

Isolator Products



OP232/Bx In-line opto-isolators for RS232/V24 serial connections

Description

OP232Bx opto isolators provide 'complete' electrical isolation for serial connections using the RS232/V24 standards.

- 'Complete' means sub-pico Farad total capacitance, and isolation resistance of 10^{12} ohms typically. There are no transformers or capacitors, only optical data paths, so all lines including ground are broken.
- No external power supplies are needed in normal installation as power is drawn from the signal lines themselves. A power pin is provided at either end to allow power to be supplied separately in special circumstances.
- Full duplex operation is provided with two options; model B1 provides Transmit (TX) and Receive (RX) lines (3 wire interface), and model B2 adds a control pair wired as CTS/RTS (5 wire interface).
- 9600 baud is achieved in all circumstances. All units are tested at 20k baud and 38.4k baud is normally possible; the speed limitation is the tolerance of the UARTS to small delay asymmetries introduced by optical coupling.
- Connection is by standard 9 way D connectors, one male, one female, moulded into the body. The device is wired 'straight through' so that for a standard connection it is only necessary to open an existing connection and insert the OP232 device.
- The devices are moulded into a cylindrical machined black plastic body, **39mm** diameter by **122mm** long. Construction is fully potted giving maximum protection.



Applications

RS232 is ubiquitous; every PC has a couple of COM ports, but the standard itself is a bit

of a problem. The main difficulty is that RS232 takes system ground outside the computer.

The computer exports its clock noise, possibly making it impossible to use with sensitive measuring instruments.

A path is created back into the computer by which external electrical faults can do extensive damage.

Probably worst of all ground loops are created, often preventing communication at all, and causing all sorts of other problems.

OP232 devices prevent all these problems, often making RS232 viable and the most direct and cheapest solution.

Applications include;

- Isolation of noise affecting measuring instruments in medicine, geophysics, sound recording etc..
- Computer protection.
- Installation of long cable runs in industrial control and communication.
- Connection of Point-Of-Sale terminals to vending or weighing equipment in warehousing or vehicle fuel (Petrol/Gasoline) pumps.

Connections

RS232 Opto-Isolator Wiring			
RS232 Function	DTE (Computer) end, Female, 9 way D	Data Direction	DCE (peripheral end), Male 9 way D
Signal	PIN		PIN
RXD	2	<<	2
TXD	3	>>	3
RTS	7	>>	7
CTS	8	<<	8
GND	5		5
POWER	4 (DTR)		6 (DSR)

Note the symbols << and >> show the direction of data flow. CTS/RTS are not active on B1 (single duplex) devices. Since each side is completely isolated, power for a side's outgoing line(s) is provided by incoming lines on the same side. Power is only needed if the voltage level on the incoming line is too low (<approx 7 volts 0-p). If external power is provided this is between GND and POWER (9 to 16 V nominal of either polarity, or

AC). It will power only that side.

Cabling to enable most adaptations is available off the shelf, [please enquire](#).

Pricing and ordering

Prices below are per unit ex-factory Exeter UK. They do not include shipment, VAT, or any other applicable taxes. Pricing in other currencies will be set at date of order. Prices below valid from 14.07.2004

Opto-isolator price list.				
Quantity	Order code			
	OP232 / B1		OP232 / B2	
	£ Sterling	Euro	£ Sterling	Euro
1-4	88.00	132.00	98.00	147.00
5-9	81.00	121.50	90.50	135.75
10-49	74.00	111.00	83.25	124.88
50-99	70.50	105.75	78.50	117.75
100-299	69.00	103.50	77.25	115.88

Quantity pricing above applies to the total quantity ordered even if a mix of B1 and B2, and to the total of a scheduled order.

Credit facilities for small orders will normally be opened on day of order for government agencies, educational institutions, UK PLCs and EU equivalents subject to receipt of faxed purchase orders. Otherwise cheque/money order with order please.

[B1 options can be bought from Farnell Components on their order code 648-942.](#)

They have sales offices and associates around the world and can accept most credit cards for non-account holders.

Delivery

UK delivery is normally by INTERLINK next-day at £8.50 for up to 2 units, £12.50 for all other single delivery quantities. Next day delivery can be arranged into most of Northern Europe.

Important Notes

These devices are manufactured to very high quality standards, and offer a degree of

protection that is difficult to measure with standard instruments. The insulation resistance is typically 10,000 better than is measurable with insulation testers. Even with capacitance below 1pF, coupling by this means is higher than by conduction, even at mains supply frequencies. If the connecting cables to either side are laid over each other, coupling through the insulation will be the dominant mechanism.

We do not set or publish a voltage rating, since RS232 is a standard which has its ground connections exposed at either end. Therefore, a situation where any substantial voltage existed between these grounds by design would almost certainly contravene local electrical safety regulations. We can state that all units are tested at 1kV prior to shipment, and exceed our lower limit of 2×10^{11} ohms at this voltage, and typically return 3×10^{12} ohms. The isolators used have a manufacturers rating of 10kV. This statement implies no fitness for any purpose at any unsafe voltage.

These devices have already received type approval for certain specialist applications, and we believe will exceed any required statutory levels by such a margin, that they may be submitted for any local approvals with very considerable confidence.

They are CE marked as complying with EU regulations for EMC. We will continue to seek approvals for other national regimes, and this data sheet will be updated as appropriate. There are however no appropriate standards at present for this function, and it will normally be easier for a user to obtain approvals appropriate to an application by direct testing and local certification by appropriately qualified personnel.

These units are not authorised for use in life-support systems, or any other application where failure of these devices, or any aspect of use of these devices might lead to death or injury. Scimar Engineering Ltd will not accept any liability whatsoever for any form of loss or injury resulting from any aspect of the use of these devices.

This document nor any other publications from the company represent any statement of fitness of purpose for any application.

Applications are so numerous and the potential hazards from mis-use so varied that we could not make any such statement. Where there is any question of hazard to human health or life the application must be checked by locally qualified engineers and certified by them as safe and complying to local regulations.

Warranty

Since these devices are fully potted (and thus any faults impossible to diagnose), and should properly be considered as having fulfilled their function if destroyed by fault voltages, we restrict ourselves to a six month formal warranty (except where sales law decrees otherwise) against failure due to defects, workmanship etc. **However we have only ever had one single device returned due to failure** on our part (which was traceable to a slip up in QC), and we would normally expect (but at our sole option) to offer replacements well beyond that period as a matter of pride and goodwill, if it could be shown that there was some fault on our part.

We have had the case of a gentleman with a CAD/CAM computer connected via our previous model isolator to an NC controlled plasma cutter. Some part of the cutter went up in smoke, which had previously signalled the need for an expensive rebuild of the computer. He phoned to say he was delighted that our isolator had this time saved this expense, and to enquire whether we thought it likely that our device would still be functional when they sorted out the cutter fault. Although he was more than happy to order another there and then, we said we thought it worthwhile to give the existing isolator a try, and never heard from him again!

Enquiries: [e-mail sales@scimar.co.uk](mailto:sales@scimar.co.uk) for further details

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