

Serial Communications Module RS232

(MSR04XI)

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INTRODUCTION AND TECHNICAL DATA

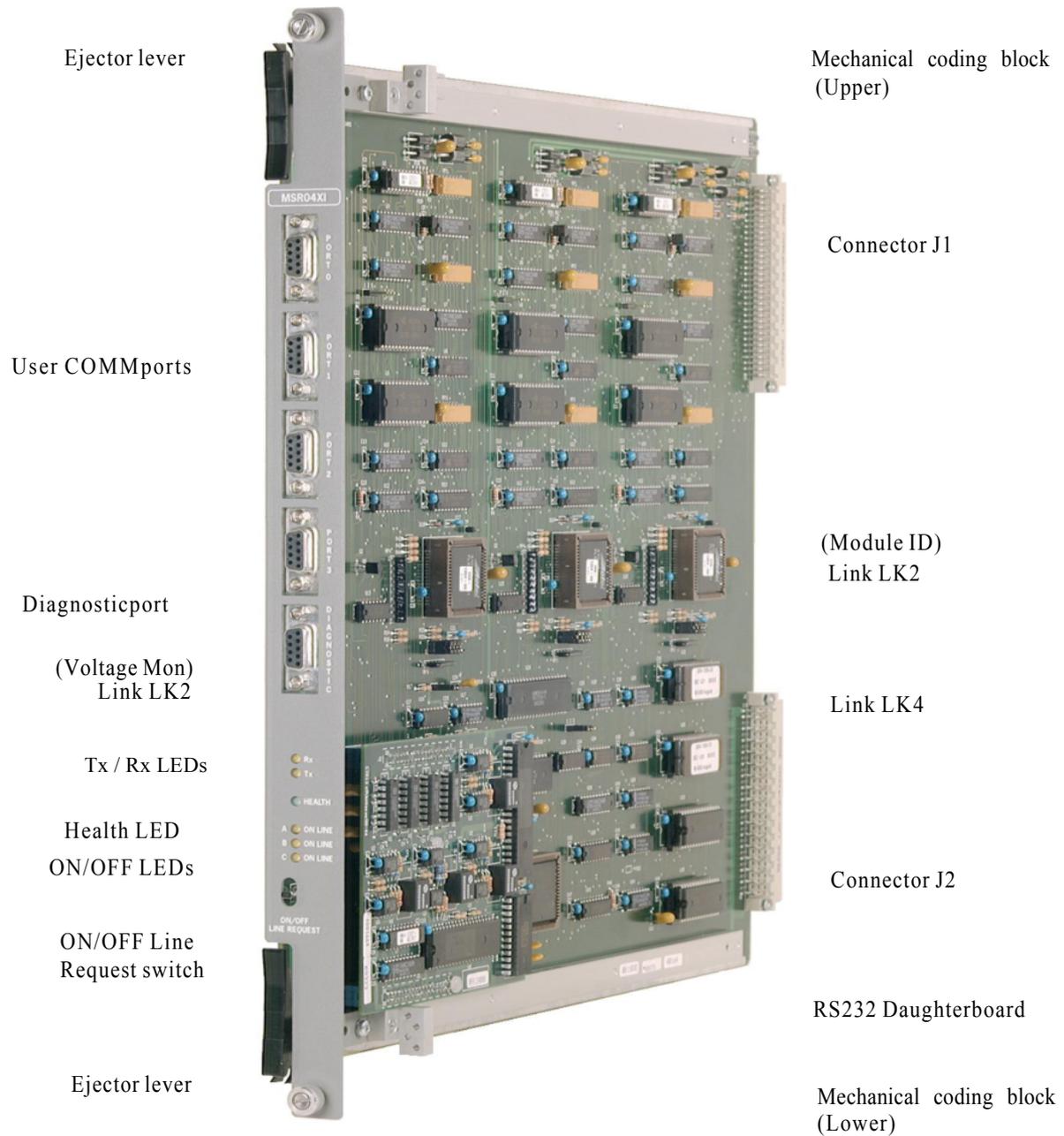
PURPOSE

The Serial Communications Module provides a serial interface between the SC300E environment and a variety of remote devices complying with the standard RS232-C. At least one Serial Communications Module must be used in the system and fitted in Slot 10 of the main chassis to enable communications between the system processors and the workstations. The workstation link is used for loading the application software and monitoring ladder and diagnostic functions. The link utilises Port 0 of the module. Additional modules can be fitted to any other I/O slot, 'wrong slotting' is prevented by mechanical coding blocks (Figure 2-1). The system software identifies the module via a built-in hardware identifier.

Circuit triplication and voting procedures make the module single fault tolerant and front panel indicators show Tx/Rx activity, the circuit on-line status and the health of the module. Communications connections are via four identical ports on the front panel (Ports 0 to 3) and these connections are duplicated on the field connector (J2) at the rear. A fifth port is for diagnostic purposes only. The module is compatible with 'single slot hot repair' and the front panel has a switch to enable a request that the module be taken off line.

This document is intended to provide a general understanding of the function of Serial Communications Module, sufficient to enable basic maintenance operations to be effected in the field.

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Ejector lever

Mechanical coding block (Upper)

User COMMPorts

Connector J1

Diagnosticport

(Module ID)
Link LK2

(Voltage Mon)
Link LK2

Link LK4

Tx / Rx LEDs

Health LED
ON/OFF LEDs

Connector J2

ON/OFF Line
Request switch

RS232 Daughterboard

Ejector lever

Mechanical coding block (Lower)

Triguard SC300E MSR04XI Serial Communications Module RS232

ASSOCIATED DOCUMENTATION

Reference No	Title
008-5097	Chassis User Manual

SPECIFICATION

Model	MSR04XI
Communications	Serial RS232
Microcontroller	Intel family
Communication ports:	Port 0: RS232 9600 or 19200 Baud Port 1: RS232 9600 or 19200 Baud Port 2: RS232 9600 or 19200 Baud (see Note) Port 3: RS232 9600 or 19200 Baud (see Note) Diagnostic: for diagnostics purposes only Note: Ports 2 & 3 must be set to the same Baud rate.
rate. Isolation	Ports 0 to 3, 1kV
Indicators	Tx, Rx, Health, 3 x On Line
Hot repair procedure	Single slot
Module power consumption	3.5W
Overall size (mm)	400(9U)H x 397L x 28W
Overall size (inches)	15.75H x 15.63L x 1.1W
Weight	1.3kg

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ENVIRONMENTAL SPECIFICATIONS

The maximum ambient temperature measured at the hottest point within the Triguard system shall not be greater than 60 degrees centigrade.

Temperature operating:	+5°C to +60°C
Temperature storage:	-25°C to +70°C
Humidity	5% to 95% non-condensing at ambient <40°C
EMC/RFI Immunity	Tested and certified to IEC 1131-Part 2 1994
Vibration/Shock	Tested and certified to IEC 1131-Part 2 1994

Certification:

General Certification: Ref. SC300E Product Guide (ref 008-5209)

TRANSPORT AND HANDLING

The MSR04XI module must be transported and stored in its original packing material which should be retained for this purpose.

TECHNICAL DESCRIPTION

PHYSICAL

The Serial Communications Module is a 9U high PCB with integral front panel and front and rear connectors; a plug-in daughter board carries the RS232 interface circuits. Figure 1-1 shows the general layout, location of the connectors and front panel components.

Mechanical coding blocks

All Input/Output modules carry two mechanical coding blocks equipped with pins which mate with holes in corresponding blocks in the chassis and prevent the module being inserted into the wrong slot. The pins in the module blocks are factory installed in a pattern determined by the module and corresponding set screws are removed from the chassis coding blocks to enable fitting. Unused holes are plugged with set screws. The chassis mechanical coding block configuration for this module is shown in Figure 2-1 .



Figure 2-1 Chassis mechanical coding block configurations

Links

The PCB has a total of nine links. For the top section of the PCB the links are located and configured as follows:

Three LK1 links (3-pin) located approximately 80mm down from the top of the module, not user configurable, link not fitted.

Three LK2 links (8-pin) located approximately 210mm down from the top of the module - Module ID links which should always be fitted (refer to Figure 1-1).

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On the lower section of the PCB are three further links, LK2, LK3 and LK4, located and configured as follows:

LK2 (2-pin) located approximately 220mm down from the top of the module and 110mm in from the front face, used in the voltage monitoring circuit, always fitted.

LK3 (3-pin) located beneath the plug in daughterboard. Used for 3-2-1-or 3-2-0 operation, factory fitted hard wired, all pins linked for 3-2-1 mode.

LK4 (3-pin) located approximately 250mm down from the top of the module and 220mm from the front face, used for the daughterboard clock speed setting, pins 1 and 2 linked.

Table 2-1. Default link settings

Link	Default setting
LK1 (3 off x 3 pin)	Links not fitted
LK2 (3 off x 8 pin)	Fitted
LK2 (2 pin)	Fitted
LK3 (3 pin)	Hard wired (all pins linked)
LK4 (3 pin)	Fitted (pins 1 & 2 linked)

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EXTERNAL CONNECTIONS

Pinouts and signals for front panel connectors J4 to J6 through to J2 backplane are given in Table 2-2.

Is your interface DTE (data terminal equipment) or DCE (data communications equipment)? The point of reference for all signals is the terminal (or PC).

Transmit and receive leads (2 or 3) can be reversed depending on the use of the equipment, either DTE or DCE.

Table 2-2. Front panel & backplane connector pinouts with signals

Port 0 (9-way)		J2 (backplane)
1		n/c
2	Rx	A4
3	Tx	C2
4		n/c
5	Ground	A6
6	n/c	n/c
7	RTS	A2
8	CTS	C4
9	n/c	n/c

Port 1 (9-way)		J2 (backplane)
1		n/c
2	Rx	A12
3	Tx	C10
4		n/c
5	Ground	A14
6	n/c	n/c
7	RTS	A10
8	CTS	C12
9	n/c	n/c

Port 2 (9-way)		J2 (backplane)
1		n/c
2	Rx	A20
3	Tx	C18
4		n/c
5	Ground	A22
6	n/c	n/c
7	RTS	A18
8	CTS	C20
9	n/c	n/c

Port 3 (9-way)		J2 (backplane)
1		n/c
2	Rx	A28
3	Tx	C26
4		n/c
5	Ground	A30
6	n/c	n/c
7	RTS	A26
8	CTS	C28
9	n/c	n/c

n/c =No connection

Wiring schematic for serial communication cables are shown in Figure 2-2 .

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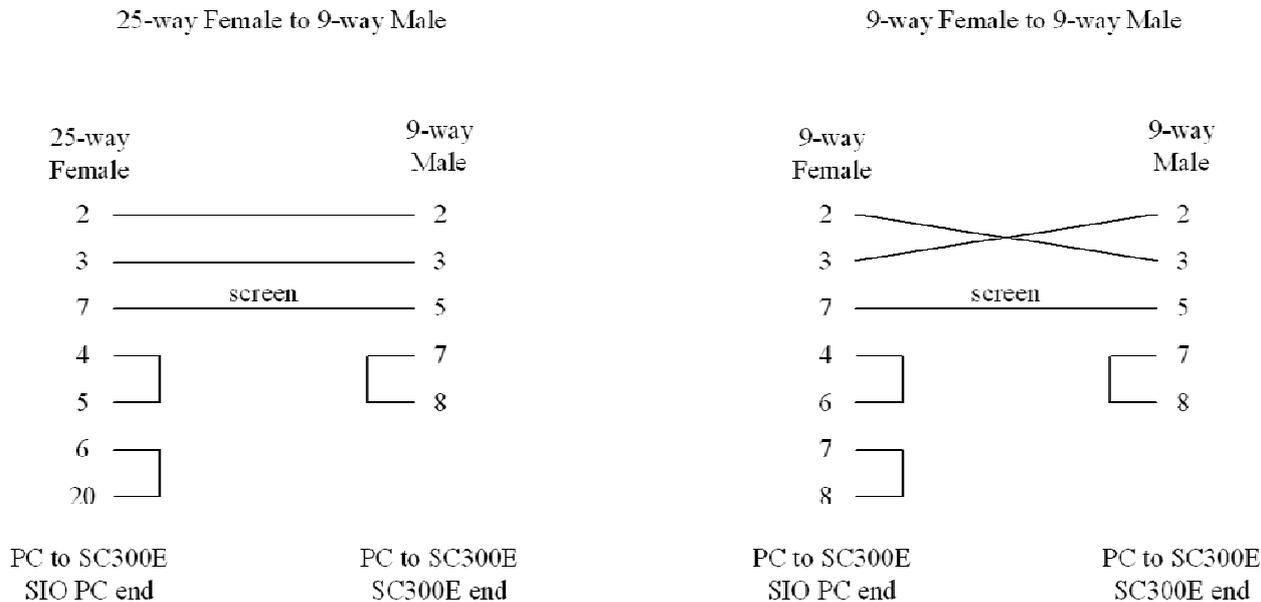


Figure 2-2 Serial communications cable wiring

THEORY OF OPERATION

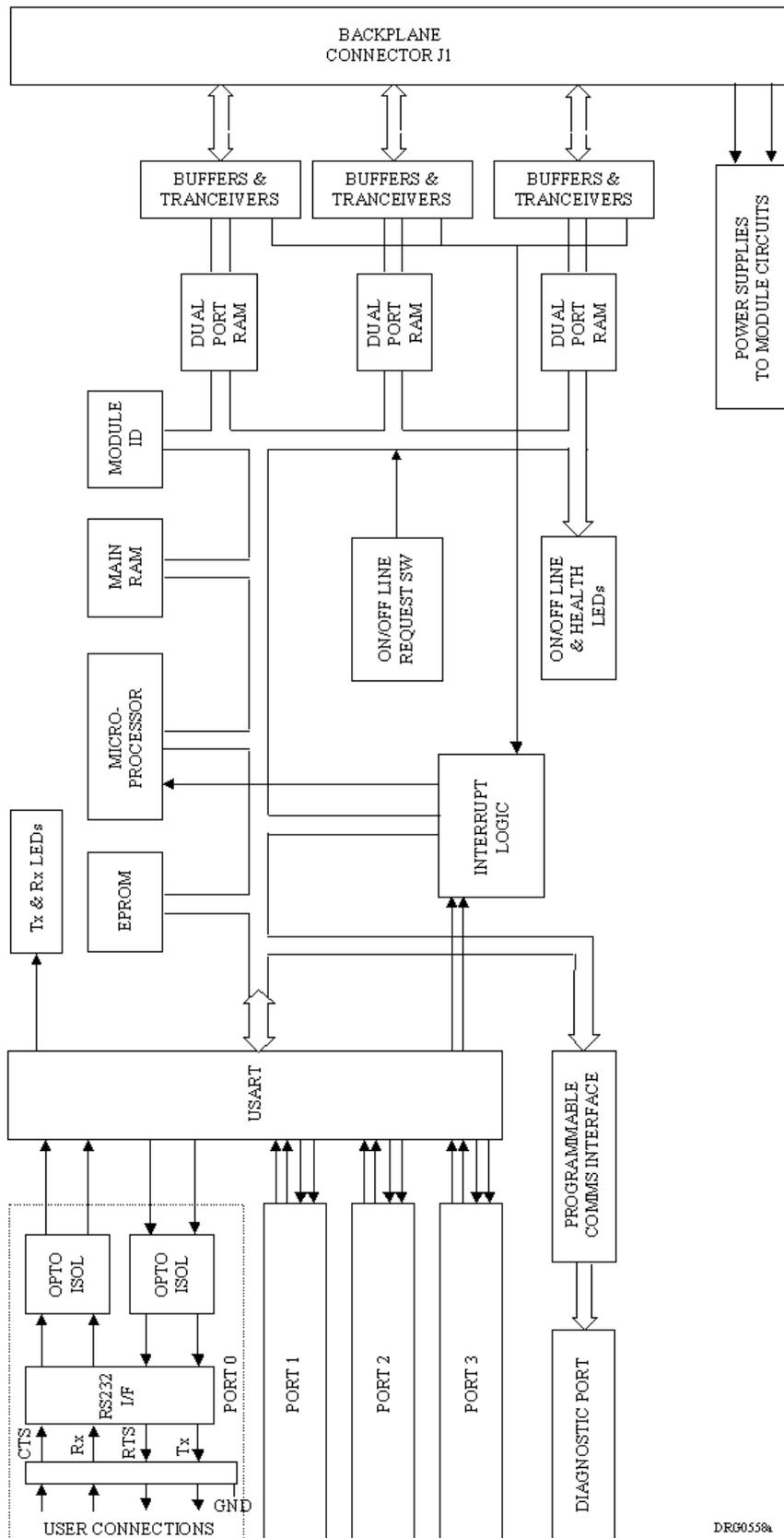
Triplicated data enters and leaves the module (Figure 2-3) via the chassis backplane connector J1 and is isolated from the MPP by bus transceivers. Data for transmission is loaded into dual port RAM in each of the three circuit branches and is voted 2-oo-3 before being passed to the USARTs on the daughter board where it is serialised and sent to the appropriate communications port.

Data received at the ports is converted to parallel form by the USART and written to dual port RAM in each branch, the data is accompanied by information about the status of the ports and the embedded microprocessor. The dual port memory is then read by the MPP via a second set of transceivers.

The four communications ports are configured to run in full duplex mode using an RS232 interface and having a maximum rate of 19200 Baud. The communications ports are isolated from the module circuits by opto-isolators and connected to field connector J2 at the rear of the module. The ports are capable of powering modems or line drivers for transmission over long distances.

Power for the module circuits is derived from the dual redundant SC300E power supply units, individual auctioneering and regulating circuits supplying various logic areas. The communications port opto-isolators and interfaces also have separate supplies.

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DR60558a

Figure 2-3 Serial communications module – Block diagram

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SERVICING

SCOPE

CAUTION: 1

The module contains components that may be electrostatically sensitive, it should be transported and stored in its original packaging material.

System repair is by module replacement. Faulty modules are not repairable in the field; they should be returned for repair.

DIAGNOSIS

The TriBuild workstation is used for fault diagnosis. In the case of an Input/Output fault the Health LED on the faulty module will be extinguished.

REMOVAL AND REPLACEMENT

CAUTION 2

Failure to take the faulty module off-line before removing it from the chassis could trigger a fault alarm or cause plant shutdown.

CAUTION 3

When inserting a module ensure that it is aligned with the markings on the chassis rails and that it engages with the upper and lower guides. Improper insertion may cause damage to the module and/or chassis connectors.

Operate the On/off Line Request switch on the faulty module, the three On Line LEDs should all extinguish to indicate that the MPPs have recognised the request and taken the module off-line.

Slacken the two module securing screws and use the black ejection levers (top and bottom) to draw the module from its slot.

Insert the new module ensuring that it engages properly in the upper and lower guides in the chassis, the top and bottom chassis rails carry alignment marks to assist. Pull out the ejection levers and as the module is pushed back engage the levers on the chassis rails. The levers should then be used to draw the module into position, some resistance will be felt as the rear connector pins engage. The module should be fixed in position with the securing screws.

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Operate the On/off Line Request switch and check that the three On Line LEDs illuminate for one second, extinguish for one second and then illuminate permanently to indicate that the module has been put on-line. If the LEDs do not illuminate either the first or second time or fail to remain illuminated, then the module must be considered faulty.

PREVENTIVE MAINTENANCE

No preventive maintenance is necessary.

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SERVICE SUPPORT

SPARE PARTS

Spare parts and technical advice can be obtained from your local area office.