8903/SP
Peer-to-Peer
Communications Interface

Technical Manual

HA500806U001 Issue 1

Compatible with firmware Version 1.11 and Version 3.3 onwards

WARRANTY

Parker SSD Drives warrants the goods against defects in design, materials and workmanship for the period of 24 months from the date of manufacture, or 12 months from the date of delivery (whichever is the longer period), on the terms detailed in Parker SSD Drives Standard Conditions of Sale IA500504.

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Cont.1

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Cont.2

Safety Information

WARNING!
During commissioning, remove the fuses (or trip the circuit breaker) on your 3-phase supply.
Make sure the power is OFF, and that it cannot be switched on accidentally whilst you are working.

REFER TO YOUR MAIN PRODUCT MANUAL FOR SPECIFIC SAFETY INFORMATION ABOUT THE DEVICE YOU ARE CONTROLLING

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.

Application Area

The equipment described is intended for industrial motor speed control.

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.

Safety

All control and signal terminals are SELV, i.e. protected by double insulation.

EMC

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate counter-measures.

This equipment contains electrostatic discharge (ESD) sensitive parts. Observe static control precautions when handling, installing and servicing this product.

Cont.3

Safety Information

CAUTION!

At any time, there may be a loss of motor control and separate/independent application measures should be taken to ensure that such loss of motor control cannot present a safety hazard.

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 INTERFACE

Introduction

This manual describes the Parker SSD Drives' Peer-to-Peer Communications Interface Option (TechCard).

The 8903/SP Peer-to-Peer TechCard uses a proprietary protocol. It may be used in the following ways:

- Connect DSE 890 to all drives in the system
- Peer-to-peer data exchange with other drives

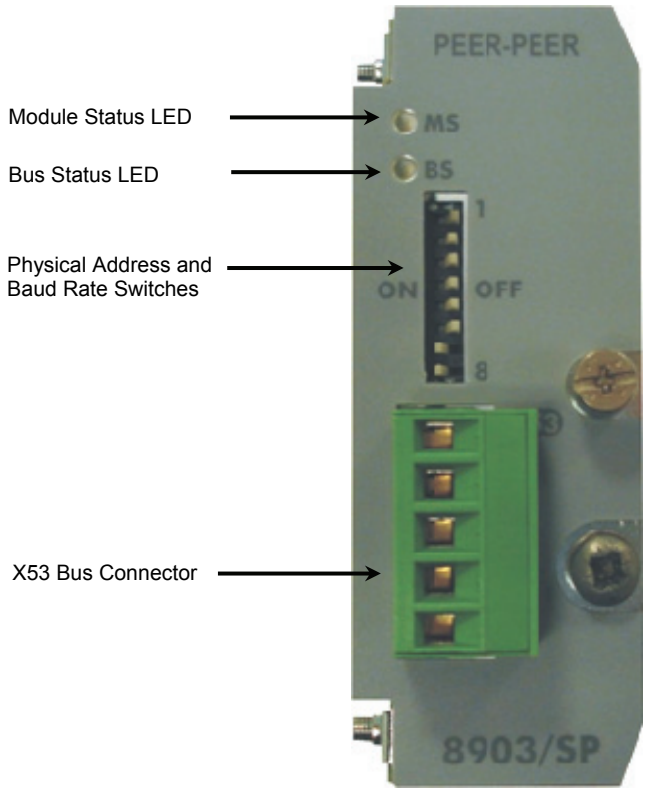


Figure 1. Front of the 8903/SP Peer-to-Peer Communications Interface Option

Part Number

The part number for the Peer-to-Peer Communications Interface Option is :

8903/SP
8903/SP/FF (indicates a factory-fitted option)

Used On

The TechCard can be used on 890 drives with the following Product Codes:

890SD/..	890SD Standalone Drive
890CD/..	890CD Common Bus Drive

Refer to the 890 Engineering Reference Manual, Appendix E for Product Code details.

Restrictions

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

2
Installation

WARNING!
Disconnect all sources of power before attempting installation.

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

To Remove the Control Board

1. Remove the blank covers, each secured by a single screw (1) that fit over the TechCard slots.
2. Undo the top and bottom captive screws in the handles (2) of the Control Board.
3. Pull gently on the handles (2) and slide the Control Board out of the drive.

Note: *Save the blank cover and screw for future use. The drive should not be operated without a TechCard or blank cover. When fitted, these maintain the drive's IP20 rating.*

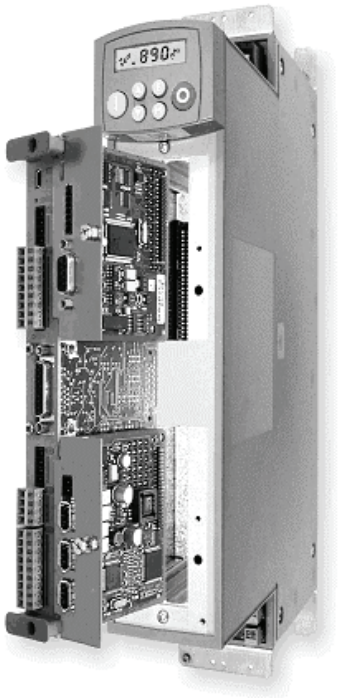


Figure 2. 890 showing Control Board withdrawn, with Options fitted

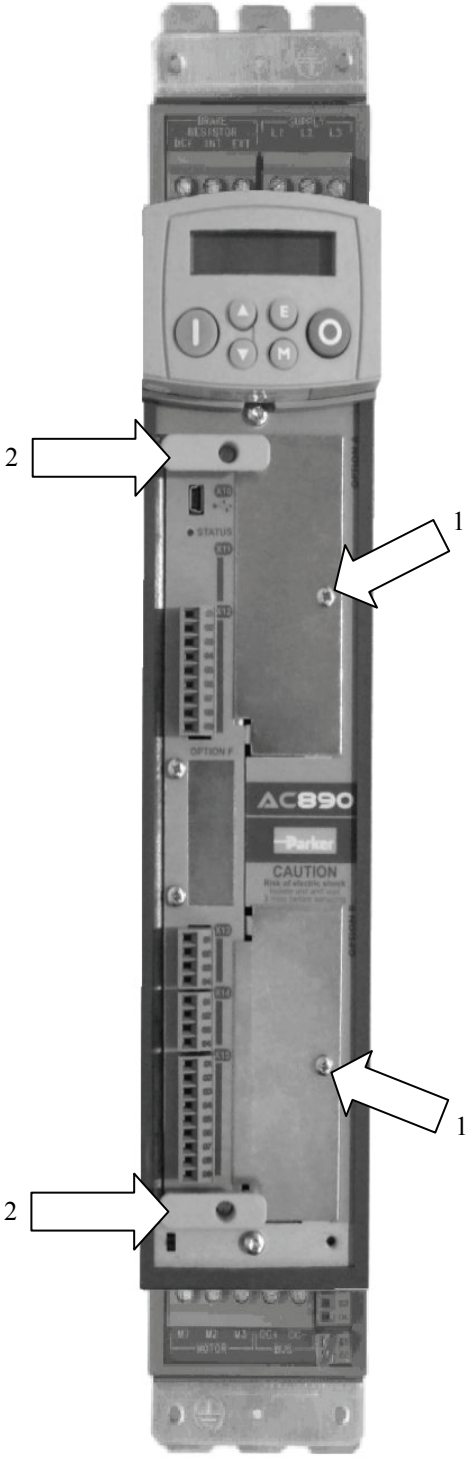


Figure 3. Front of 890 drive showing Control Board fitted

Fitting the TechCard

The TechCard fits on to the Control Board.

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

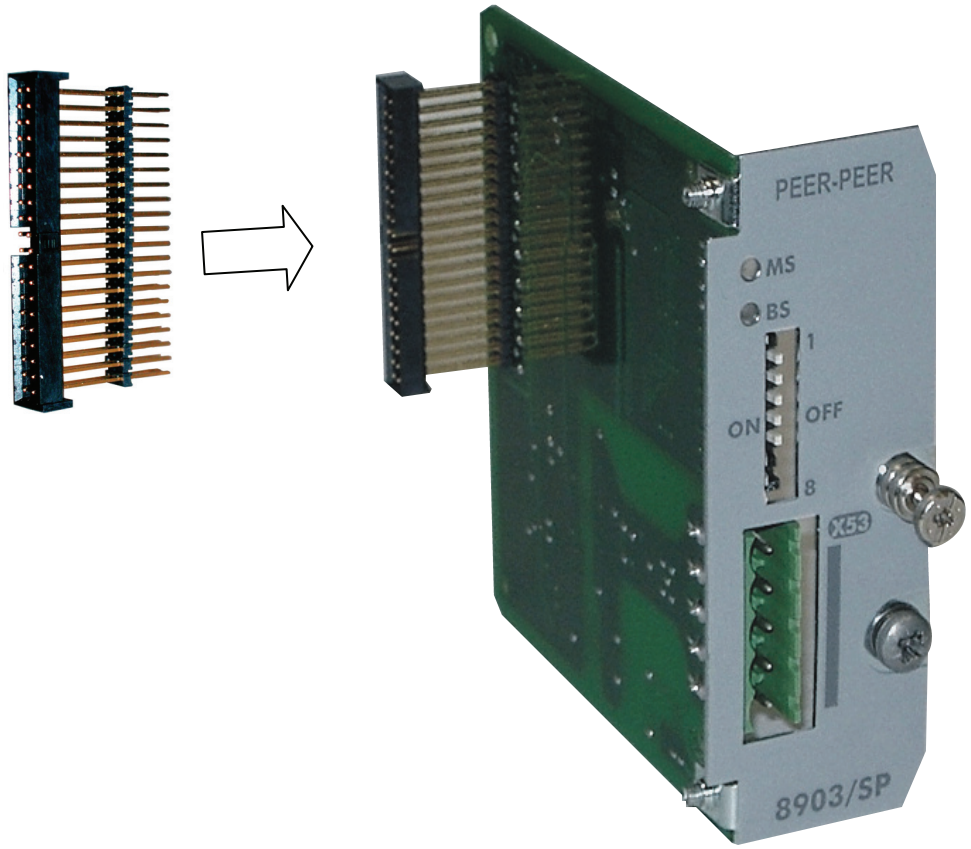


Figure 4. Fitting the connector to the TechCard

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 TechCard in position using the captive screw on the front of the option.

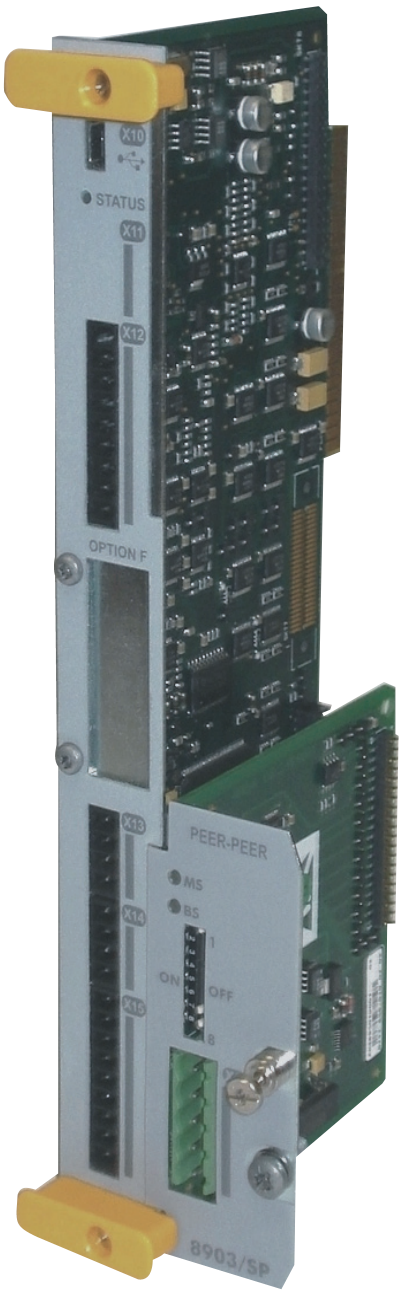
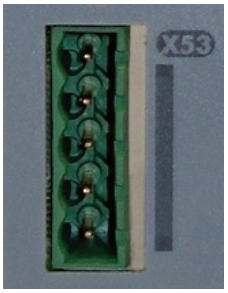


Figure 5. 890 Control Board with Peer-to-Peer Communications Option fitted

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 TechCard 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.

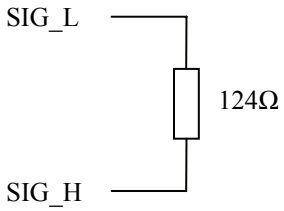
The twisted pair of the cable must be connected to the terminals **SIG_L** and **SIG_H.** It is recommended to connect one of the cores for power to the terminal **GND** (do not connect to safety earth). The cable shield must be connected to the terminal **SCREEN** on the connector X53 at each node.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

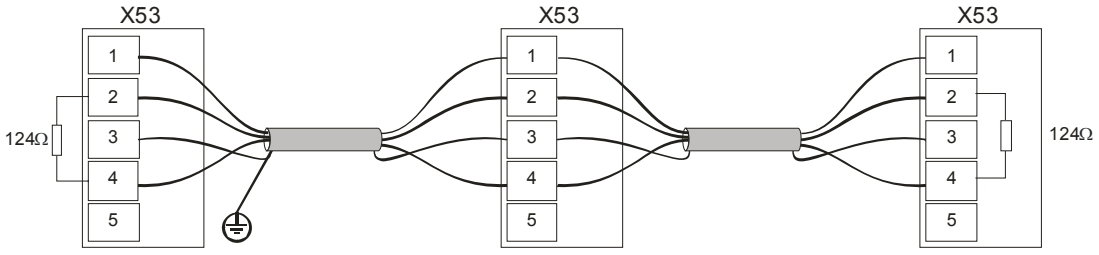
Terminators

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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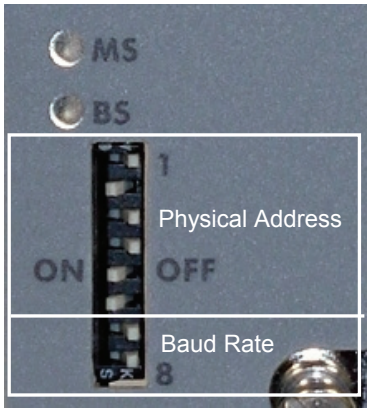
Configuring Peer-to-Peer

Switch Setup

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

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

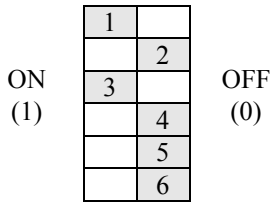
The physical address of a node must be selected using the switches (1-6) on the front of the TechCard. Each address must be unique.

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

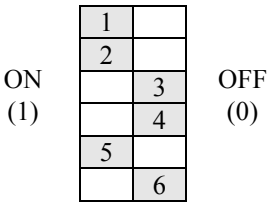
Switch Number	Address Value
1	1
2	2
3	4
4	8
5	16
6	32

Examples

Address 5



Address 19



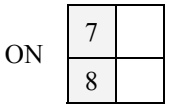
The complete range of physical address switches positions can be found in the Appendix.

Baud Rate Selection

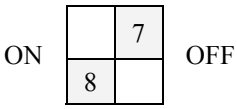
Each Peer-to-Peer TechCard connected to the bus *must* be set to the same baud rate. This is done using the switches (7-8) on the front of the TechCard.

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

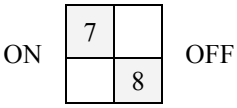
1000kbits/s



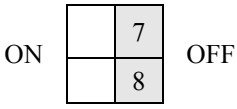
800kbits/s



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:

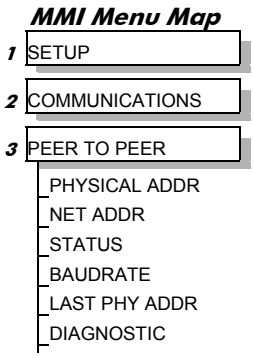
MS	BS	State
Off	Off	No power
Amber	Off	Initialising
Green	Green	Operating (slave node)
Green	Green-Off 95%	Operating (master node)

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*

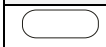
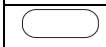
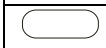
Last physical ID detected on the bus.

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 TechCard hardware failure	Install correct drive firmware. Change TechCard.
 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.

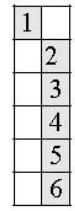
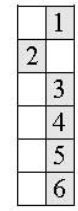
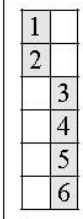
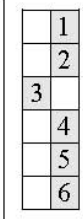
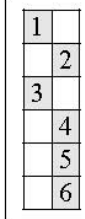
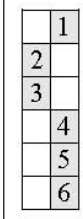
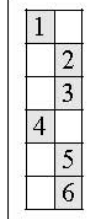
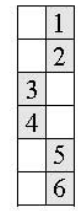
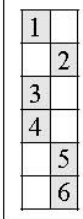
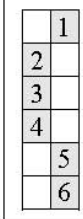
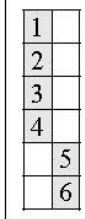
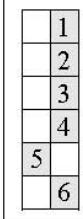
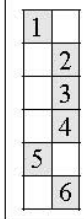
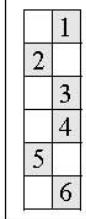
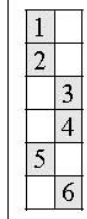
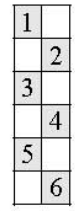
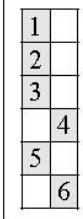
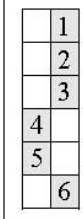
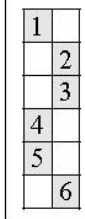
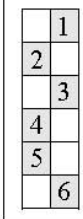
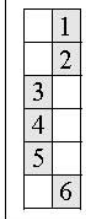
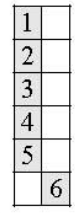
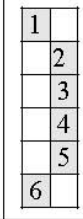
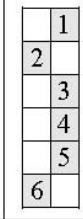
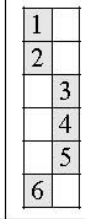
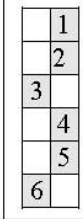
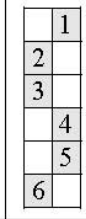
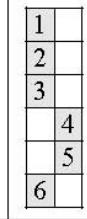
Module list

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

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