

User Manual

A Series A510

Interface Converter

Serial ↔ Parallel



The interfacing specialists

A510 User Manual

Version 6.00

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1.0 PRODUCT DESCRIPTION

The A Series A510 is an RS-232 Serial to Centronics Parallel protocol converter. The parallel port may be set for either direction, providing Serial ⇌ Parallel or Parallel ⇌ Serial interface conversion. The RS-232 port may be selected as either DTE or DCE. Serial RS-422 is available as a factory option. The physical layout of the A Series A510 is as follows:

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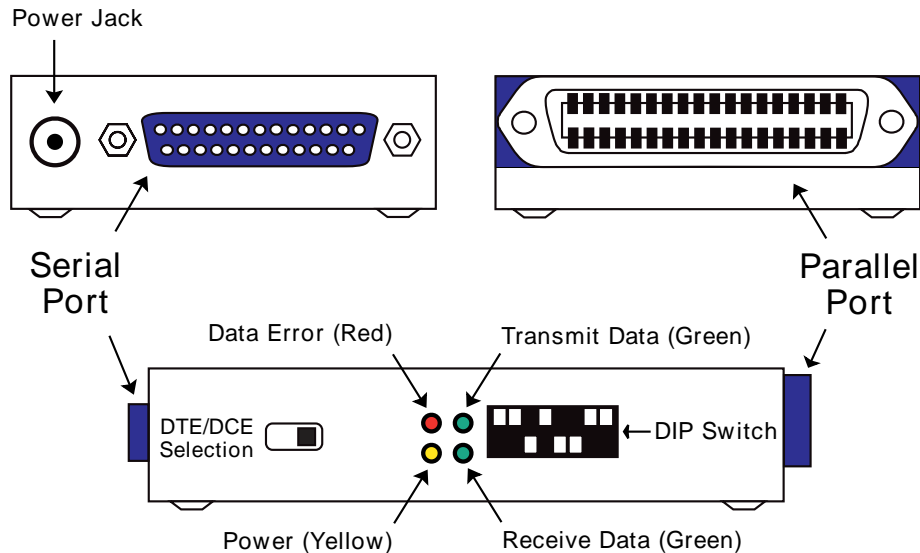


Figure 1 - A510 viewed from both ends and side

2.0 INSTALLATION

Before installing the A510 please make sure that all DIP Switch settings are according to your requirements. It is most important to set the direction of the parallel port to either INPUT or OUTPUT as required. *The A510 will not operate unless the direction is set correctly.*

Insert the power plug into the power jack socket, next to the 'Serial' connector. Turn the power ON and observe the LEDs. The 'Power' LED should light up and remain alight, all other LEDs should light up and then extinguish within 2 seconds. After this sequence the A510 is ready for operation.

Power OFF the A510 and connect the correct cables between the A510 and the target devices. Use only cables which you know to have the correct pin configurations to match the A510 to your equipment. Cable requirements and pin assignments are discussed in Sections 7 and 8.

WARNING: *All devices must be powered OFF before connecting cables to them.*

Incorrect cabling may cause damage to either the A510 or your equipment and is not covered by warranty. If in doubt about pin configurations please have them checked by your dealer.

3.0 CHARACTER GENERATION FUNCTION (SELF TEST)

The Character Generation Function in the A510 will output a continuous stream of printable ASCII characters from either the Serial or Parallel ports. This function may be used to confidence test both ports of the A510 or to test the operation of other devices. It is activated in the following manner:

Step 1: Take note of the original DIP Switch settings of the A510 then turn the power OFF. Select the output port via the 'Parallel Port Direction' switch, DIP Switch 1, and set it as required:
 Switch 1 is ON = Output from SERIAL port only
 Switch 1 is OFF = Output from both SERIAL & PARALLEL ports

Step 2: Select the Character Generation Function (Self Test) on the DIP by setting switch numbers 6, 7 and 8 to 'Self Test' mode as follows:

DIP Switch number	6	7	8
Switch Setting	On	On	Off

Note: If you are sending the output to the serial port there is another setting available. Please refer to Table 4-3 in Section 4 for this alternative setting.

Step 3: Connect a suitable cable between the A510 and the Output Device. Power ON the Output Device and then power ON the A510.

The A510 will produce a continuous output as follows:

```
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

This output will continue for as long as the A510 is powered ON. To stop the continuous output simply power OFF the A510.

Step 4: Turn OFF the power to the A510 and re-configure it for normal use with the DIP Switch settings which you took note of in Step 1.

4.0 HARDWARE CONFIGURATION

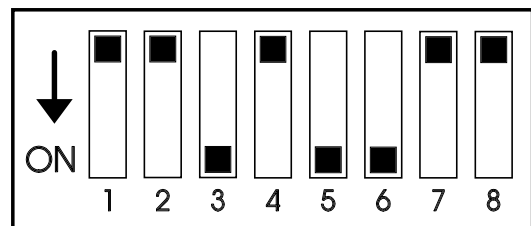
4.1 How to set the DIP Switch

Before attempting to change the DIP Switch settings, remove the power plug from the A510. All DIP switches are read only once, when the A510 is powered ON and are located at the side of the A510 as shown in Section 1, Figure 1.

4.2 Default Factory DIP Switch Settings

The A510 is factory pre-set to the following configuration:

- Parallel port as OUTPUT
- 9600 bps
- 8 Data Bits
- No Parity
- DTR/DSR Handshaking
- 1 Stop Bit



4.3 DTE / DCE Serial RS-232 Port Selection

To make cabling easier the RS-232 Serial Port may be switch selected as either DTE or DCE via the slide switch located at the side of the A510. The factory setting is DCE.

DTE < > DCE



4.4 Providing power through the Parallel Port Connector

The A510 may be powered directly through pin-18 of the Centronics parallel port connector. A steady +5 volts at 200mA is needed for the A510 to operate normally.

Note: an internal blocking diode in the A510 circuit prevents any power going out from pin-18 of the Centronics parallel port connector.

4.5 DIP Switch Settings

Table 4-1

Switch	Function	OFF	ON
1	Parallel Port Direction	Output	Input
2	Handshaking	DTR/DSR	Robust Xon/Xoff
3	Bits Per Second (refer to Table -2)		
4			
5			
6	Data Bits, Parity & Test Mode (refer to Table -3)		
7			
8			

Table 4-2

Switch	300	600	1200	2400	4800	9600	19.2K	38.4K
3	Off	On	Off	On	Off	On	Off	On
4	Off	Off	On	On	Off	Off	On	On
5	Off	Off	Off	Off	On	On	On	On

Table 4-3

Switch			Data Bits	Parity	Stop Bits	Self Test
6	7	8				
On	On	On	8	Even	1	No
On	On	Off	8	None	1	Yes
On	Off	On	8	Odd	1	No
On	Off	Off	8	None	1	No
Off	On	On	7	Even	1	No
Off	On	Off	7	None	2	Yes
Off	Off	On	7	Odd	1	No
Off	Off	Off	7	None	2	No

5.0 INTERFACE PORT PIN ASSIGNMENTS

5.1 Centronics Parallel Port

<i>Pin</i>	<i>Signal</i>	<i>Description</i>	<i>Pin</i>	<i>Signal</i>	<i>Description</i>
1	Data Strobe	Active Low	19	Ground	-
2	Data Bit 1	Active High	20	Ground	-
3	Data Bit 2	Active High	21	Ground	-
4	Data Bit 3	Active High	22	Ground	-
5	Data Bit 4	Active High	23	Ground	-
6	Data Bit 5	Active High	24	Ground	-
7	Data Bit 6	Active High	25	Ground	-
8	Data Bit 7	Active High	26	Ground	-
9	Data Bit 8	Active High	27	Ground	-
10	Acknowledge	Active Low	28	Ground	-
11	Busy	Active High	29	Ground	-
12	Paper End	Pulled Low	30	Ground	-
13	Select	Pulled High	31	Initialize	Pulled High
14	Autofeed	Pulled High	32	Error	Pulled High
15	Not Connected	-	33	Ground	-
16	Ground	-	34	Not Connected	-
17	Ground	-	35	Not Connected	-
18	+5V DC **	Input	36	Ground	-

Note: (a) Pins are Pulled High to +5V via 4K7 resistor.
 (b) Strobe & Data lines are Pulled High to +5V via 1K resistor.

** (1) The A510 may be powered directly from pin 18 with +5V DC at 200mA.

5.2 RS-232 Serial Port

The RS-232 Serial Port of the A510 is factory configured as **DCE**.

<i>Pin</i>	<i>Status and Usage</i>	<i>Set for DCE</i>	<i>Set for DTE</i>
1	Used - (Ground)	FG	FG
2	Input / Output- (Data)	RD	TD
3	Output / Input- (Data)	TD	RD
4	Not used - (Pulled High 4K7)	CTS	RTS
5	Not used - (Pulled High 4K7)	RTS	CTS
6	Output / Input- (Handshaking)	DTR	DSR
7	Used - (Ground)	SG	SG
8	Not used - (Pulled High 4K7)	DCD	DCD
20	Input / Output- (Handshaking)	DSR	DTR
22	Not used - (Pulled High 4K7)	RI	RI

Note: Pins 4, 5, 6, 8 and 20 are pulled to the correct levels to allow a PC serial port to operate under most conditions without any additional loopback connections.

5.3 Factory Option - RS-422 Serial Port

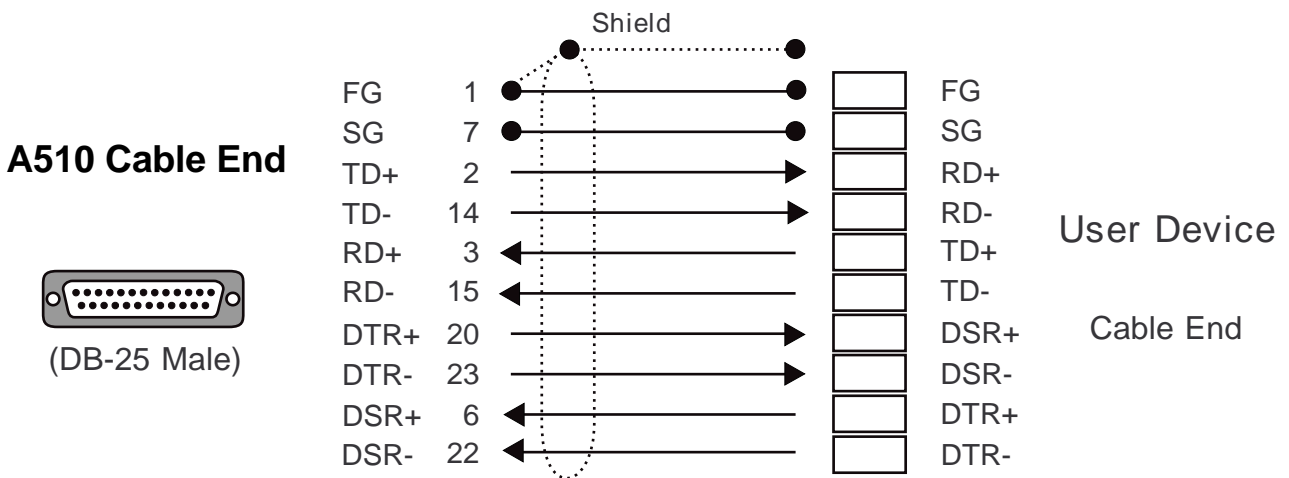
The Serial Port of the A510 may be purchased as a factory option using part number A510-422. This model has the serial port dedicated to RS-422 and does not make use of the DTE/DCE switch.

5.4 RS-422 Port Pinout

<i>Pin</i>	<i>Status and Usage</i>	<i>Signal</i>	<i>Description</i>
1	Used - (Ground)	FG	Frame Ground
7	Used - (Ground)	SG	Signal ground
2	Output- (Data)	TD+	Transmit Data +
14	Output- (Data)	TD-	Transmit Data -
3	Input - (Data)	RD+	Receive Data +
15	Input - (Data)	RD-	Receive Data -
20	Output- (Handshaking)	DTR+	Data terminal ready +
23	Output- (Handshaking)	DTR-	Data terminal ready -
6	Input - (Handshaking)	DSR+	Data Set Ready +
22	Input - (Handshaking)	DSR-	Data Set Ready -

Note: The Receive Data and Data Set Ready pairs are each terminated with a 120ohm resistor across the inputs.

5.5 RS-422 Cable to Other RS-422 Devices



6.0 FLOW CONTROL (Handshaking)

6.1 Hardware (DTR/DSR) Handshaking

Hardware, DTR/DSR, handshaking uses the Data Terminal Ready (DTR) and Data Set Ready (DSR) signal lines to control the flow of data between devices. This form of handshaking is recommended and is the preferred method of handshaking under the DOS operating system.

6.2 Software Handshaking - Robust Xon/Xoff

Robust Xon/Xoff handshaking overcomes limitations in the Standard Xon/Xoff protocol by ensuring that the A510 device repeatedly sends Xon/Xoff characters to the connected device.

For example, without Robust Xon/Xoff if an Xoff is sent from the A510 to the connected device and somehow becomes corrupted, the connected device will not receive the Xoff and will therefore continue to send data to the A510 causing the buffer of the A510 to overflow and resulting in the loss of data.

Robust Xon/Xoff overcomes this situation by sending the Xoff character after every character received past the cutoff point of the A510 buffer. Also, when the A510 is receiving data it will send an Xon, every 5 seconds, to the connected device. The behaviour of the A510 Xon/Xoff flow control buffer is as follows:

- An 'Xoff' is issued when there are 35 bytes or less remaining in the buffer.
- An 'Xon' is issued if there are more than 45 bytes available in the buffer.
- The Robust 'Xon' time interval is 5 seconds, this may be observed on the Transmit Data LED when the A510 is powered on.

7.0 CABLE REQUIREMENTS

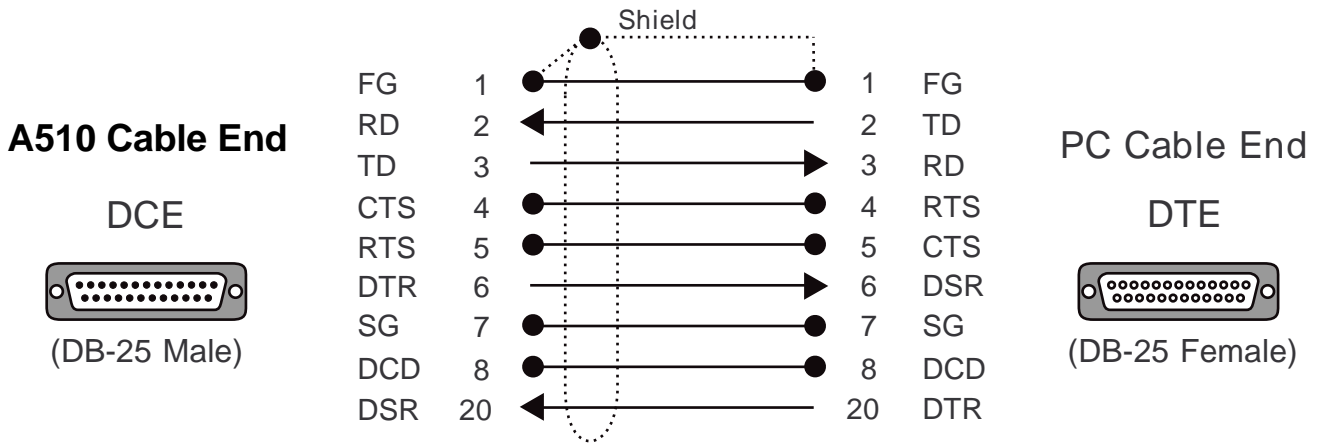
Alfatron recommends the use of shielded cable with all of its products. Shielding reduces EMI Radiation and improves noise immunity. This helps minimise interference to other equipment and will improve communications reliability.

The recommended cable construction is as follows:

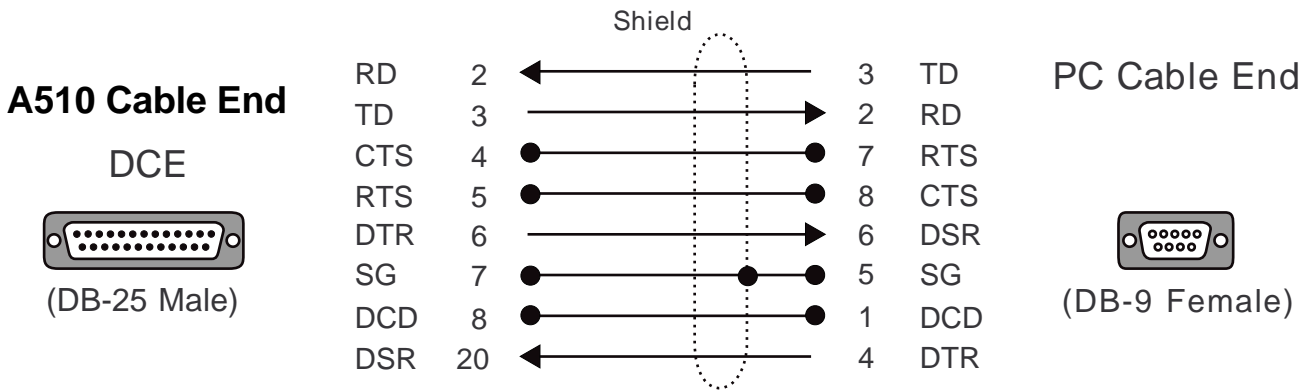
- Take the shield (surrounding cable wires) and solder it to the Frame Ground (FG) pin. If FG is not available, use Signal Ground (SG) but in this case always use a separate wire for ground which is connected at both ends.
- The shield must be connected at both ends of the cable.

8.0 CABLE EXAMPLES

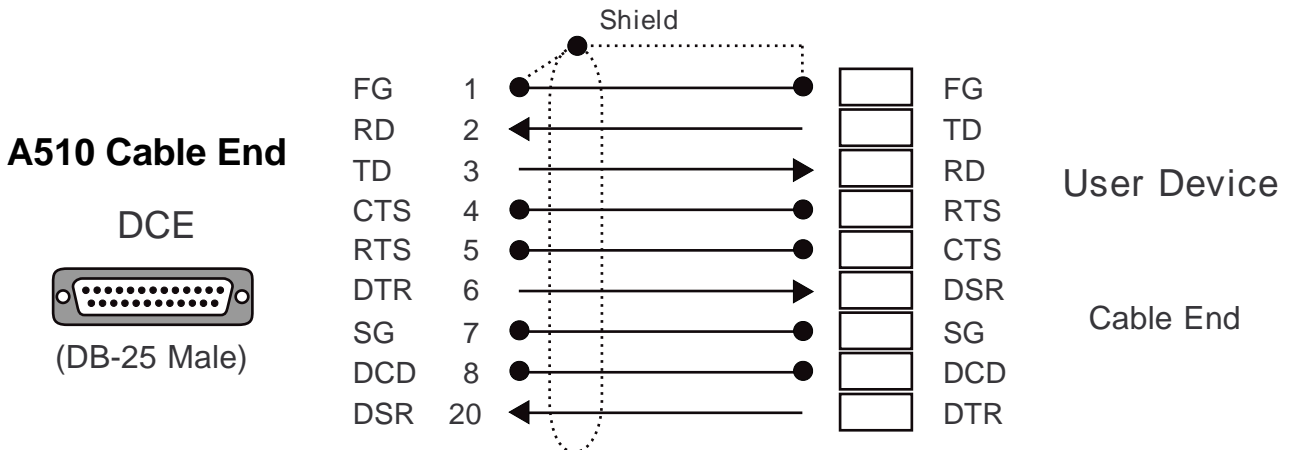
8.1 RS-232 Cable to a PC with a DB-25 Serial Connector



8.2 RS-232 Cable to a PC with a DB-9 Serial Connector



8.3 RS-232 Cable to other RS-232 Devices



9.0 SPECIFICATIONS

CPU:	89C51 Microprocessor
Parallel Port:	Centronics Parallel Select as Input or Output 36-pin Centronics female connector
Serial Port:	Asynchronous RS-232D Full duplex communication DB-25 female connector Select as DTE or DCE DIP Switch Selection: Baud Rate: 300, 600, 1200, 2400, 4800, (bps) 9600, 19200 and 38400. Data Bits: 7 or 8 Parity: None, Odd or Even Stop Bits: 1 or 2 Handshaking: Software (Robust Xon/Xoff) Hardware (DTR/DSR)
Flow Control Buffer:	60 byte receive buffer
LED Indicators:	Power On (Yellow) Receive Data (Green) Transmit Data (Green) Data Error (Red)
Power Supply:	9V (200mA) DC Power Adapter Plug jack - 5.5mm outer/2.5mm inner diameter Outer Negative A510 may be powered directly from pin-18 of the parallel connector. A regulated +5V DC power supply with a current of up to 200mA is required.
Dimensions:	24mm x 73mm x 115mm
Weight:	245 grams
Operating Temp:	10° to 35° C
Storage Temperature:	0° to 45° C

All specifications subject to change without notice



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DECLARATION OF CONFORMITY

according to the European Commissions EMC Directive 89/336/EEC

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of, Address of Manufacturer: UNIT 9, 36 NEW ST.
RINGWOOD VIC 3134
AUSTRALIA

Australian Company Number: ACN: 005 410 819

declare under sole responsibility that the product:

Product Name: A Series RS-232 Serial / Parallel
Interface Converter

Model Number: A510

to which this declaration relates is in conformity with the following standards:

CISPR-22 / EN 55022 class B	EMI from Information Technology Equipment (ITE)
IEC 801-2 / prEN55024-2	Electro Static Discharge Immunity
IEC 801-3 / prEN55024-3	Radiated RF Immunity
IEC 801-4 / prEN55024-4	Electrical Fast Transients Immunity