8903/SP
Peer-to-Peer
Communications Option

Technical Manual

HA500806U001 Issue 2

WARRANTY

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Safety Information

Requirements

IMPORTANT: Please read this information BEFORE installing the equipment.

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, EMC considerations, and to enable the user to obtain maximum benefit from the equipment.

Complete the following table for future reference detailing how the unit is to be installed and used.

INSTALLATION DETAILS	
Model Number *(see product label)*	
Where installed *(for your own information)*	
Unit used as a: *(refer to Certification for the Inverter)*	O Component O Relevant Apparatus
Unit fitted:	O Wall-mounted O Enclosure

Application Area

The equipment described is intended for industrial motor speed control utilising DC motors, AC induction or AC synchronous machines

Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Product Warnings

 **Caution** Risk of electric shock	 **Caution** Refer to documentation	 **Earth/Ground** Protective Conductor Terminal

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Safety Information

Hazards

DANGER! - Ignoring the following may result in injury

1. This equipment can endanger life by exposure to rotating machinery and high voltages.
2. The equipment must be permanently earthed due to the high earth leakage current, and the drive motor must be connected to an appropriate safety earth.
3. Ensure all incoming supplies are isolated before working on the equipment. Be aware that there may be more than one supply connection to the drive.
4. There may still be dangerous voltages present at power terminals (motor output, supply input phases, DC bus and the brake, where fitted) when the motor is at standstill or is stopped.
5. For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range.
   CAT I and CAT II meters must not be used on this product.
6. Allow at least 5 minutes for the drive's capacitors to discharge to safe voltage levels (<50V). Use the specified meter capable of measuring up to 1000V dc & ac rms to confirm that less than 50V is present between all power terminals and earth.
7. Unless otherwise stated, this product must NOT be dismantled. In the event of a fault the drive must be returned. Refer to "Routine Maintenance and Repair".

WARNING! - Ignoring the following may result in injury or damage to equipment

SAFETY

Where there is conflict between EMC and Safety requirements, personnel safety shall always take precedence.

- Never perform high voltage resistance checks on the wiring without first disconnecting the drive from the circuit being tested.
- Whilst ensuring ventilation is sufficient, provide guarding and /or additional safety systems to prevent injury or damage to equipment.
- When replacing a drive in an application and before returning to use, it is essential that all user defined parameters for the product's operation are correctly installed.
- All control and signal terminals are SELV, i.e. protected by double insulation. Ensure all external wiring is rated for the highest system voltage.
- Thermal sensors contained within the motor must have at least basic insulation.
- All exposed metalwork in the Inverter is protected by basic insulation and bonded to a safety earth.
- RCDs are not recommended for use with this product but, where their use is mandatory, only Type B RCDs should be used.

EMC

- In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.
- This equipment contains electrostatic discharge (ESD) sensitive parts. Observe static control precautions when handling, installing and servicing this product.
- This is a product of the restricted sales distribution class according to IEC 61800-3. It is designated as "professional equipment" as defined in EN61000-3-2. Permission of the supply authority shall be obtained before connection to the low voltage supply.

CAUTION!

APPLICATION RISK

- The specifications, processes and circuitry described herein are for guidance only and may need to be adapted to the user's specific application. We can not guarantee the suitability of the equipment described in this Manual for individual applications.

RISK ASSESSMENT

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended.
In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off
- The motor's direction of rotation might not be controlled
- The motor speed might not be controlled
- The motor might be energised

A drive is a component within a drive system that may influence its operation or effects under a fault condition.
Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

Cont.4

Contents

PEER-TO-PEER COMMUNICATIONS OPTION

Introduction

This manual describes the Parker SSD Drives' Peer-to-Peer Communications Option.

Product Features

- Suitable for use with 890CD Common Bus Drive, 890SD Standalone Drive and 890PX Drive.
- Connect DSE to all drives in the system
- Peer-to-peer data exchange with other drives

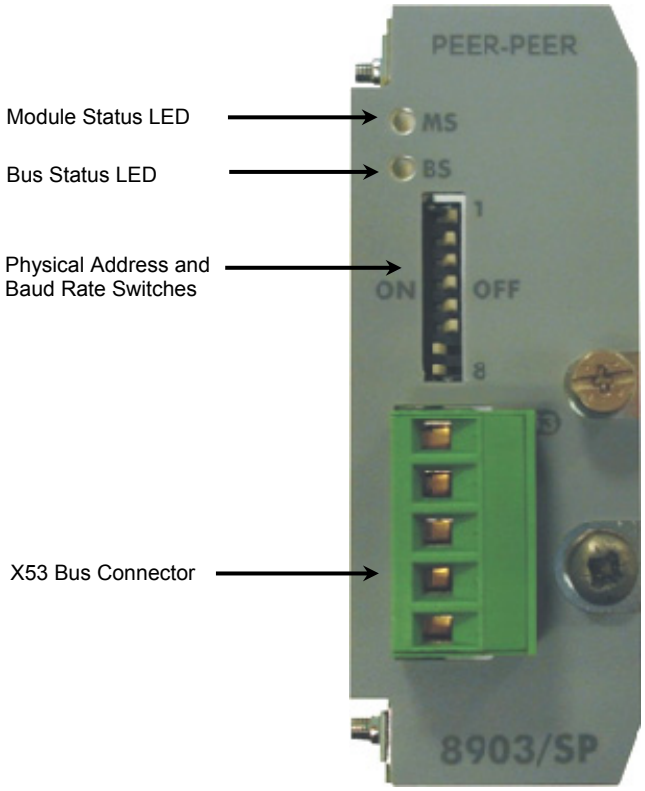


Figure 1. Front of the 8903/SP Peer-to-Peer Communications Interface Option

Product Order Code

Not fitted order code: 8903-SP-00

Factory fitted order code: 890xx-xxxxxxxx-xxx-xxxxX

Compatible Firmware

This option will work with the following versions of 890 firmware:

Version 1.11 onwards Version 3.3 onwards Version 4.1 onwards

Restrictions

Option must be fitted in Slot B.

When the 8903/SP is fitted, the options 8903/CB and 8903/DN cannot be used.

Installation

WARNING!

Before installing, ensure that the drive wiring is electrically isolated and cannot be made "live" unintentionally by other personnel. Wait 5 minutes after disconnecting power before working on any part of the system or removing the covers from the drives.

To Remove the Control Board

1. Remove the blanking plates, each secured by a single screw, that fits over the option slots (1).
2. Loosen the top and bottom screws from the handles of the Control Board (2).
3. Pull gently on the handles and slide the Control Board (2) out of the drive.

Note: *Save the blanking plate and screw for future use. The drive should not be operated without either an option or a blanking plate fitted. When fitted, these maintain the drive's IP20 rating.*

Caution

This Option contains ESD (Electrostatic Discharge) sensitive parts. Observe static control precautions when handling, installing and servicing this Option.

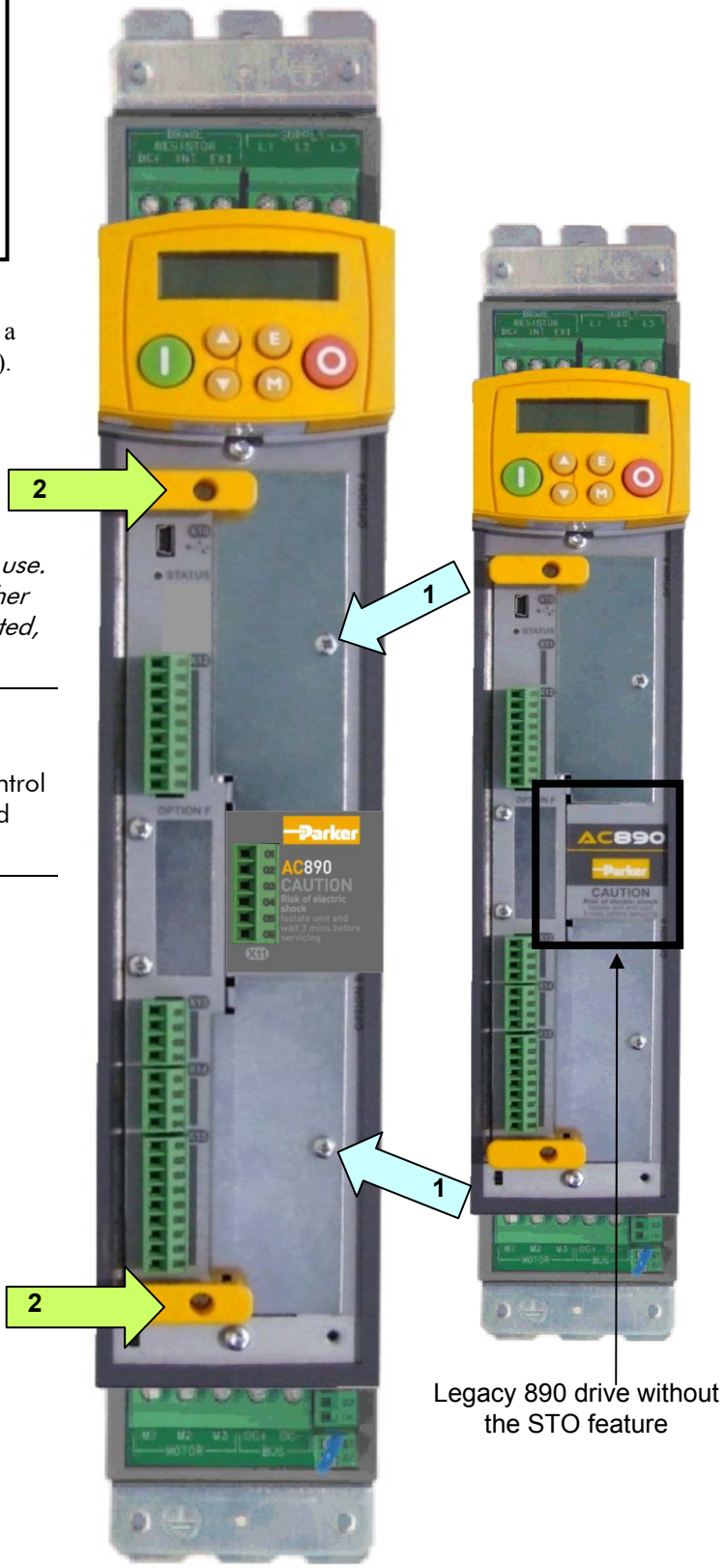


Figure 3. Front of 890 drive showing Control Board fitted

Fitting the Option

The Option fits on to the Control Board.

1. Insert the connector into the Option as shown. The pins of the connector will protrude through into the connector on the other side of the Option.
2. Press the assembly into the **BOTTOM** connector (adjacent to terminals X13, X14 and X15) on the Control Board. Ensure that the front panel of the Option overlaps the front of the Control Board.

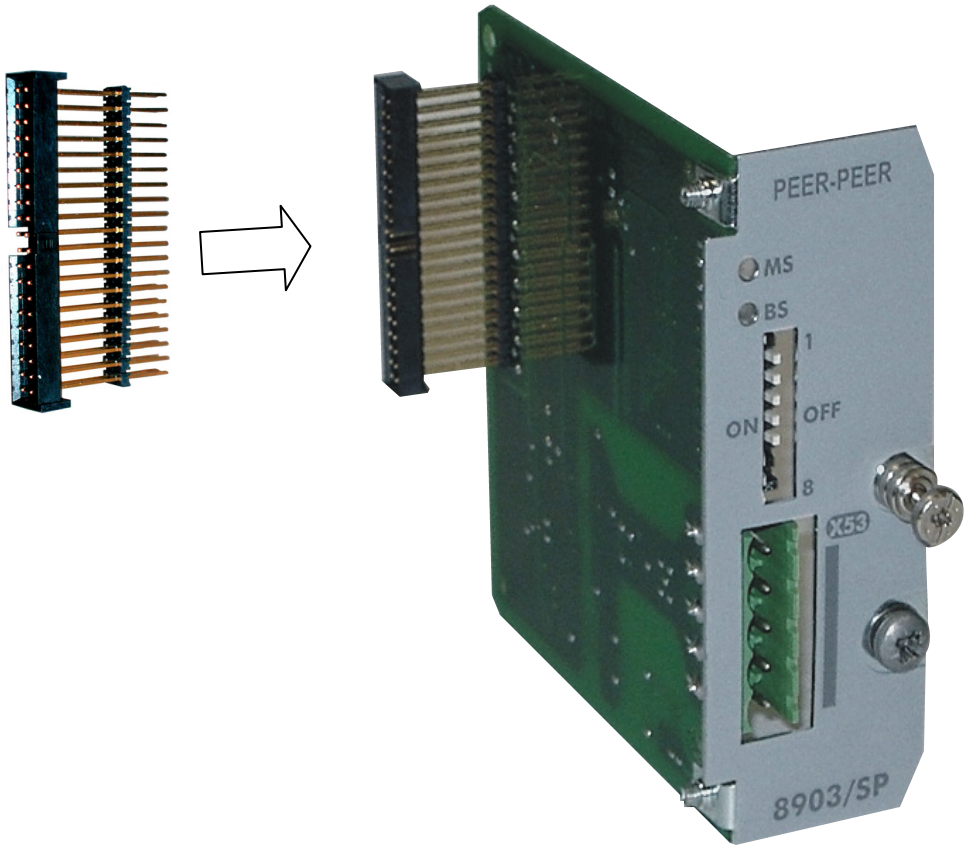


Figure 4. Fitting the connector to the Option

Re-fitting the Control Board

1. Slide the board into the drive, engaging the edges of the boards into the slots. Push until the back edge of the Control Board PCB locates with the connectors in the drive.
2. Tighten in position using the top and bottom screws in the handles of the Control Board.
3. Screw the Option in position using the captive screw on the front of the option.

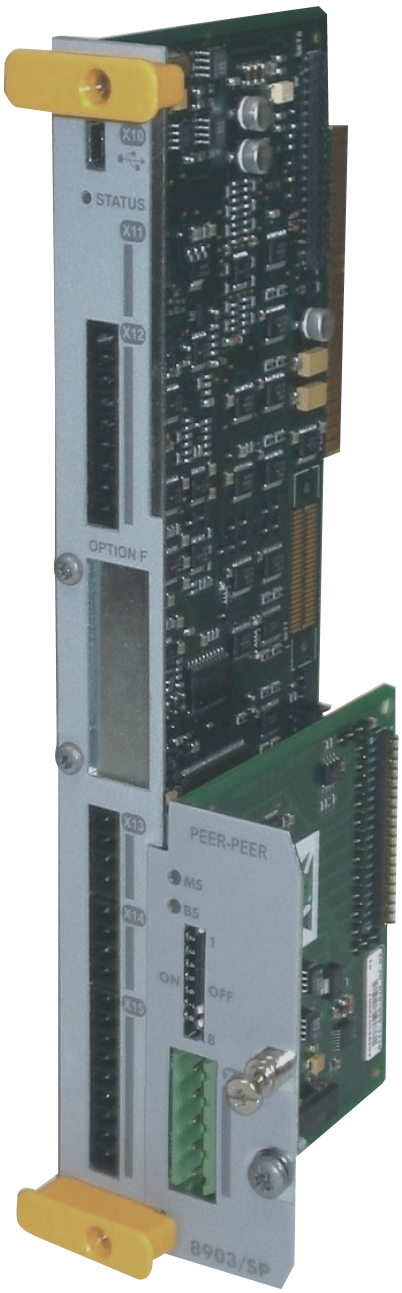
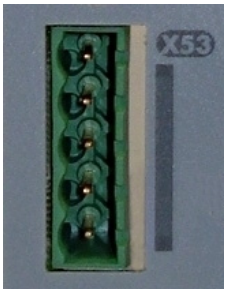


Figure 5. 890 Control Board with Peer-to-Peer Communications Option fitted

Wiring the System

Terminal X53

X53 Pin Number	8903/SP	Connection
1		GND
2		SIG_L
3		SCREEN
4		SIG_H
5		N/C

Cable Specification

The media for the Peer-to-Peer Option is a shielded copper cable consisting of one twisted pair and two cores for power. The recommended bus cable is specified in ISO/DIS 11898.

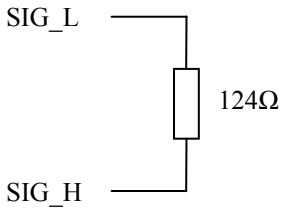
The twisted pair of the cable must be connected to the terminals **SIG_L** and **SIG_H.** It is recommended to connect one of the cores for power to the terminal **GND** (do not connect to safety earth). The cable shield must be connected to the terminal **SCREEN** on the connector X53 at each node. Nodes should be connected in a daisy chain configuration. The cable shield should be connected to **safety earth** at one point *only*.

Keep electrically noisy and sensitive cables apart. Pay particular attention to screening and earthing of motor cables. Where necessary, sensitive cables should cross noisy cables at 90° to minimise capacitive coupling.

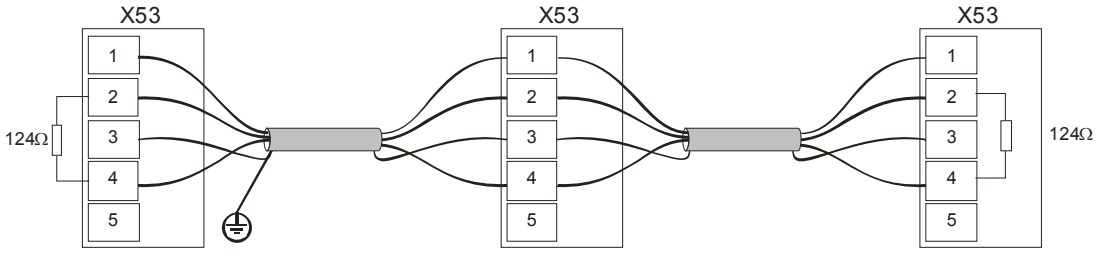
Terminators

Both nodes at the end of the trunk *must* have a terminating resistor. A resistor of 124Ω (±1%, minimum ¼ watt) is recommended, but it should be chosen to equal as closely as possible the characteristic impedance of the cable. The terminating resistor must be connected between the pins **SIG_L** and **SIG_H**.

All other nodes in the system should not have a terminating resistor.



Wiring Diagram



Maximum Cable Lengths

Data Rate	Maximum Cable Length
1000 kbits/s	35 metres
800 kbits/s	50 metres
500 kbits/s	100 metres
250 kbits/s	250 metres

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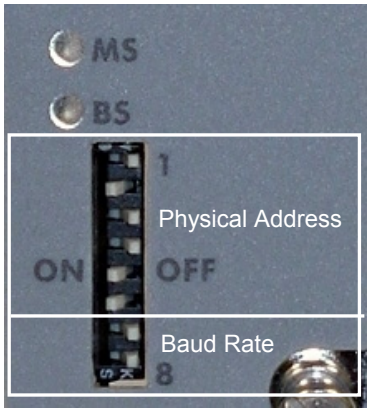
Configuring Peer-to-Peer

Switch Setup

The option requires the setup of the physical address and baud rate using the switches (1 – 8) on the front of the Option.

Note that the state of the switches is continually monitored so that the physical address and baud rate may be changed at any time. A change in the switch state will cause the module to go back to the initialisation state. It is recommended to set up the switches before power-up to avoid bus disturbances.



Physical Address Selection

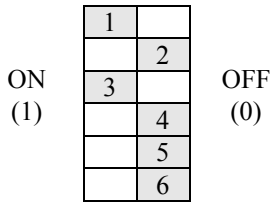
The physical address of a node must be selected using the switches (1-6) on the front of the Option. Each address must be unique.

One node must have address zero, which then becomes the master node. It is recommended that consecutive addresses are used from address zero upwards.

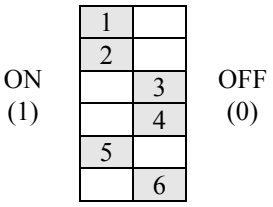
Switch Number	Address Value
1	1
2	2
3	4
4	8
5	16
6	32

Examples

Address 5



Address 19



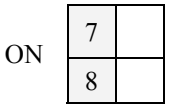
The complete range of physical address switches positions can be found in the Appendix.

Baud Rate Selection

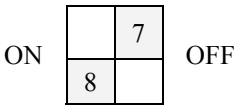
Each Peer-to-Peer Option connected to the bus *must* be set to the same baud rate. This is done using the switches (7-8) on the front of the Option.

The baud rate selection depends on the cable length of the bus.

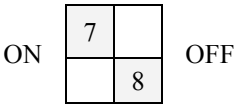
1000kbits/s



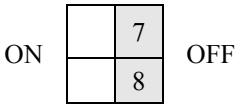
800kbits/s



500kbits/s



250kbits/s



LED Status

The two status LEDs MS (Module Status) and BS (Bus Status) display the current state of the Peer-to-Peer option.

Normal operation:

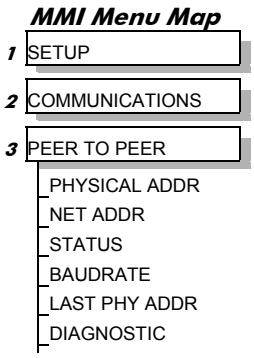
MS	BS	State
Off	Off	No power
Amber	Off	Initialising
Green	Green	Operating (slave node)
Green	Green-Off 95%	Operating (master node)

Warning and fault conditions:

MS	BS	State
Green	Amber	Operating (bus warning)
Green Flickering Red	Green	Operating (excessive data)
Green-Red 50%	Green	No master detected
Off	Red	No bus detected / Incorrect baud rate
Off	Red-Off 50%	Duplicate physical address detected
Red-Off 50%	Red-Off 50%	Fault

MMI View

Diagnostic information is available through the MMI.



PHYSICAL ADDR *Read only* *Range: 0 – 63*

Physical address of the node selected using the switches on the option card. The master node has a physical address of 0.

NET ADDR *Read only* *Range: 0 – 255*

Net address of the node set by DSE.

STATUS *Read only* *Range: Enumerated – see below*

Status of the Peer-to-Peer bus connection.

Enumerated Value: *STATUS*

0: UNKNOWN	- wrong option / option not fitted
1: ERROR	- module error
2: DUP PHY ADDR	- duplicate physical address detected on the bus
3: INITIALISING	- option initialising after power-up or change of switches
4: NO BUS	- bus not detected (cable disconnected or alone)
5: NO MASTER	- master node not detected on the bus
6: OPERATING	- operating mode

BAUDRATE *Read only* *Range: Enumerated – see below*

Baud rate of the node selected using the switches on the option card. All nodes must be set to the same baud rate.

Enumerated Value: *BAUDRATE*

0: INVALID

1: 250K

2: 500K

3: 800K

4: 1000k

LAST PHY ADDR *Read only* *Range: 0 - 63*

Last physical ID detected on the bus.

DIAGNOSTIC *Read only* *Range: 0x0000 to 0xFFFF*

Diagnostic value “0000” = No Error

Troubleshooting

LED Diagnostics

LED MS	LED BS	MMI STATUS	Description	Solution
Off	Off	-	No Power	Check power.
Amber	Amber	UNKNOWN	Incorrect firmware Option hardware failure	Install correct drive firmware. Change Option.
Green	Amber	OPERATING	Node just connected onto an active bus Excessive noise Incorrect baud rate on other nodes	BS LED will change to green after a few seconds. Check cabling and screening. Make sure all nodes are set to the same baud rate.
Green-Flickering Red	Green	OPERATING	Excessive data	Reduce the amount and/or rate of peer-to-peer data transfer in the drive configurations.
Green-Red 50%	Green	NO MASTER	Master not detected	One node on the bus must be selected as master (physical address 0).
Off	Red	NO BUS	Bus not detected Node alone Incorrect baud rate	Check cable and termination. Connect other nodes. Select correct baud rate.
Off	Red-Off 50%	DUP PHY ADDR	Duplicate physical address	Change the physical address to a unique value.
Red-Off 50%	Red-Off 50%	ERROR	Module error	Power cycle the node.

DSE Module List

If excessive peer-to-peer data is being transmitted across the bus then the **Errs** (errors) column in the Module List in DSE will show non-zero values. The Module Status (MS) LED will also flicker red.

To resolve this problem reduce the amount / rate of peer-to-peer data until Errs is zero. Increasing the baud rate, if possible, will also help.

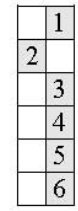
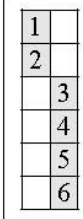
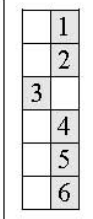
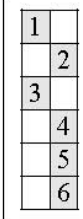
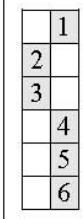
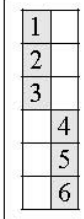
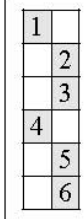
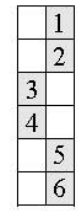
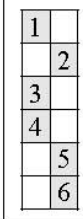
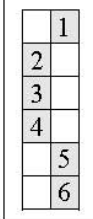
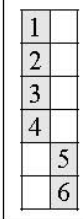
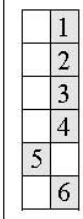
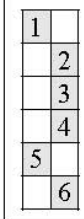
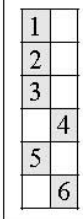
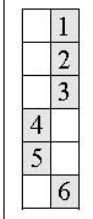
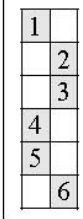
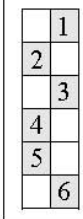
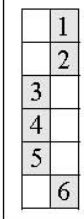
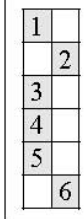
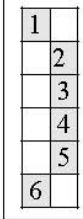
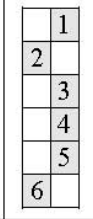
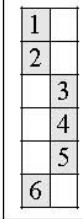
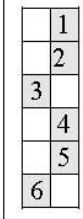
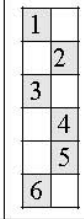
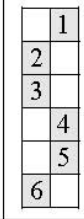
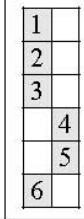
Module list

Adr...	Name	Library	Status	CPU %	Heap...	Msg/s	Errs
0005	test_m1	890 v1.11	OK	46.7	11.4	86	734
0011	test11	890 v1.11	OK	10.6	16.1	477	88
0012	test12	890 v1.11	OK	9.4	13.3	472	180
0013	test13	890 v1.11	OK	11.4	13.3	469	227
0014	test14	890 v1.11	OK	11.4	13.3	463	186
0015	test15	890 v1.11	OK	11.0	13.3	459	178
*0016	test16	890 v1.11	OK	11.8	13.3	450	77
0017	test17	890 v1.11	OK	11.8	13.3	440	177
0018	test18	890 v1.11	OK	9.8	13.3	441	92
0019	test19	890 v1.11	OK	9.4	13.3	434	285
0020	test20	890 v1.11	OK	9.4	13.3	422	310
0021	test21	890 v1.11	OK	9.4	13.3	404	274
0022	test22	890 v1.11	OK	16.1	13.3	396	548
0023	test23	890 v1.11	OK	12.2	13.3	327	4693
0024	test24	890 v1.11	OK	3.5	13.3	74	53
0025	test25	890 v1.11	OK	6.3	13.3	76	0
0026	test26	890 v1.11	OK	3.5	13.3	84	81
0027	test27	890 v1.11	OK	3.1	13.7	84	0
0028	test28	890 v1.11	OK	5.9	13.7	84	12
0029	test29	890 v1.11	OK	2.7	13.3	82	39
0030	test30	890 v1.11	OK	3.1	13.3	80	13

Figure 6. Example of Module List in DSE

Appendix

Physical Address Switch Positions

	0	1	2	3	4	5	6	7	8	9
00										
10										
20										
30										
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Note: Left is ON, Right is OFF

12
Disposal

This product contains materials which are consignable waste under the Special Waste Regulations 1996 which complies with the EC Hazardous Waste Directive - Directive 91/689/EEC.

We recommend you dispose of the appropriate materials in accordance with the valid environmental control laws. The following table shows which materials can be recycled and which have to be disposed of in a special way.

Material	Recycle	Disposal
metal	yes	no
plastics material	yes	no
printed circuit board	no	yes

The printed circuit board should be disposed of in one of two ways:

1. High temperature incineration (minimum temperature 1200°C) by an incinerator authorised under parts A or B of the Environmental Protection Act
2. Disposal in an engineered land fill site that is licensed to take aluminium electrolytic capacitors. Do not dispose of in a land fill site set aside for domestic waste.

Packaging

During transport our products are protected by suitable packaging. This is entirely environmentally compatible and should be taken for central disposal as secondary raw material.

ISS.	MODIFICATION	ECN No.	DATE	DRAWN	CHK'D
1	Initial Issue (HA500806U001)	20718	01 Jul 09	FEP	MEF
2	Standardised Safety pages over 3 pages. Product Code – added new coding. Page 2 – Replaced photos to show new Safe Torque Off feature. Replaced TechCard with Option and Replaced DSE 890 with DSE.	20814	12 Feb 10	FEP	MF

FIRST USED ON	MODIFICATION RECORD 8903/SP Peer-to-Peer Communications Interface	
Parker	DRAWING NUMBER ZZ469265C001	SHT. 1 OF 1