	
03:	12	Z Loc :	
24:	P30	Z=F	
01:	66	F	<u>search byte 1 (B)</u>

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02:	00	Exponent of 10	
03:	13	Z Loc :	
25:	P30	Z=F	
01:	69	F	<u>search byte 2 (E)</u>
02:	00	Exponent of 10	
03:	14	Z Loc :	
26:	P30	Z=F	
01:	78	F	<u>search byte 3 (N)</u>
02:	00	Exponent of 10	
03:	15	Z Loc :	
27:	P30	Z=F	
01:	00	F	<u>search byte 4 (00 terminates search)</u>
02:	00	Exponent of 10	
03:	16	Z Loc :	
28:	P30	Z=F	
01:	00	F	<u>search byte 5 (00 terminates search)</u>
02:	00	Exponent of 10	
03:	17	Z Loc :	
29:	P30	Z=F	
01:	00	F	<u>search byte 6 (00 terminates search)</u>
02:	00	Exponent of 10	
03:	18	Z Loc :	
30:	P30	Z=F	
01:	00	F	<u>search byte 7 (must always be 00)</u>
02:	00	Exponent of 10	
03:	19	Z Loc :	
31:	P30	Z=F	
01:	127	F	<u>find & replace 0 (127 --> not used)</u>
02:	00	Exponent of 10	
03:	20	Z Loc :	
32:	P30	Z=F	
01:	69	F	<u>find & replace 1 (E is replaced with 1)</u>
02:	00	Exponent of 10	
03:	21	Z Loc :	
33:	P30	Z=F	
01:	87	F	<u>find & replace 2 (W is replaced with 2)</u>
02:	00	Exponent of 10	
03:	22	Z Loc :	
34:	P30	Z=F	
01:	127	F	<u>find & replace 3 (127 --> not used)</u>
02:	00	Exponent of 10	
03:	23	Z Loc :	

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35:	P30	Z=F	
01:	13	F	<u>termination character (carriage return)</u>
02:	00	Exponent of 10	
03:	24	Z Loc :	
37:	P15	Port Serial I/O (Special)	
01:	1	Rep	
02:	01	Configuration code	
03:	1	CTS/Delay	
04:	1	First control port	
05:	10	Output Loc	
06:	15	No. of locs to send	
07:	13	Termination character	
08:	0	Maximum characters	
09:	100	CTS/Input wait	
10:	3	Loc :	
11:	1	Mult	
12:	0	Offset	
38:	P86	Do	
01:	23	Set low Flag 3	
39:	P95	End	

Example of how to receive buffered information

40:	P91	If Flag/Port	
01:	44	Do if port 4 is high	
02:	30	Then Do	
41:	P15	Port Serial I/O (Special)	
01:	1	Rep	
02:	01	Configuration code	
03:	1	CTS/Delay	
04:	1	First control port	
05:	9	Output Loc	
06:	1	No. of locs to send	
07:	13	Termination character	
08:	100	Maximum characters	
09:	1000	CTS/Input wait	
10:	1	Loc :	
11:	1	Mult	
12:	0	Offset	
42:	P95	End	