8903/FA
FireWire IEEE 1394a
Communications Interface

Technical Manual

HA469265U001 Issue 1

Compatible with Version 1.x Software

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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.

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, and to enable the user to obtain maximum benefit from the equipment.

Application Area

The equipment described is intended for industrial motor speed control utilising 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.

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

WARRANTY

SSD Drives warrants the goods against defects in design, materials and workmanship for the period of 12 months from the date of delivery on the terms detailed in SSD Drives Standard Conditions of Sale IA058393C.

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FIREWIRE COMMUNICATIONS INTERFACE

Introduction

This manual describes the SSD Drives' FireWire® Communications Interface Option (TechCard).

Note: *FireWire is also known as IEEE1394 and is a high speed peer-to-peer serial bus.*

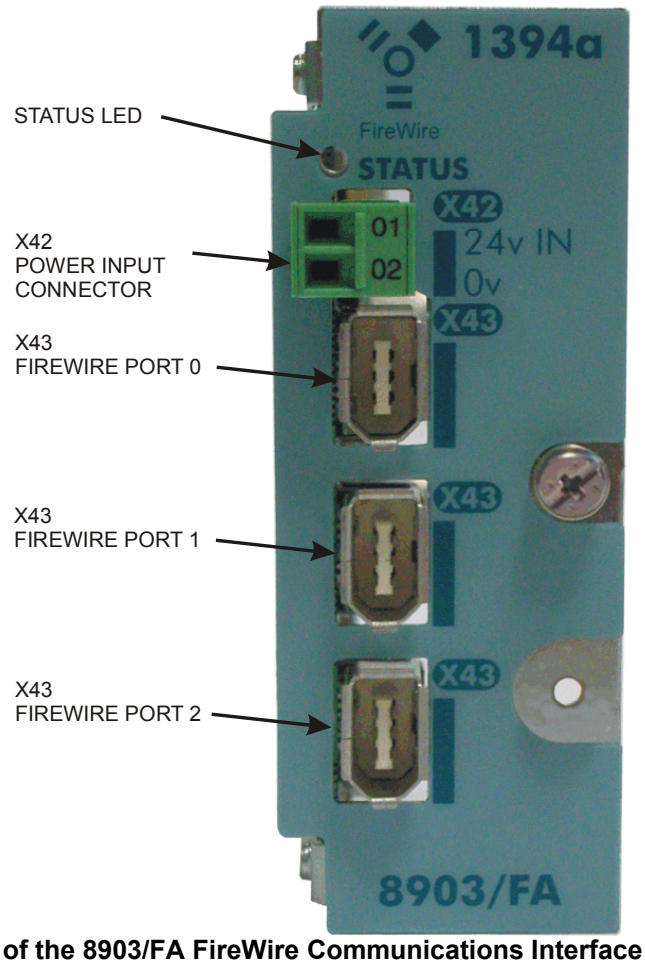


Figure 1. Front of the 8903/FA FireWire Communications Interface Option (TechCard)

Part Number

The part number for the FireWire Communications Interface Option is :

8903/FA
8903/FA/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.

Recommended Spare Parts

We recommend that you keep one TechCard as a spare to reduce down-time.

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 blue 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 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.*

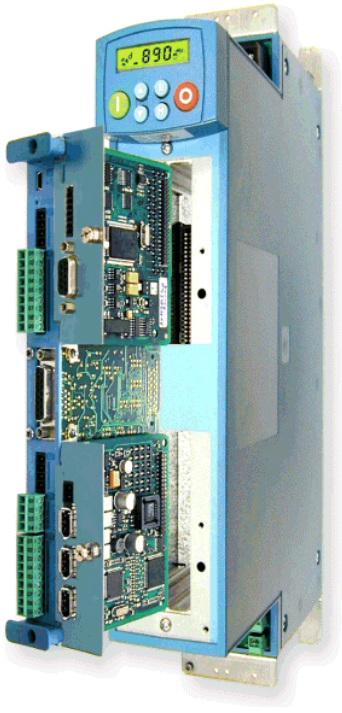


Figure 2. 890 showing Control Board withdrawn with Options fitted

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 legs of the connector will protrude through into the connector on the other side of the TechCard.
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 TechCard overlaps the front of the Control Board. Ease the connector at the TechCard so that the two pcb's are parallel when viewed on edge.

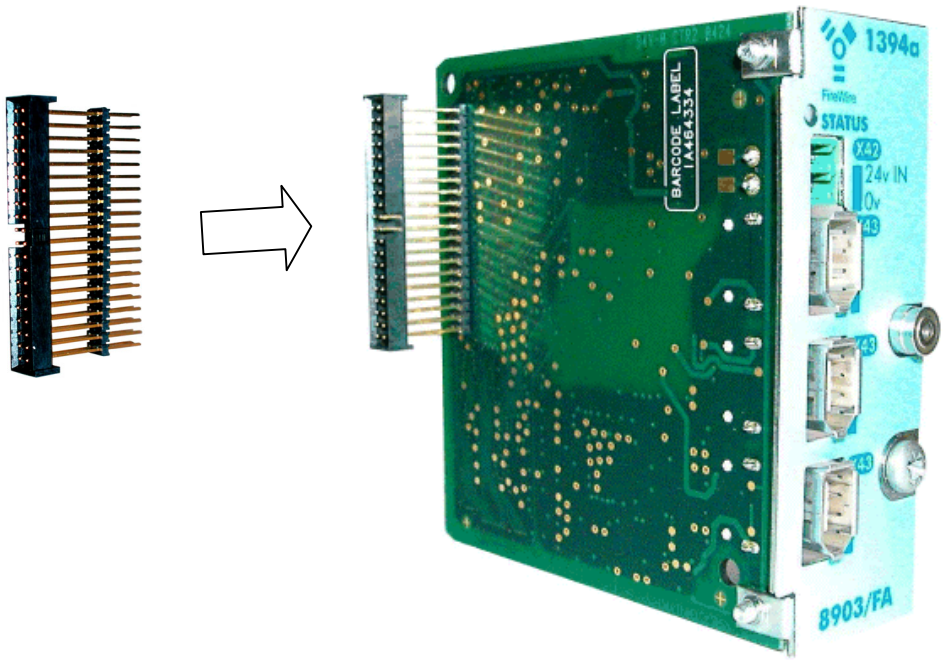


Figure 4. Fitting the connector to the TechCard

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 blue handles of the Control Board.
3. Screw the TechCard in position using the captive screw on the front of the Option.

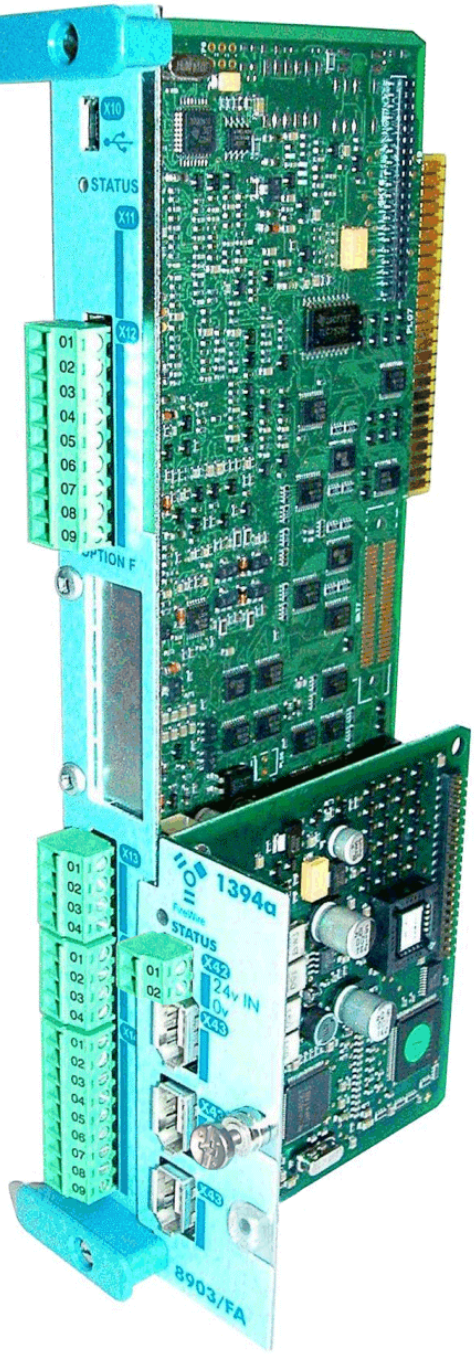


Figure 5. 890 Control Board with FireWire Communications Option fitted

Wiring the System

Terminology

Node :	Any single piece of IEEE1394 connected apparatus
Bus :	The network of interconnected IEE1394 nodes
Hop :	Any single IEEE1394 interconnecting cable
Lonely :	No other active nodes detected

Powering the Node

IMPORTANT: DO NOT power the TechCard using the drive's 24V.

The IEEE1394 bus requires a **separate**, **floating** 24Vdc (12-24Vdc) supply connected to the Power Input Connector, terminal X42.

Supply 24Vdc to one of the nodes on the bus. The 24Vdc is transferred to other nodes on the bus via the IEEE1394 cable.

Pin 01 = 24V
Pin 02 = 0V

If you do power more than one node on the same bus (for instance, one supply in each of two enclosures allowing for one of the enclosures to be isolated yet maintaining the bus), the supplies must again be **separate**, **floating** supplies.

Connect the 24V supply to the X42 terminal block using twisted pair cable.

Connecting the Nodes

Use an IEEE 1394a cable to connect two nodes together. These cables are considered electrically sensitive.

Bus resets can result from excessive noise coupling in to the 1394a cables. A reset can take 0.5s to complete. During this time data will not be transferred by the bus. To avoid resets, keep electrically noisy and sensitive cables apart. Where necessary, sensitive cables should cross noisy cables at 90° to minimise capacitive coupling.

We can supply the following recommended cables:

SSD Part Number	Cable Length
CM469189U002	0.2m
CM469189U003	0.28m
CM469189U010	1m
CM469189U045	4.5m
CM469189U100	10m

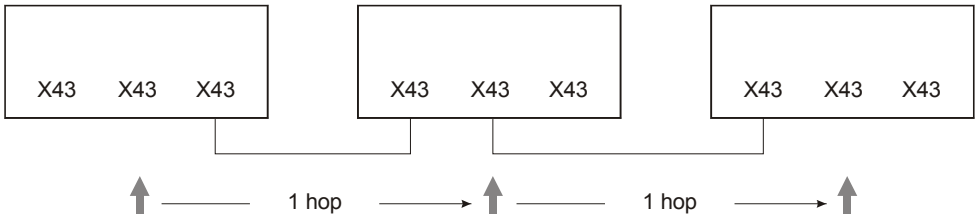
Note: *If using 10m cables, note that an additional limitation applies: the cable length limit between the two most distant nodes on the network is 72m. 10m cables should be used sparingly, and short (1m) cables should be used wherever possible to ensure this limit is not exceeded. See "Extenders" below.*

Each port is interchangeable – any message transmitted by the node exits all three ports. Any message received on one port is repeated on the other two ports.

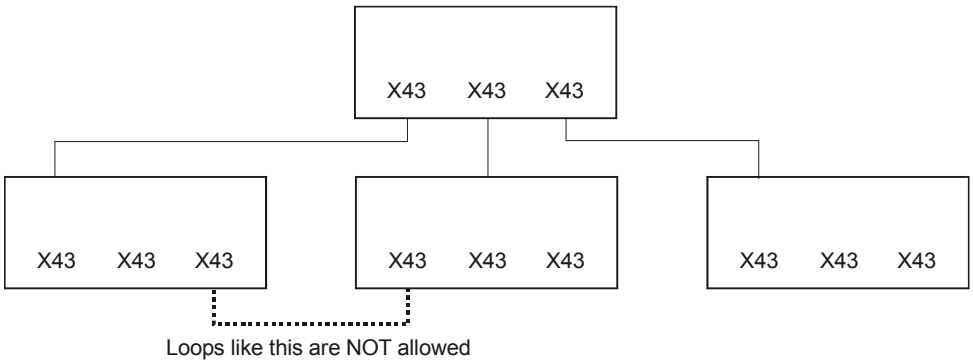
Nodes can be connected in a Daisy Chain or a Tree configuration but loops are not allowed.

The maximum number of hops between the most distant nodes on the network is 16, so for 17 or more nodes a Tree is essential. The maximum number of nodes is 63.

Refer to Figure 6 on next page.



Daisy Chain Configuration



Tree Configuration

Extenders

If any hop needs to be longer than 10m, then an extender is required to repeat the bus over CAT5 cable or optical fibre. There are commercially available units such as:

www.fwdepot.com …	FW2UTP-01	1x IEEE1394a port, 1xRJ45 CAT5 port
	FW2UTP-02A	1x IEEE1394a port, 2xRJ45 CAT5 port
	FW2UTP-02B	1x IEEE1394a port, 2xRJ45 CAT5 port

Any 2 of the above can be used with a CAT5 crossover cable of up to 100m.

www.newnex.com … FireNex-MX (TM) 2xIEEE1394a ports, 1x optical duplex LC port

Two of the above can be used with 100m of LC to LC ,62.5125um, multimode optical cable.

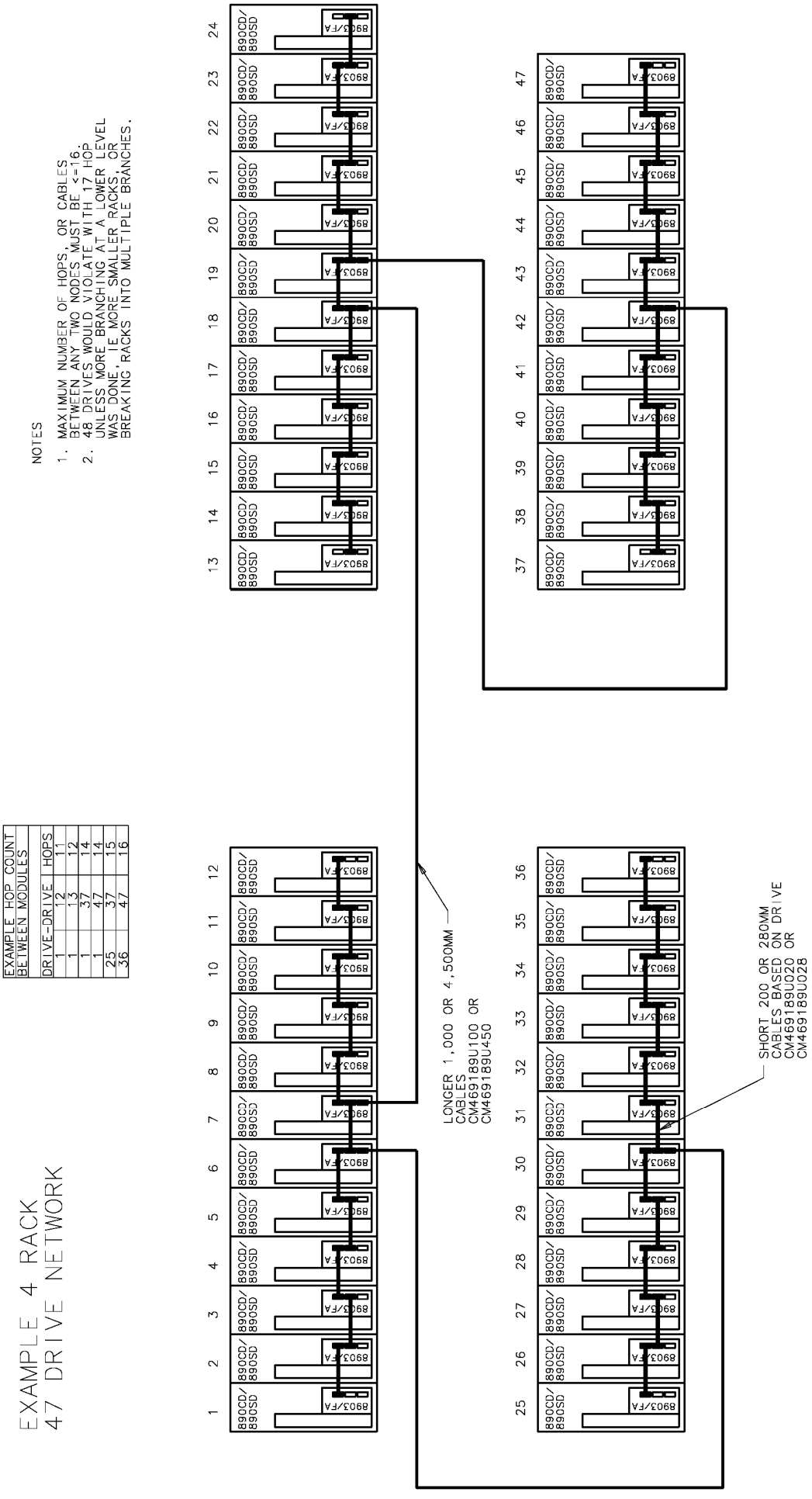


Figure 6. Example 4 Rack, 47 Drive Network

Configuring the 890 Drive

All drives in the system MUST be fitted with a FireWire TechCard that is wired correctly.

The FireWire TechCard is plug-and-play, requires no setting-up, and can be used in one of three ways:

1. DSE 890 : use FireWire to connect DSE 890 to all drives in the system.
2. Peer-To-Peer : use FireWire to link drive parameters. Your DSE 890 Configuration will perhaps be using the outputs of Logic blocks, digital inputs/outputs etc.
3. Virtual Axis : use FireWire to broadcast synchronised information to all drives on the system (e.g. a shaftless printing application).

You can use the diagnostics provided in the FIREWIRE block to see your system at work.

FIREWIRE

SETUP::COMMS::FIREWIRE

The FireWire block parameterises FireWire communications, providing a series of diagnostics. There are no user settable parameters in this block.

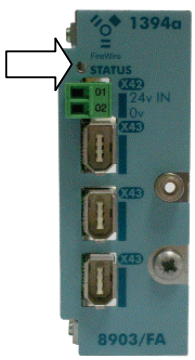
Parameter Descriptions			
OWN ID	*PREF: 117.01*	*Default: 99*	*Range: —.*
FireWire network ID of the drive.			
BUS MASTER ID	*PREF: 117.02*	*Default: 99*	*Range: —.*
FireWire network ID of the network FireWire Master.			
NUMBER OF NODES	*PREF: 117.03*	*Default: 0*	*Range: —.*
Total number of FireWire Nodes connected to the network..			
CYCLE TIMER	*PREF: 117.04*	*Default: 0*	*Range: —.*
Timer which should be synchronised across the FireWire network.			
BUS RESETS	*PREF: 117.05*	*Default: 0*	*Range: —.*
Number of times the FireWire bus has reset since power-on.			
MCAP ADVERTS	*PREF: 117.06*	*Default: 0*	*Range: —.*
Count of Multicast Advertisements received by this node.			
MAX HOPS	*PREF: 117.07*	*Default: 0*	*Range: —.*
Maximum number of cable hops between the two most distant nodes on the network.			
OFFSET (40.69ns)	*PREF: 117.08*	*Default: 0*	*Range: —.*
Time delay between this node and the node hosting the Cycle Time Master.			

The DSE 890 Configuration Tool is SSD Drives' Windows-based block programming software and is supplied with each 890 drive.

Status LED Indications

The Status LED on the TechCard indicates the following states:

Flash Sequence		Bus State
	50-50 OFF-RED	No Bus Power
	100 AMBER	Bus Reset
	50-50 OFF-GREEN	Bus Power On, Lonely
	5-95 OFF-GREEN	Bus Running, multiple drives



ISS.	MODIFICATION	ECN No.	DATE	DRAWN	CHK'D
1	Initial Issue (HA469265U001)	17320	14/04/05	CM	AFL

FIRST USED ON	MODIFICATION RECORD 8903/FA FireWire Communications Interface	
SSD DRIVES	DRAWING NUMBER ZZ469265C001	SHT. 1 OF 1