

SDS-122

Serial Data Switch

User Guide

Issued 1.8.01

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SDS-122 Serial Data Switch

The SDS-122 is a configurable two-way serial data switch which will allow two modem devices to be connected to a datalogger simultaneously, so allowing both remote and local interrogation of the datalogger to be carried out. It can support both DTE and DCE devices without the need for a null modem cable, and can operate either in manual or automatic mode.

1. Introduction

The SDS-122 will normally be fitted in a datalogger enclosure. It allows two modems to be connected to a single datalogger at the same time and can automatically switch the datalogger to communicate with whichever modem initiates communications.

The SDS-122 can support both DTE and DCE devices without the need for a null modem cable, and can emulate an SC932 (9-pin to RS232-DCE) interface. One port of the SDS-122 can also be configured to emulate an optically isolated SC32A interface in either DCE or DTE mode. A jumper switch is provided for use with CR500/510, CR10/10X and CR23X dataloggers to block the transmission of synchronous data.

The SDS-122 can be set either for fully automatic mode, or manual mode, controlled by a datalogger control port or any logic signal. When in automatic mode, the SDS-122 can be configured to either hold the last port rung or to default to a specific port, when communication finishes on either port.

2. Specifications

2.1 Physical

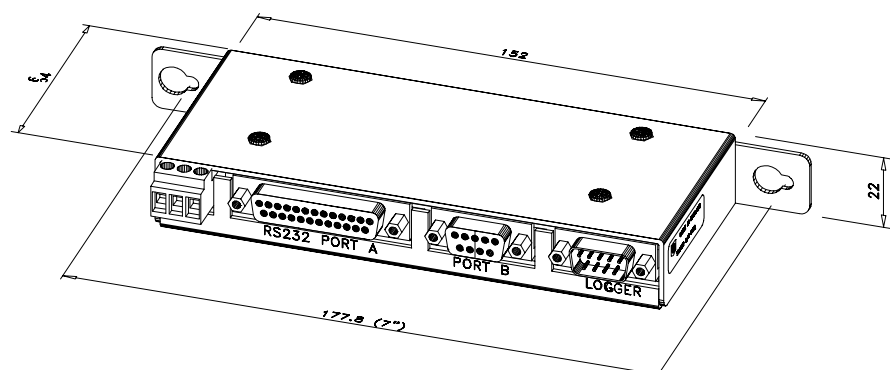


Figure 1 General View of SDS-122

Length (over mounting lugs):	195mm
Width (over connectors):	75mm
Height:	22mm

Mounting Holes:	4.8mm dia. (0.1875in) at 177.8mm (7in) spacing (suitable for mounting onto an ENC 12/14 enclosure chassis plate)
Weight:	180g

2.2 Operational

Table 1 Current Consumption in Various Modes/Communication Activity		
Mode	Activity	Current Drain from Datalogger
Isolated	Quiescent (not communicating)	<75μA
Isolated	Communicating	Up to 3mA
Non-Isolated	No RAD-SRM modem connected and with no communication activity (quiescent)	<100μA
Non-Isolated	RAD-SRM connected, waiting for call	2.5mA
Non-Isolated	RAD-SRM in comms. session but no communication activity	9mA
Non-Isolated	RAD-SRM communicating with PC208E or TCOM in Monitor Mode	12mA
Non-Isolated	Jumper PL50 not fitted; RAD-SRM connected but no communication activity. (This is the one-way, print-enabled RAD-SRM mode.)	<100μA

Normal Operating Temperature Range: -25°C to +50°C

For extended temperature range requirements please contact Campbell Scientific.

2.3 Port Configuration/Connections

The SDS-122 has one datalogger port, one switched datalogger port, a 25-way switched RS232 port and a control port.

Datalogger Port

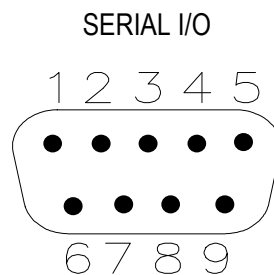


Figure 2 Pin Positions for Datalogger Port: 9-way Male 'D' Type Connector

The datalogger port (marked 'LOGGER' in Figure 1) is a 9-way male 'D' type connector, having the following pin configuration:

PIN	ABBREVIATION	I/O
1	+5V	
2	0V	
3	RING	O

4	RX	O
5	ME	I
6	SDE/PE	I
7	CLK/HS	I
8	Connected to pin 8 of port B (12V supply)	
9	TX	I

NOTE

When the datalogger is in communication mode, pin 5 (ME – Modem Enable) is held high. This line is used by the SDS-122 to detect communications and prevent switching to the other port.

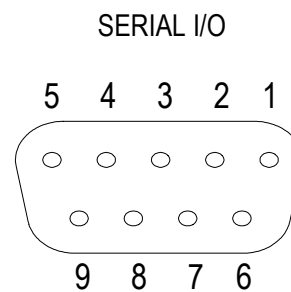
Switched Datalogger Port B

Figure 3 Pin Positions for Switched Datalogger Port 'B': 9-way Female 'D' Type Connector

The switched datalogger port (marked 'PORT B' in Figure 1) is a 9-way female 'D' type connector, having the following pin configuration:

PIN	ABBREVIATION	I/O
1	+5V	
2	0V	
3	RING	I
4	RX	I
5	ME	O
6	SDE/PE	O
7	CLK/HS	O
8	Connected to pin 8 of the datalogger port (12V supply)	
9	TX	O

25-Way Switched RS232 Port A

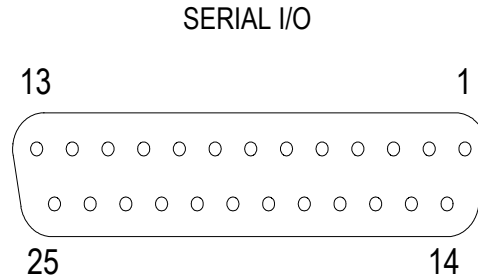


Figure 4 Pin Positions for Switched RS232 Port 'A': 25-way Female 'D' Type Connector

The 25-way switched RS232 port (marked 'RS232 PORT A' in Figure 1) is a 25-way female 'D' type connector, having the following pin configuration:

PIN	ABBREVIATION	INPUT/OUTPUT	
		DTE	DCE
1	Frame Ground		
2	TX	O	I
3	RX	I	O
4	RTS	O	I
5	CTS	I	O
6	DSR	I	O
7	GND		
15	External Power Supply	I	I
20	DTR	O	I

Other pins are not connected.

Control Port (3-way Screw Terminal)

The control port is a 3-way terminal block with screwed connections. This terminal block can be unplugged from the unit for ease of wiring. The terminal connections are marked G, P and M and are used as follows:

TERMINAL	CONNECTION
G	0V – It is recommended that a wire is run from this terminal to the main protective earth point in the system to give maximum protection from interference and transients.
P	In MANUAL mode, this terminal can be pulled high to select port B. In AUTO mode, when PL41 is fitted, it functions as an output and will go logic high when port B is being used or logic low when port A is being used.
M	When this line is pulled high, the SDS-122 will be in MANUAL mode and only the port that is selected by the user (by using the P terminal) will be active.

3. Installation

You should install the SDS-122 in a dry, non-condensing environment. The ENC12/14 datalogger enclosure, available from Campbell Scientific, provides an ideal environment for, typically, a CR10/10X datalogger and the SDS-122, plus a power supply or other equipment.

Use one SC12 cable to connect the SDS-122's 'datalogger' port to a datalogger port, and a second to connect port 'B' to a compatible modem. A computer/short haul modem can be connected to port 'A' using a standard RS232 cable.

Normally, for most applications, there will be no need for a connection to be made between the 3-way terminal block on the SDS-122 and the datalogger, unless direct measurements of the switch status, or manual control is required. It is recommended that a ground wire is connected between the 'G' terminal of the SDS-122 and the system protective ground, to ensure optimum internal transient protection of the device.

CAUTION

Although the SDS-122 has built-in transient protection, it is *not* protected against secondary lightning damage.

Devices that are connected to port A or port B which are likely to be subject to large transients should have external protection fitted. For long cable runs on port A, RAD-SRM Short Haul modems fitted with RAD-SP lightning arrestors should be used.

4. Configuration

The configuration of the SDS-122 is defined by internal jumpers. To access these jumpers it is necessary to open the case by removing the four case screws and pulling the two halves of the case apart.

CAUTION

Before touching any components or jumpers, take precautions against electrostatic damage when handling the exposed circuit board – either by using an ESD protection earth strap connected to the sensor case, or, at the very least, by making sure that you discharge any static by touching the case or metal shell of the 'D' type connectors on the circuit board.

The jumpers control:

- The way in which the SDS-122 switches from one port to another
- The RS232 port configuration (DCE or DTE)
- The degree of isolation between the datalogger and the RS232 device.

It is important to understand the different methods of isolation, as this can affect the accuracy of measurements made by the datalogger. In permanent installations it is good practise to ensure that the datalogger ground and computer ground are isolated, otherwise ground loops and digital noise could result in errors on low-level analogue measurements. The SDS-122 can be set to provide opto-isolation to prevent such ground loops, but this mode of operation is not suitable for all RS232 devices, either because the device needs to source power from the

datalogger or because it is not able to provide power to the output electronics of the SDS-122.

WARNING

The opto-isolation provided by the SDS-122 is not designed, nor should it be used, for the purpose of providing a safety protection barrier. Internal protection devices will cause a breakdown of the isolation if the potential difference between the datalogger and RS232 ground exceeds 47V.

To work in isolated mode, the RS232 device must provide power to the SDS-122 by holding at least one of the input handshaking lines at a positive voltage during communications (pins 4 or 20 in DCE mode, pins 5 or 6 in DTE mode). The voltage input to these lines must be <9V or be current limited to an effective source impedance of 1Kohm. If a suitable handshaking line is not available, a power source (6-20V) can be connected to pin 15 (referenced to pin 7G).

In non-isolated mode, the SDS-122 can provide power from the datalogger via the handshaking lines, to power external interfaces. See details on jumpers PL50, PL51 and PL56 below for information on the power available. When this mode is enabled, no isolation is provided by the SDS-122. Some devices, such as the RAD-SRM short haul modem, and most telephone modems provide their own isolation barrier. Care should be taken when selecting third party devices to ensure that they provide some form of barrier to prevent ground loops.

4.1 Jumper Configuration

It is envisaged that most applications will be with a telephone modem connected to Port B and a personal computer connected directly to Port A. The SDS-122, as supplied, has its jumpers set to this default configuration – please see Figure 5.

When used with a RAD-SRM modem on Port A in interactive mode, jumper block SW6-10 and jumper PL50 must be changed from their default positions. SW1-5 needs to be set to match the DTE/DCE setting of the RAD modem. If using the default RAD setting (DCE), SW1-5 will need to be rotated – please refer to Figure 6. The position of jumpers PL51 and PL56 may need to be reviewed if outputting data via Port A in ‘print-enabled’ mode.

The description of each jumper and its default setting is given in Section 4.3. Note that some jumpers work in combination to achieve the state required.

4.2 Special Modes of Operation

The SDS-122 contains a programmable chip, which, in conjunction with the jumper settings (see Section 4) determines the way in which the ports are selected. Currently, the program allows one or other of the two communication ports to be connected to the datalogger. There is no state where neither port is connected. For special applications, the program can be modified to provide other modes of operation. Please contact Campbell Scientific for more details.

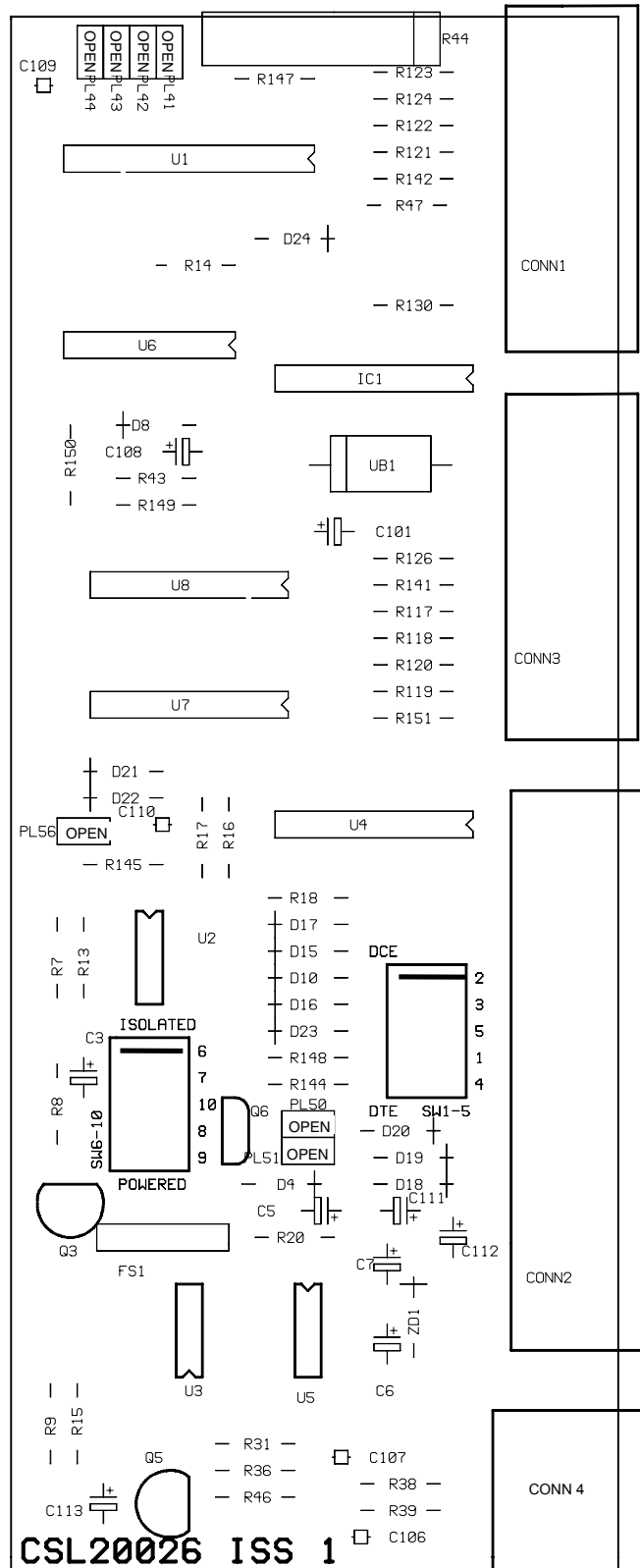


Figure 5 Default Jumper Positions on Circuit Board

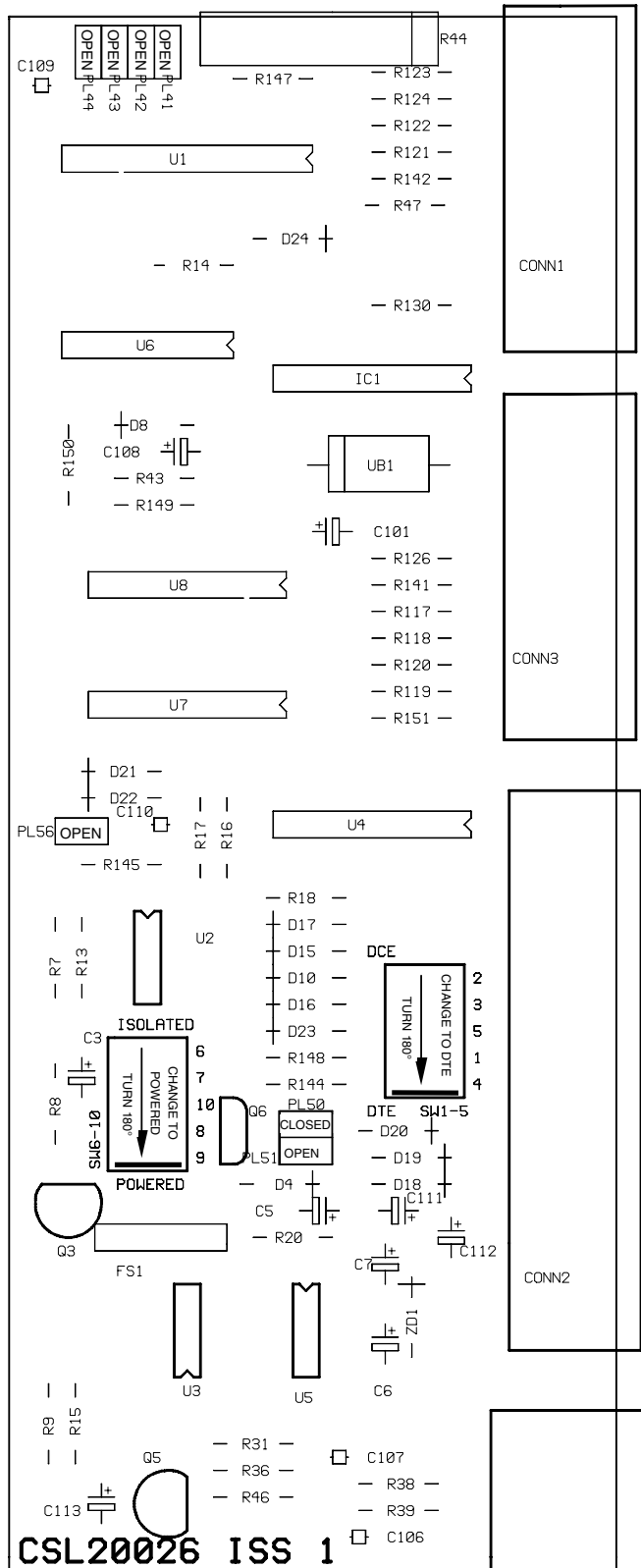


Figure 6 Jumper Positions for a RAD-SRM Short Haul Modem on Port A

4.3 Default Jumper Settings

JUMPER	DEFAULT	DESCRIPTION
PL41	Not fitted	When jumper PL41 is fitted, port A/B on the 3-way screw terminal will output 0V for switch on port A, or 5V for switch on port B when the SDS-122 is in AUTO mode only. When the jumper is not fitted, or the unit is in MANUAL mode, then the line becomes an input.
PL42	Not fitted	When jumper PL42 is fitted the SDS-122 will default to the port selected by PL43 when the ME line goes low. When the jumper is not fitted, the unit will stay with the last port used after the ME line goes low.
PL43	Not fitted	This jumper works in combination with jumper PL42. When jumper PL43 is fitted <i>and jumper PL42 is also fitted</i> , the SDS-122 will revert to port B when the ME line goes low. When PL43 is not fitted, but PL42 is fitted, the unit will default to port A when the ME line goes low.
PL44	Not fitted	When jumper PL44 is fitted and synchronous data is transmitted, (e.g. to a storage module), the SDS-122 will block any data output to port A. When PL44 is not fitted all data is allowed to pass through to port A.
SW1-5	DCE	Jumper block SW1-5 can be set so that port A can operate as either a DCE or DTE interface, and so there is no requirement for a null modem cable. The 'DCE' and 'DTE' jumper positions are marked on the PCB. Note that, to change the settings, the whole jumper block is removed and re-inserted at 180°. The red line on the jumper block should be adjacent to the state (DCE or DTE) required. Port A should be set to be the <i>opposite</i> type of interface to that to which it is being connected; e.g. set Port A to DTE when connecting to a RAD-SRM set to its default DCE state.
SW6-10	Isolated	Jumper block 6-10 can be set so that port A is either <i>optically isolated</i> or <i>powered</i> . RAD-SRM short haul modems would be driven in the powered mode. 'Isolated' and 'Powered' positions are marked on the PCB. Note that, to change the settings, the whole jumper block is removed and re-inserted at 180°. The red line on the jumper block should be adjacent to the state (Isolated or Powered) required.

PL50	Not fitted	When jumper PL50 is fitted, not less than 4.3V is supplied to pins 20 and 4 of port A in DTE mode and to pins 5 and 6 of port A in DCE mode. RAD-SRM modems in interactive communications would need the PL50 jumper to be fitted. The actual voltage supplied to the pins will depend on the setting of jumper PL51 (see below). When the jumper is not fitted, no voltage is supplied. This has no effect in isolated mode.
PL51	Not fitted	When jumper PL51 is fitted, >7V is permanently output to pins 20 and 4 of port A in DTE mode and to pins 5 and 6 of port A in DCE mode. This jumper is not normally fitted for RAD-SRM modems in interactive communication. When not fitted the outputs are shut off when ME goes low.
PL56	Not fitted	When jumper PL56 is fitted, >7V is supplied to the handshake lines (pins 20 and 4 of port A in DTE mode and pins 5 and 6 of port A in DCE mode) when either ME or SDE/PE goes high. When jumper PL56 is not fitted, 7V will only be applied when ME is high. This has no effect in isolated mode.