8903/DN
DeviceNet
Communications Option

Technical Manual

HA469264U001 Issue 3

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

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

Contents

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DEVICENET COMMUNICATIONS OPTION

Introduction

This manual describes the Parker SSD Drives' DeviceNet Communications Option.

Product Features

- Suitable for use with 890CD Common Bus Drive, 890SD Standalone Drive and 890PX Drive
- LEDs to indicate module and network status
- Hardware/software selectable Node Address
- Group 2 DeviceNet Slave
- Polled I/O
- Change of State (COS) and Cyclic Outputs
- Explicit messaging
- All DeviceNet data rates supported (125k, 250k and 500k baud)
- Up to 255 polled or explicit DSE input registers
- Up to 255 polled, cyclic or explicit DSE output registers

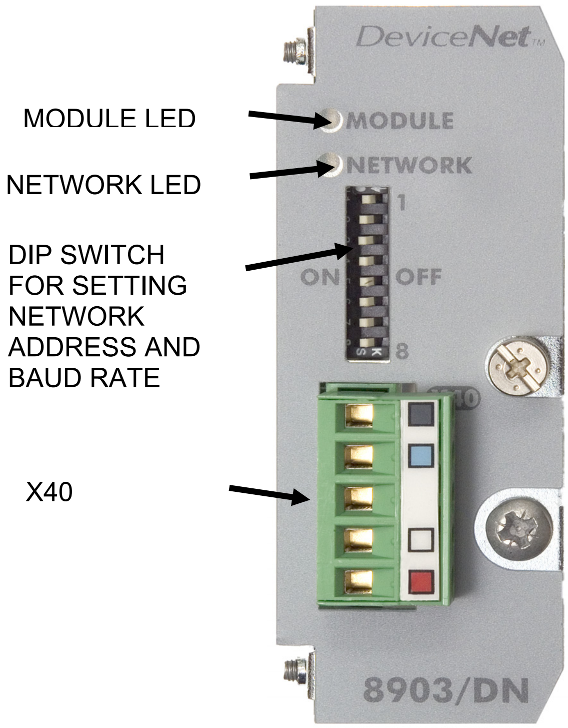


Figure 1. DeviceNet Option

Product Order Code

Not fitted order code: 8903-DN-00 - DeviceNet Option
Factory fitted order code: 890xx-xxxxxxxx-xxx-xxxDx

Compatible Firmware

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

Version 1.9 onwards   Version 2.4 onwards
Version 3.1 onwards   Version 4.1 onwards

Restrictions

Option must be fitted in Slot A.

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

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 (1), 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 blank cover 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.

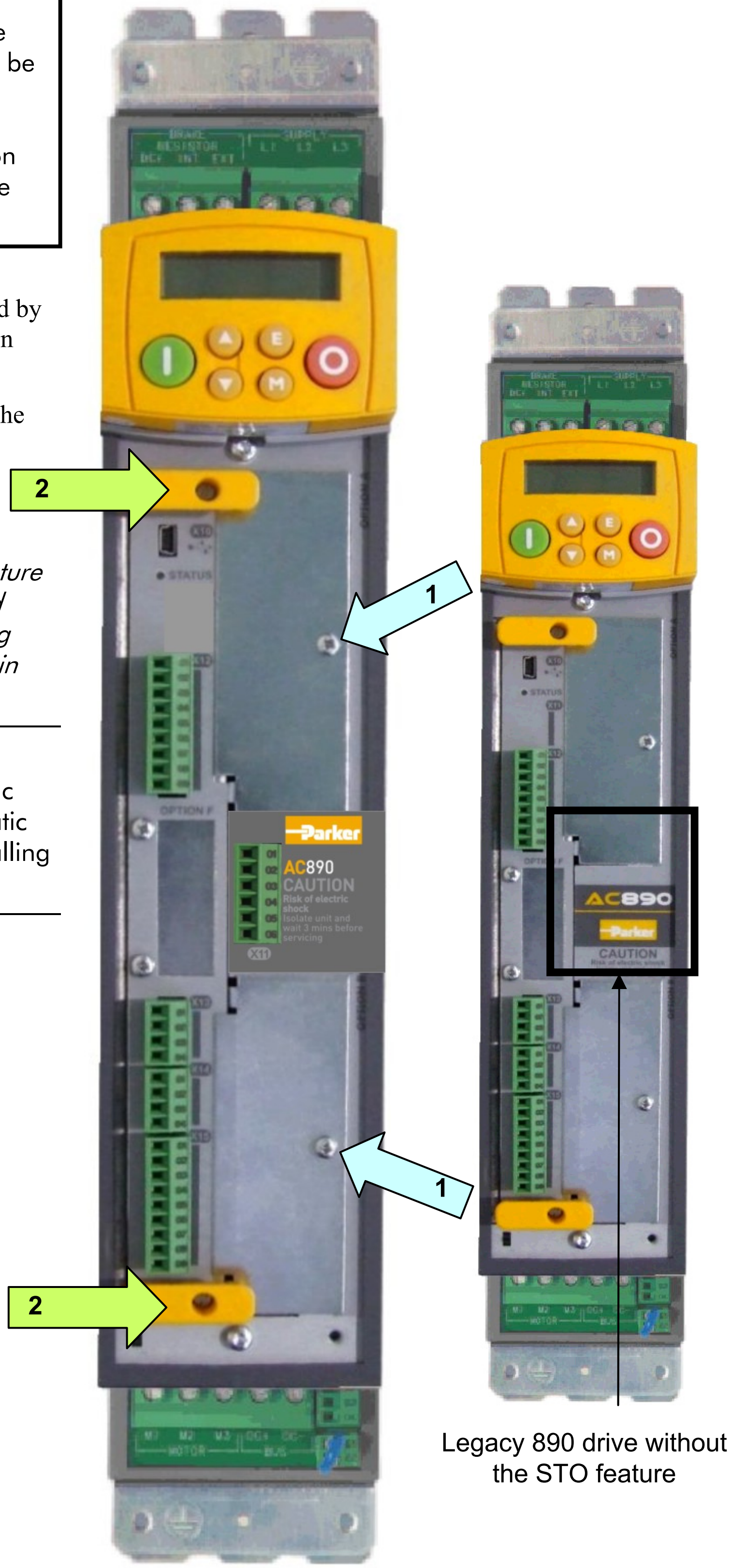


Figure 3. Front of 890 drive showing Control Board fitted

Figure 2. 890 showing Control Board withdrawn with Options fitted

Fitting the Option

The Option fits on to the Control Board.

1. Insert the connector into the Option as shown. The legs of the connector will protrude through into the connector on the other side of the Option.
2. Press the assembly into the **TOP** 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.

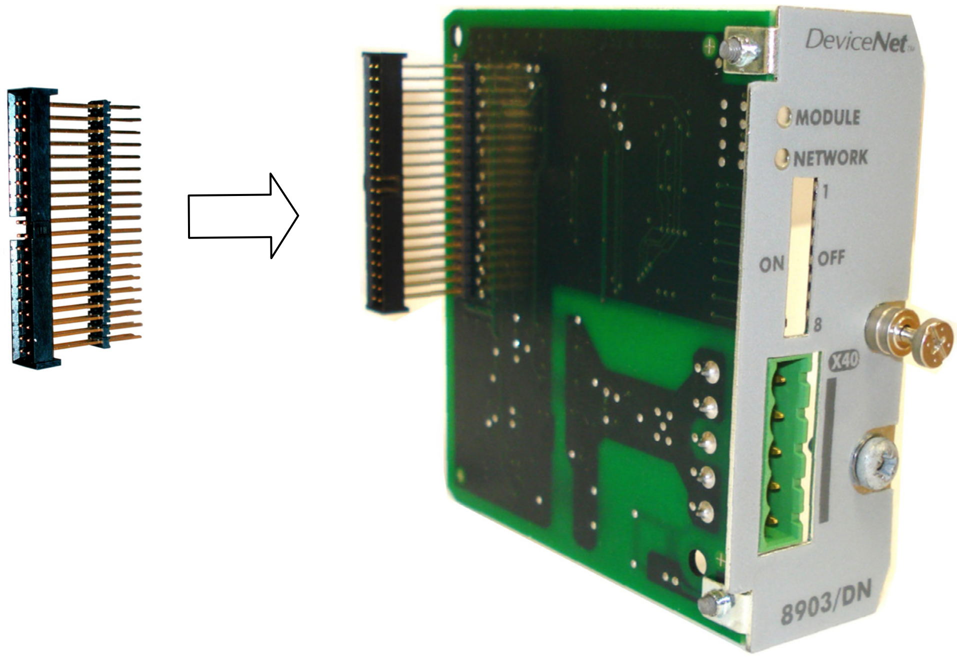


Figure 4. Fitting the connector to the Option

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.

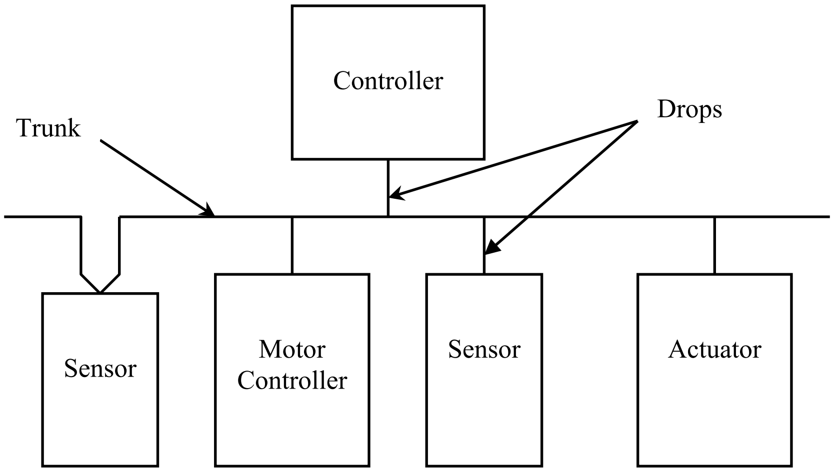
Figure 5. 890 Control Board with DeviceNet Communications Option fitted

Wiring the System

DeviceNet is a 4-wire system. Two wires convey the DeviceNet data and the remaining two wires convey power if the product is remotely powered. Remote powering is recommended and is necessary if the network is to remain operational between other devices when the drive is powered down.

Cable Specification

The DeviceNet specification makes recommendations for cable type depending on whether the cable is to serve in a trunk or a drop.



Full cable specifications are provided in the DeviceNet specification, Volume1 appendix B. A summary is given here.

	Trunk cable	Drop cable
Signals wires	Twisted pair, #18. Blue / white	Twisted pair, #24. Blue / white
Power wires	Twisted pair, #15. Black / red	Twisted pair, #22. Black / red
Shield	Foil / braid with drain wire (#18); bare. Each pair shielded separately in aluminized mylar. Combined pair shielded	Foil / braid with drain wire (#22); bare. Signal pair shielded in foil. Overall braid shield
Internal insulation	PVC insulation on power pair	PVC insulation on power pair
Electrical	High speed (VP ≥ 0.75), low loss, low distortion data pair.	High speed (VP ≥ 0.75), low loss, low distortion data pair.
Characteristic impedance of data pair	120 Ω ± 10%	120 Ω ± 10%

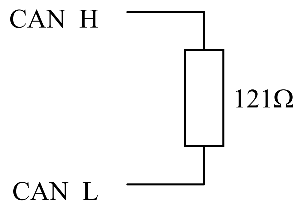
Maximum Cable Lengths

The maximum cable length depends on the baud rate selected:

Data Rate	Trunk Distance	Drop Length	
		Maximum	Cumulative
125kbaud	500 metres (1600 ft.)	3 metres (10ft)	156 metres (512 ft.)
250kbaud	200 metres (600 ft.)		78 metres (256 ft.)
500kbaud	100 metres (300 ft.)		39 metres (128 ft.)

Bus Termination

If the drive is at the end of the trunk it must have a terminating resistor. Connect a terminating resistor to the last drive between Pin 2 and Pin 4 as shown. (The resistor is ±1%, minimum ¼ Watt).

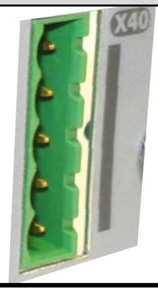


The DeviceNet specification recommends 121Ω, but it should be chosen to equal as closely as possible the characteristic impedance of the cable.

Important: Failing to fit terminating resistors correctly may result in unreliable operation.

For more information about cabling and terminators, refer to www.ODVA.org

Terminal Block (X40) Connections

X40 Pin Number	8903/DN Front View:	Designation	Wire Colour
1		V-	black
2		CAN_L	blue
3		Drain	(bare)
4		CAN_H	white
5		V+	red

NOTE *The connector conforms to the DeviceNet recommended terminal assignment.*

Setting MAC ID and Baud Rate

The DIP switches allow you to select 6 bits for the MAC ID and 2 bits for Baud Rate.

NOTE *If all 8 bits are in the ON position, MAC ID and Baud Rate are set by software. If the DSE DeviceNet function block is instantiated then this has precedence over the MMI.*

<table>
<tr><th>8903/DN
Front View</th><th>DIP
Switch</th><th>Binary
Value</th><th>Function</th><th colspan="2">Example</th></tr>
<tr><td rowspan="8">
</td><td>1</td><td>2^5</td><td rowspan="6">MAC ID
0 – 63</td><td>0 OFF</td><td rowspan="6">1</td></tr>
<tr><td>2</td><td>2^4</td><td>0 OFF</td></tr>
<tr><td>3</td><td>2^3</td><td>0 OFF</td></tr>
<tr><td>4</td><td>2^2</td><td>0 OFF</td></tr>
<tr><td>5</td><td>2^1</td><td>0 OFF</td></tr>
<tr><td>6</td><td>2^0</td><td>1 ON</td></tr>
<tr><td>7</td><td>2^1</td><td rowspan="2">Baud Rate</td><td>0</td><td rowspan="2">250 kBaud</td></tr>
<tr><td>8</td><td>2^0</td><td>1</td></tr>
</table>

DeviceNet Baud Rate Code	00	01	10	11
Baud Rate (Kbits/s)	125	250	500	not defined (125)

Drive Diagnostics

The DeviceNet MMI View

The following DeviceNet diagnostic parameters can be displayed on the MMI.

Parameter Descriptions

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

The Baudrate set by either the DIP switches 7 and 8 on the front of the DeviceNet Option or set by the DNET block in the DSE configuration.

Enumerated Value : BAUDRATE

0 : 125 KBaud
1 : 250 KBaud
2 : 500 KBaud

MAC ID *Read only* *Range: 1 - 63*

The DeviceNet node address set by DIP switches 1 to 6 on the front of the DeviceNet Option or set by the DNET block in the DSE configuration.

Note – if the MAC ID is zero, the connection to the network is disabled.

CONNECTION STATE *Read only* *Range: Enumerated - see below*

The state of the network connection.

Enumerated Value : CONNECTION STATE

0 : NON EXISTENT	
1 : SELF TESTING	
2 : STANDBY	
3 : OPERATIONAL	
4 : RECOVER FAULT	- recoverable fault
5 : UNRECOVER FAULT	- unrecoverable fault

DEVICE STATUS *Read only* *Range: Enumerated - see below*

The state of the DeviceNet Option.

Enumerated Value: DEVICE STATUS

0 : NO ERROR	
1 : OWNED	
2 : CONFIGURED	
3 : MINOR REC FAULT	- minor recoverable fault
4 : MINOR UNREC FLT	- minor unrecoverable fault
5 : MAJOR REC FAULT	- major recoverable fault
6 : MAJOR UNREC FLT	- major unrecoverable fault

Parameter Descriptions

HARDWARE *Read only* *Range: FALSE / TRUE*

Displays the method being used to set the node address and baudrate. If all the MAC ID and Baudrate Switches are set to ON, then the method is set by the DSE configuration, otherwise it is by hardware i.e. by the switches.

Enumerated Value : HARDWARE

0 : FALSE	Baudrate set by DSE configuration
1 : TRUE	Baudrate set by hardware

BAUDRATE SOFT *Read only* *Range: Enumerated - see below*

The Baudrate set by software, i.e. the DSE configuration.
(Functional when all the MAC ID and Baudrate Switches are set to ON).

Enumerated Value: BAUDRATE SOFT

0 : 125 kBaud
1 : 250 kBaud
2 : 500 kBaud

MAC ID SOFT *Read only* *Range: 1 to 63*

The MAC ID set by software, i.e. by the DSE configuration.
(Functional when all the MAC ID and Baudrate Switches are set to ON).

Configuring the DeviceNet System

To configure the DeviceNet system, complete the steps below:

Step 1: Configuring the DeviceNet Option using DSE

Step 1.1: Inserting a DeviceNet Function Block

Display your configuration page. Click on the Block menu at the top of the screen.

1. Move the cursor down to select "890 Comms" and select "DeviceNet".
2. Click to select the DeviceNet block. Move this to where you want on the screen then click again to place the block.

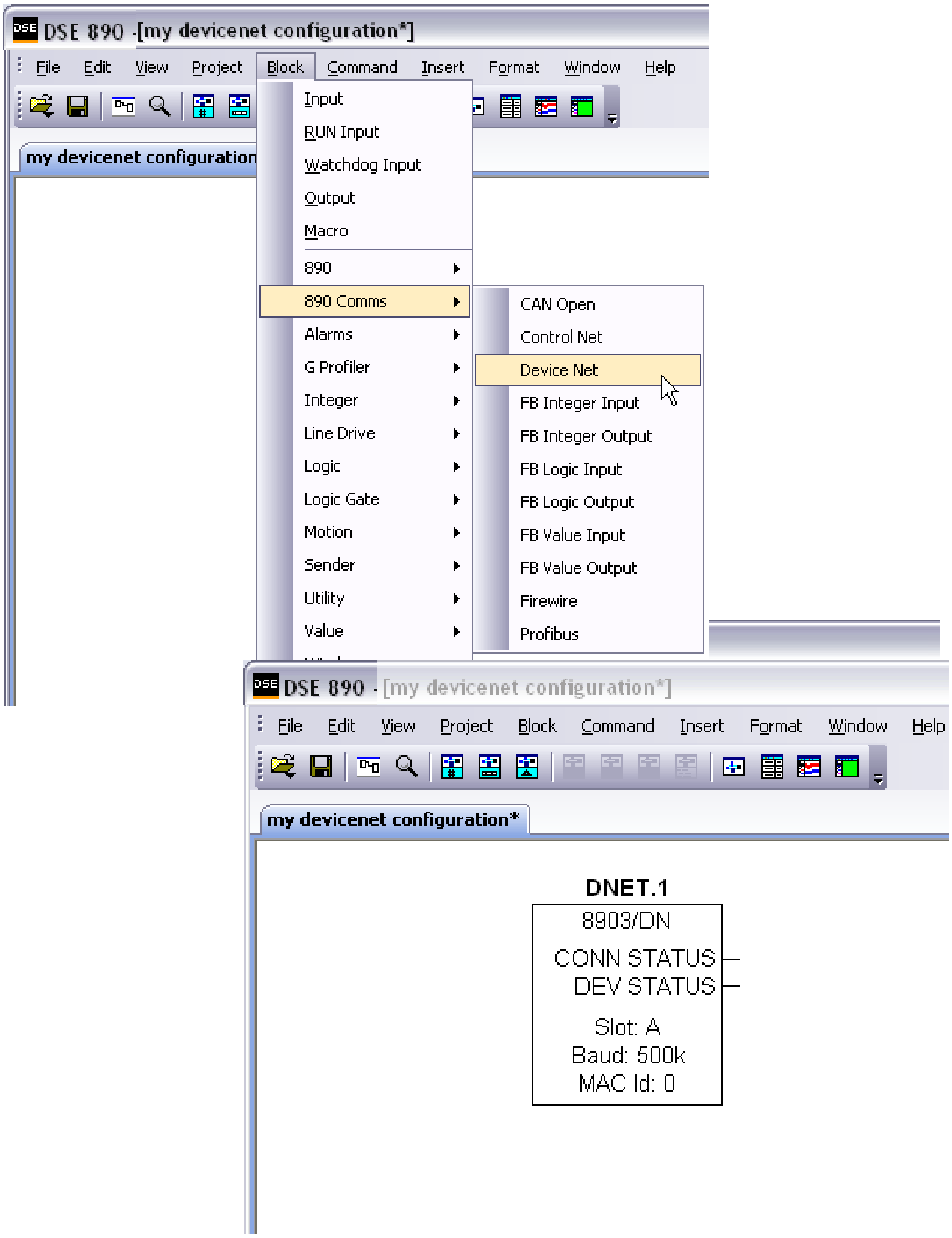


Figure 8. Configuration showing DNET function block

Step 1.2: Attaching Fieldbus Connectors

Seven feldbus connector types are available:

FB Logic Input	FB Integer Input	FB Value Input	
FB Logic Output	FB Integer Output	FB Value Output	FB Val to Int Output

Input connector : the data is sent from PLC → 890

Output connector : the data is sent from 890 → PLC

The fieldbus connectors must be added before they will appear in the DeviceNet function block.

NOTE *The function block and connectors can be renamed by using the right mouse button and selecting **Rename Block**.*

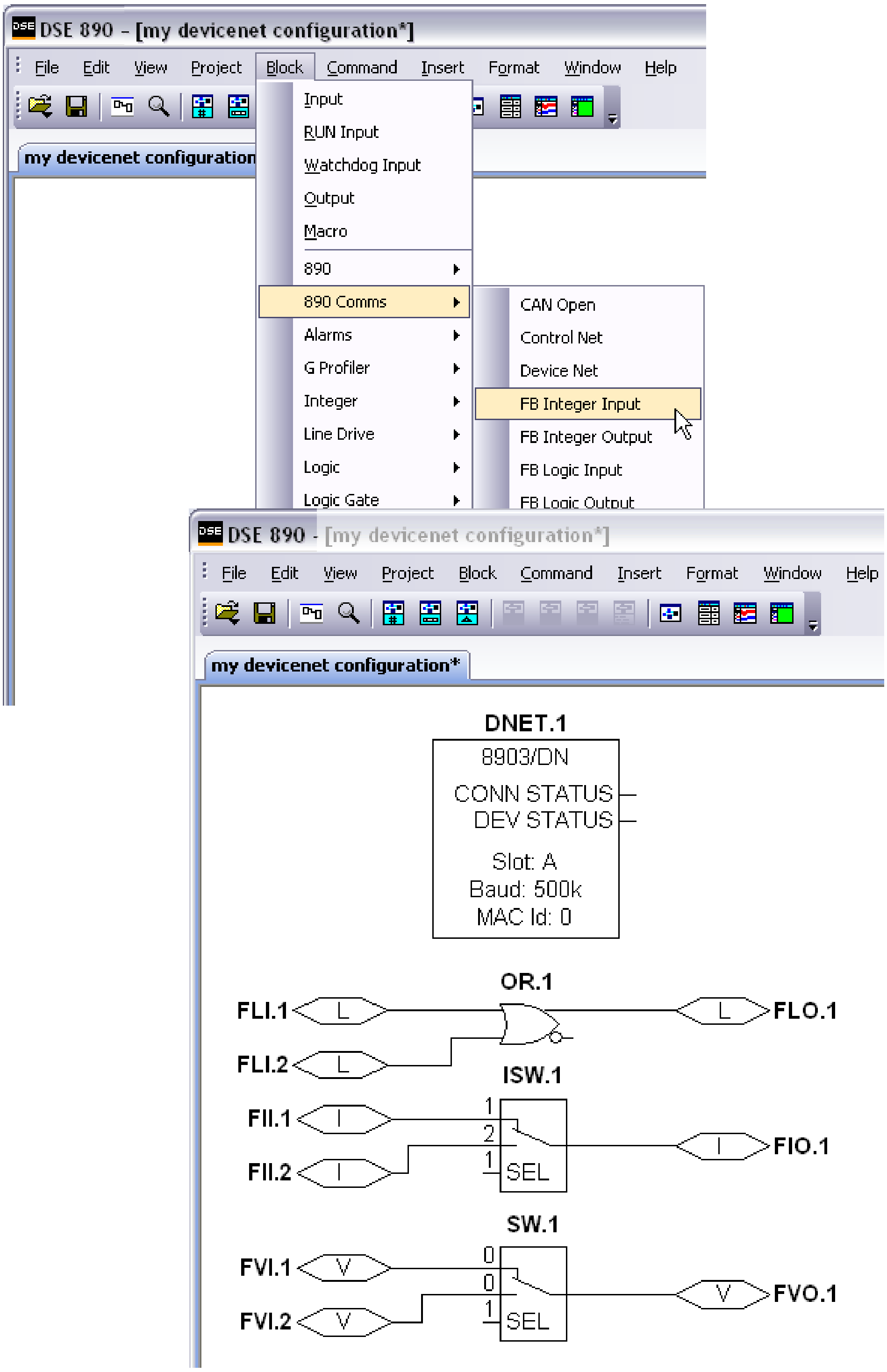
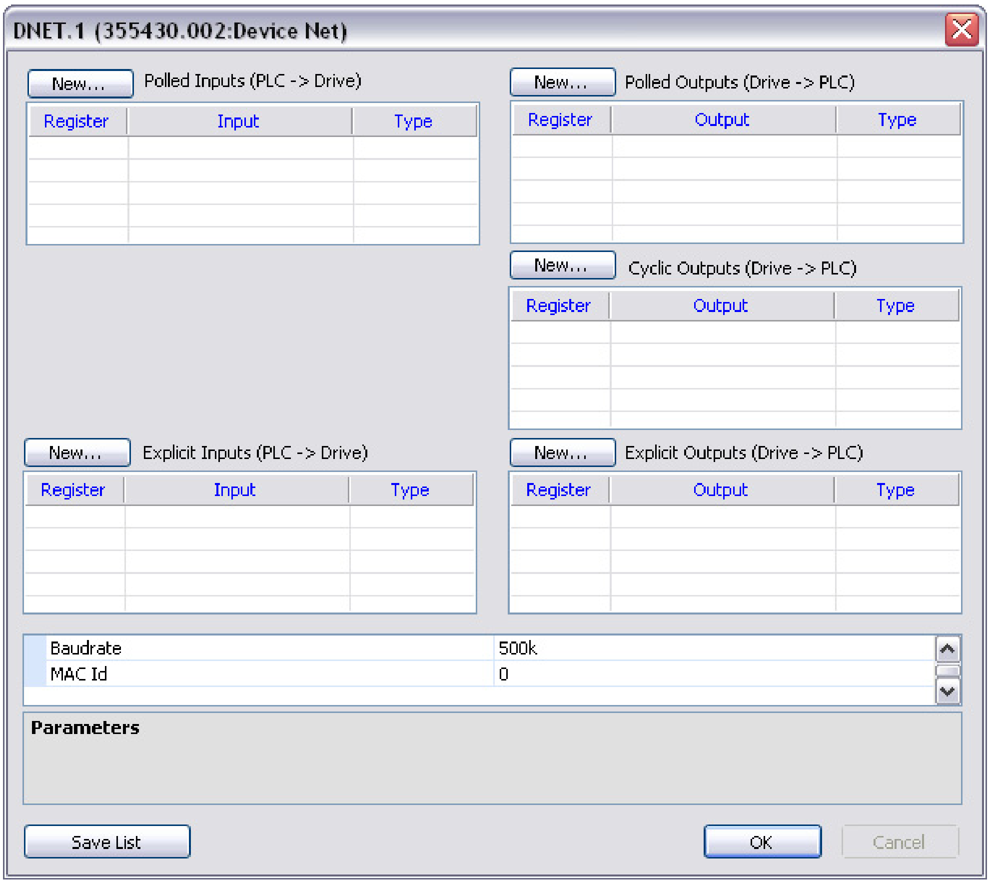


Figure 9. Configuration showing DNET function block and Fieldbus Connectors

Step 1.3: Configuring the Fieldbus Connectors

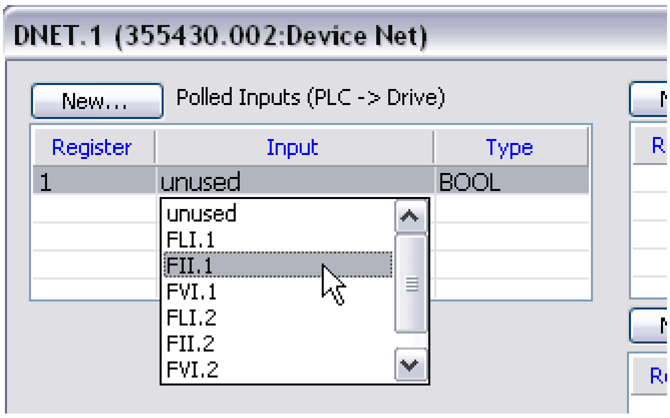
Double-click on the function block to display the dialog below. The fieldbus connectors (inputs and outputs) are assignable in the function block along with their data type to/from the PLC. The Baudrate and MAC Id can also be selected.



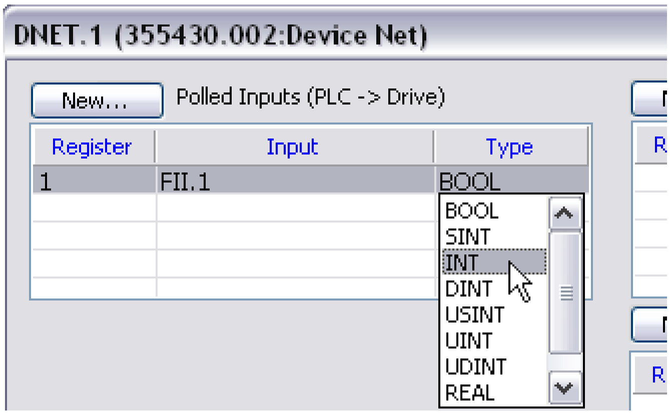
An Input may be configured to be either Polled or Explicit. An Output may be configured to be either Polled, COS/Cyclic or Explicit.

To configure the input and output connectors you have placed in the configuration:

1. Click on New... above the list that the Input or Output is to be added. A new entry will then appear in the list which then needs to be customised.
2. Click on "unused". Select the required input/output connector for this Register. For example below, the possible fieldbus selections that have been placed in the configuration: FII.1 (**F**ieldbus **I**nteger **I**nput 1), FLI.1 (**F**ieldbus **L**ogic **I**nput **1**), FVI.1 (**F**ieldbus **V**alue **I**nput **1**) etc.



3. Click in the **Type** field to choose the required PLC type on Register 1, for example.



4. Set up all the input/output registers in a similar way.
5. Right click on a row to insert, move or delete a register.
6. The Baudrate can be selected to be 125k, 250k or 500k.
7. The MAC Id can be selected in the range 0 – 125.

NOTE *The Baudrate and MAC Id set in DSE will only be used if all the switches on the DeviceNet Option are set to ON.*
If the software set MAC Id is set to zero and the switches on the DeviceNet Option are all set to ON, the option is disabled and will not appear on the DeviceNet network.

DSE Data Types

Data Type	Description	Range
LOGIC	Logic	False (F) and True (T)
INTEGER	32-bit signed integer	-2,147,483,648 to 2,147,483,647
VALUE	32-bit fixed point value	-32768.0 to 32767.9999

DeviceNet PLC Data Types

Data Type	Description	Range	PLC Size
BOOL	8-bit Boolean	False (0x00) and True (0x01)	1 byte
SINT	8-bit signed integer	-128 to 127	1 byte
INT	16-bit signed integer	-32,768 to 32,767	2 bytes
DINT	32-bit signed integer	-2,147,438,648 to 2,147,483,647	4 bytes
USINT	8-bit unsigned integer	0 to 255	1 byte
UINT	16-bit unsigned integer	0 to 65,535	2 bytes
UDINT	32-bit unsigned integer	0 to 4,294,967,295	4 bytes
REAL	32-bit IEEE-754 floating-point value	1.19209290e-38 to 3.4028235e+38	4 bytes

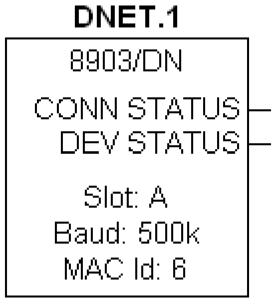
Conversion of DSE Type < > DeviceNet Type

The DSE fieldbus connectors are each assigned a DeviceNet PLC "Type" as described in "Step 1.3: Configuring the Fieldbus Connectors" on page 12. The conversion between the DSE type and the PLC type is performed automatically (refer to Appendix B : DSE/DeviceNet Conversion Rules, page 26).

Any PLC type can be assigned to a fieldbus connector

DeviceNet Status Information

The DeviceNet function block in DSE provides status information about the DeviceNet network interface.



When online, the *actual* MAC Id in use can be found by clicking the right mouse button over the “MAC Id:” text and selecting **Get**. This may be different to the MAC Id set in the function block configuration if the switches on the Option have set the Address.

The function block also provides two status outputs that can be wired to: CONN STATUS and DEV STATUS.

CONN STATUS

Enumerated value: 0: NON EXISTENT
1: DEVICE SELF TESTING
2: STANDBY
3: OPERATIONAL
4: MAJOR RECOVERABLE FAULT
5: MAJOR UNRECOVERABLE FAULT

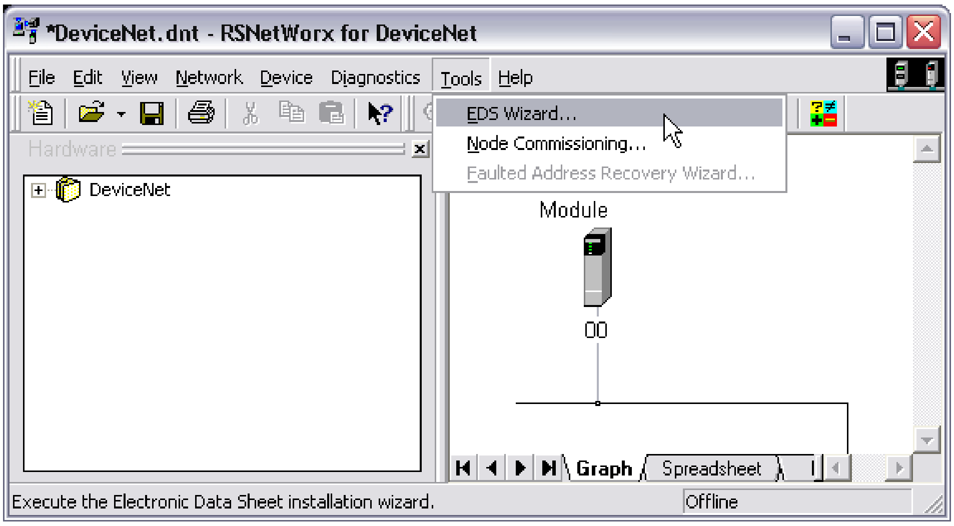
DEV STATUS

Enumerated value: 0: NO ERROR
1: OWNED
2: CONFIGURED
3: MINOR RECOVERABLE FAULT
4: MINOR UNRECOVERABLE FAULT
5: MAJOR RECOVERABLE FAULT
6: MAJOR RECOVERABLE FAULT

Step 2: Configuring the PLC/SCADA Supervisor

NOTE *This example uses the Allen Bradley RSNetWorx for DeviceNet. For other systems, refer to the manufacturer's instructions.*

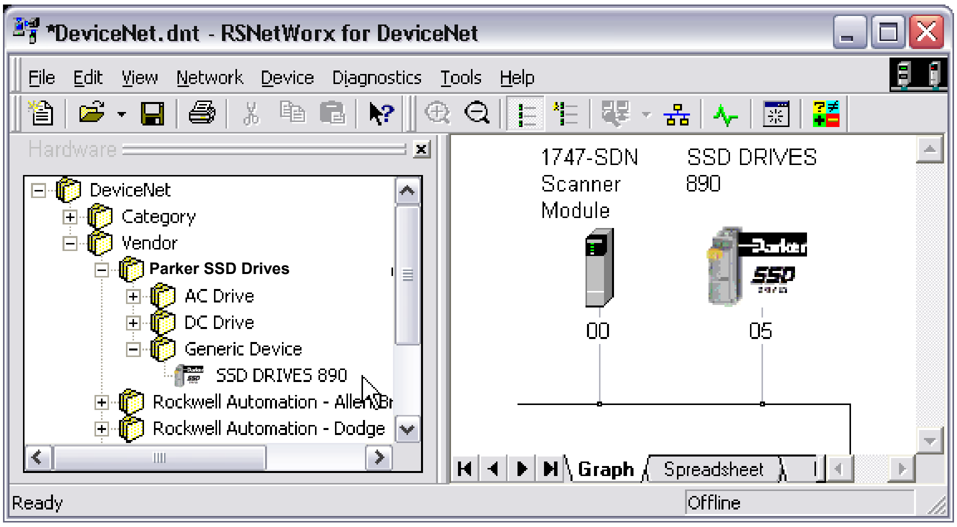
1. Import the EDS file and graphic icon for the 890 using the RSNetWorx EDS Wizard.



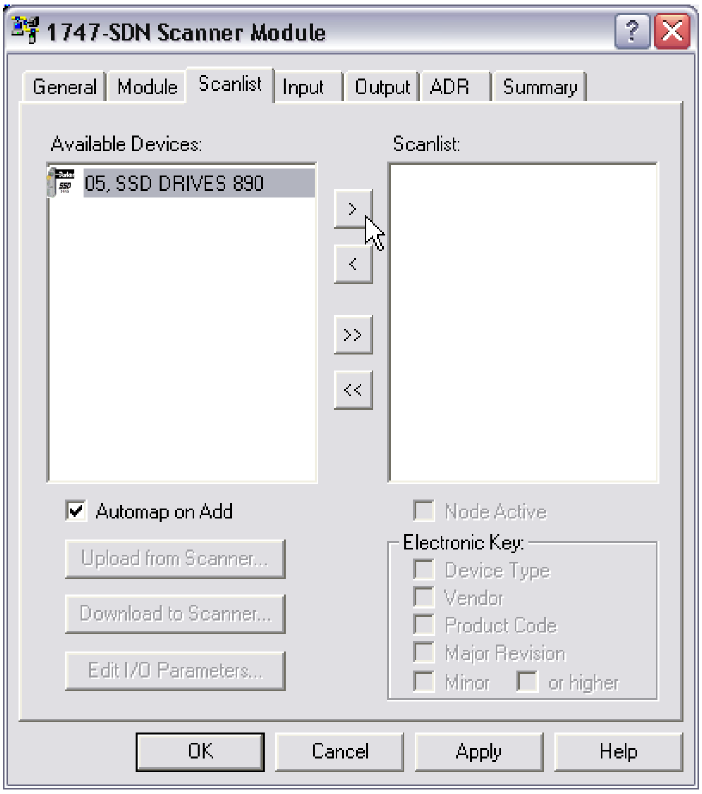
These files to select are:
dn_890.eds
dn_890.ico
and can be downloaded from www.ssddrives.com

The 890 is added into the **Generic** category.

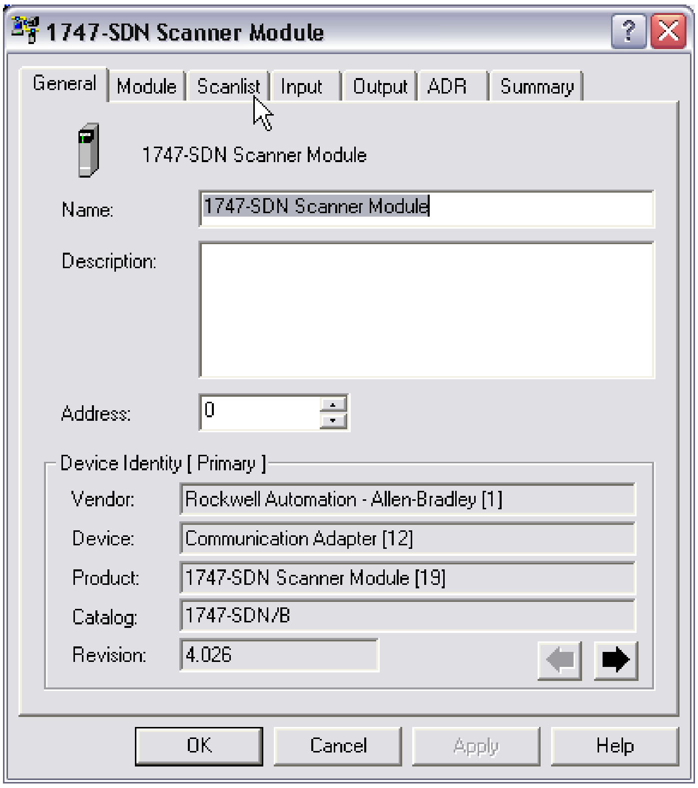
2. Select with the mouse and drag across to the network window, then click on new node to set the required MAC Id.



Make a connection between the scanner and the drive. Double click on the icon for the scanner node:

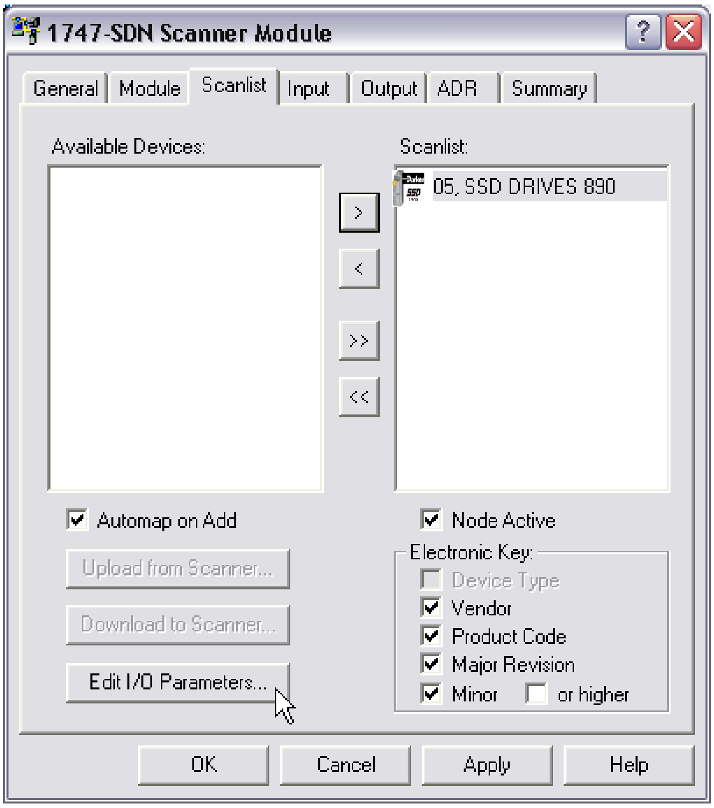


Now click on the Scanlist tab:

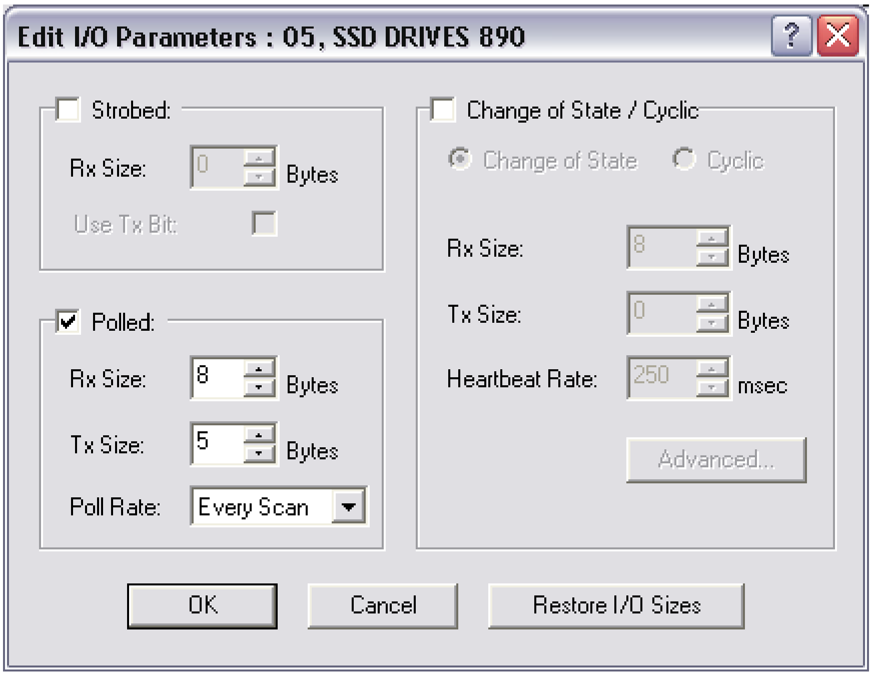


The left-hand window shows a list of devices which can be connected. The right-hand window shows a list of devices currently connected. To connect the 890 drive at at address 05, select it, as shown, and then click >.

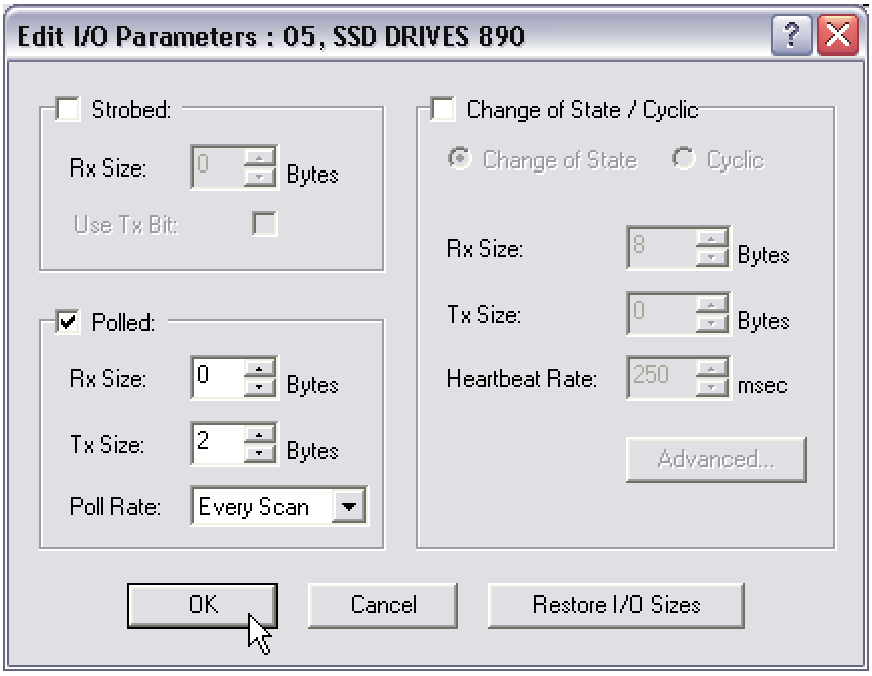
The 890 drive moves to the right-hand window:



Now click on Edit I/O Parameters to specify the number of bytes to be transferred:

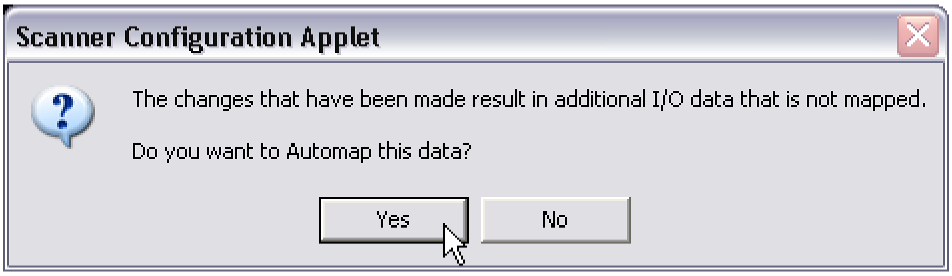


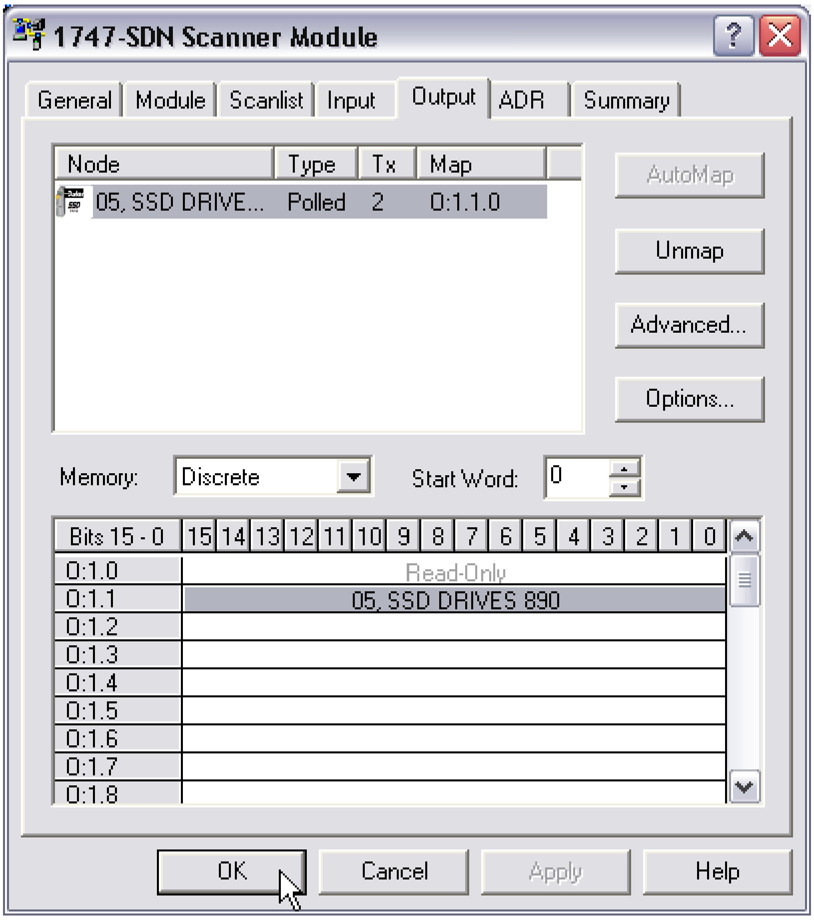
The default configuration specified in the EDS file selects Polled I/O with 8 Input bytes and 5 Output bytes. This needs to be change to what is required. For example, if Polled I/O is required with just 2 Output bytes, then enter as below:



Click OK. Confirm the following two warnings:

Click on the Output tab to view the mapping:

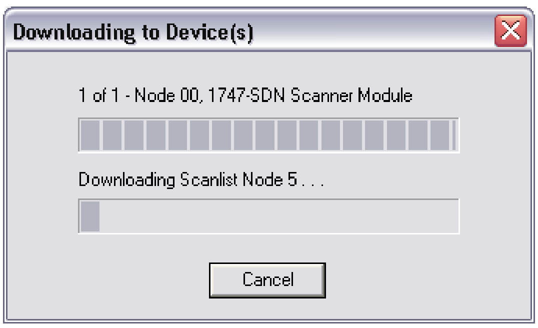




Click OK.

4. Download the completed configuration into the PLC, ensure that the PLC is in the PROG mode. For example, the SLC-500 has a keyswitch to select this. Then go online to the DeviceNet network by clicking the Online button:

   The system will scan the online network and add a status flag against each device as appropriate. From the Network menu, select Download to Network. Confirm this when prompted and then the status indicator will show download progress:



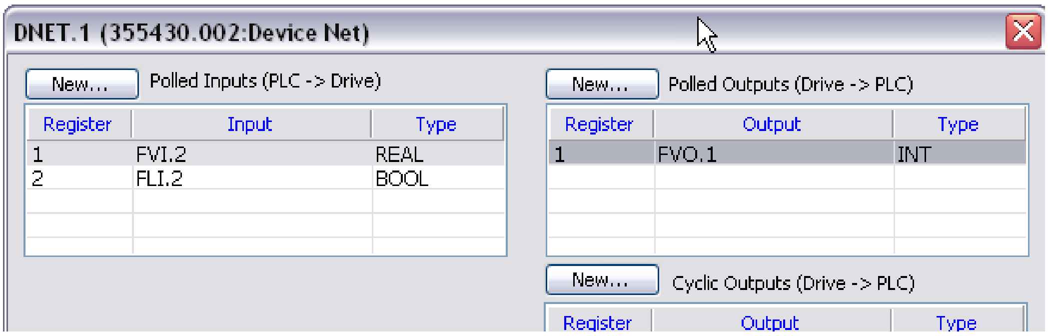
When the download is complete, the PLC will save the new configuration. Now switch the PLC to RUN mode. Data will start being transferred between PLC and drive. Configuration of the scanner is now complete.

20

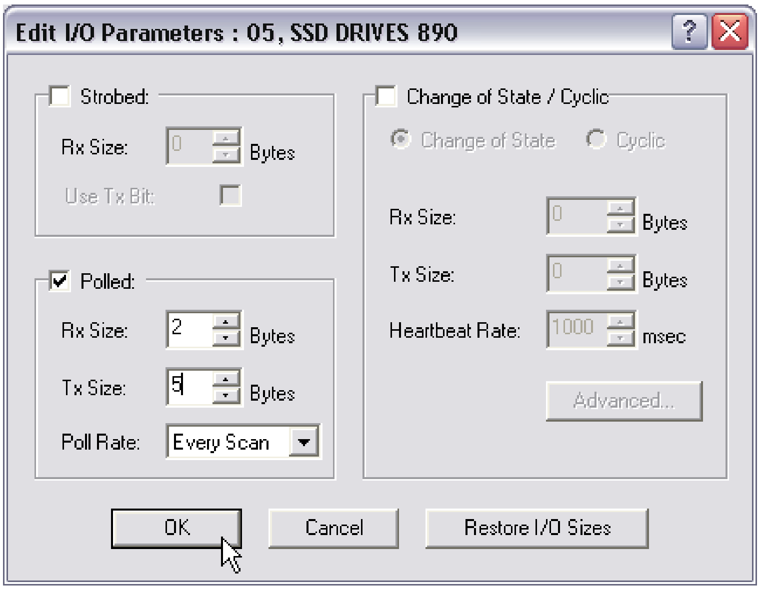
Polled Inputs and Outputs

The Poll command is a message that is transmitted by the Master. It is directed towards a single, specific Slave (point-to-point connection). A master must transmit a separate Poll message for each one of its Slaves that are to be polled. The Poll-Response is an I/O message that the Slave transmits back to the master when the Poll Command is received. Within the Slave the two messages are received/transmitted by a single Connection Object. It can be considered to be a data-exchange.

The 890 supports a single Assembly Object for Polled I/O. This is configured using DSE.



The example above defines an Assembly Object consisting of 2 Input registers and 1 Output register. The input size is 5 bytes (4 + 1) and the output size is 2. The matching PLC configuration is:



If the DSE configuration does not contain a DNET function block, the Assembly Object defaults are:

Polled Inputs, size 5 bytes

Byte	Parameter	Data Format
0, 1, 2, 3	REFERENCE::REMOTE SETPOINT (PREF 101.01)	IEEE-754 32-bit floating point
4	REFERENCE::REVERSE (PREF 101.11)	0x00 = FALSE, 0x01 = TRUE

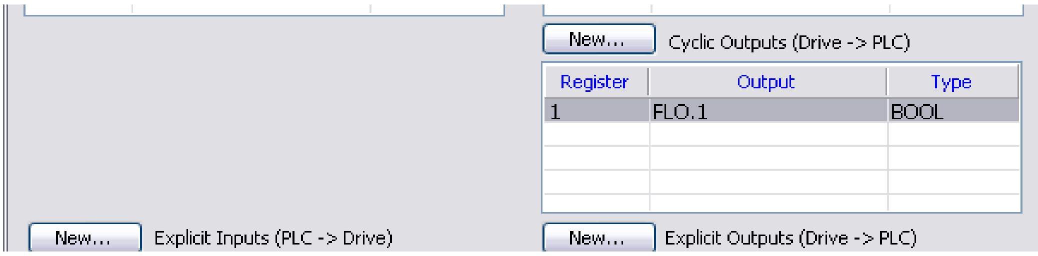
Polled Outputs, size 8 bytes

Byte	Parameter	Data Format
0, 1, 2, 3	FEEDBACKS::DC LINK VOLTS (PREF 70.02)	IEEE-754 32-bit floating point
4, 5, 6, 7	FEEDBACKS::SPEED FBK RPM (PREF 70.04)	IEEE-754 32-bit floating point

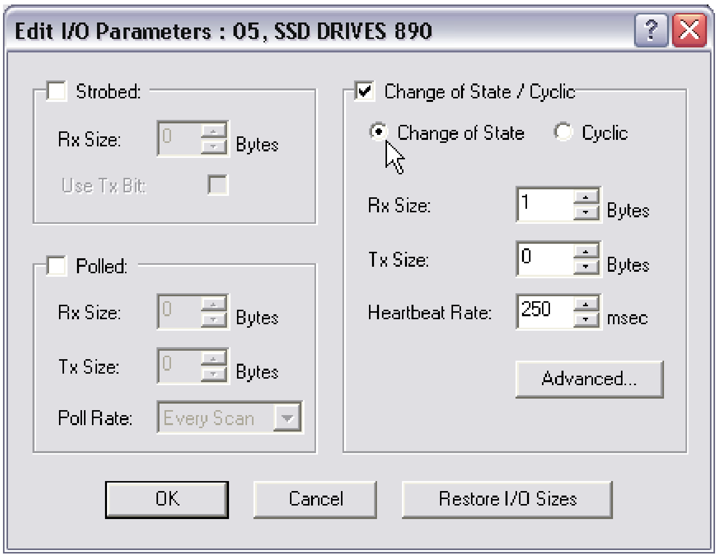
Change Of State (COS) and Cyclic Outputs

A device only sends a Change of State (COS) / Cyclic Output message when either data has changed or after a pre-defined timer expiry (heartbeat). Both the mode and cycle time are defined by the PLC.

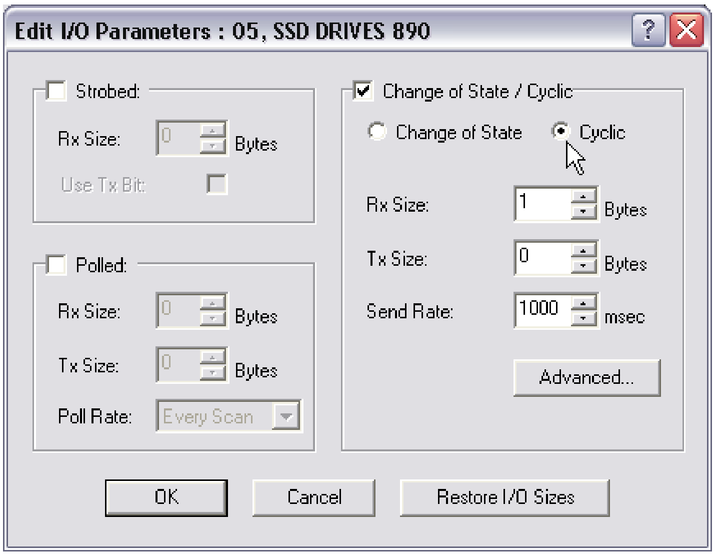
The 890 supports a single Assembly Object for COS / Cyclic Output. This is configured using DSE.



The example above defines an Assembly Object consisting of 1 Output register. The output size is 1. The matching PLC configuration is, for Change of State:



If the DSE configuration does not contain a DNET function block, the Assembly Object defaults are the same as for Polled Outputs.



Explicit Messaging

Through explicit messaging, the DeviceNet option provides the ability to access parameters within the 890 drive.

Explicit messages are identified by a class number, instance number and attribute number.

The Write and Read access is possible with the DeviceNet Common services:

Get_Attribute_Single (Read)

Set_Attribute_Single (Write)

Two vendor specific class, 0x64 and 0x65, are provided to allow access to 890 fixed parameters and user defined registers.

The following class numbers are supported:

Class Number	Name	Instance(s)	Attribute(s)	Description
0x01	Identity Object	0x01	0x01 to 0x08	Provides identification of and general information about the drive
0x03	DeviceNet Object	0x01	0x01 to 0x09	Provides information about the drive
0x04	Assembly Object	0x65, (101) 0x66, (102) 0x68, (104)	0x03	Pre-defined assembly objects used for Polled and Cyclic IO Instance = 0x64 Polled Inputs 0x65 Polled Outputs 0x68 Cyclic Outputs
0x64, (100)	Fixed Parameter Set Object	0x01 to 0xFF (1 to 255)	0x01 to 0x1F (1 – 31)	Fixed Parameter Set of the 890 drive. Instance = Block ID Attribute = Parameter Number
0x65, (101)	User Defined Register Set Object	0x01 to 0x05	1 - 255	User Defined Input and Output Registers. Instance = 1 Explicit Inputs 2 Explicit Outputs 3 Polled Inputs 4 Polled Outputs 5 COS/Cyclic Outputs

Assembly Object

Class 0x04, Instances 0x64, 0x65, 0x68, Attribute 0x03

The Assembly Object provides access to Polled Inputs, Polled Outputs and Cyclic Outputs.

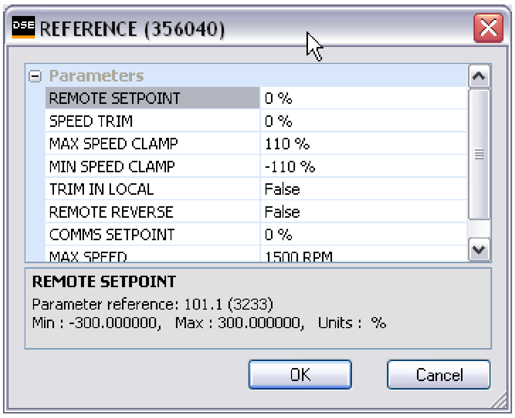
Fixed Parameter Set Object

Class 0x64, Instances 0x01 to 0xFF, Attributes 0x01 to 0x1F

The Fixed Parameter Set Object provides access to parameters that are always present in the 890. They can be found in the Motor Control macro block in the DSE Configuration.

The Instance and Attribute numbers for the required parameter can be derived from its unique PREF. This can be found using DSE, in the 890 Product Engineering Manual or by using the 6901 Operator Station. The PREF has the format XX.YY, where XX is the Block Id and YY is the Parameter Number within the block. The Instance is the same as the Block Id and the

Attribute is the same as the Parameter Number. For example, REFERENCE::REMOTE SETPOINT has PREF 101.01, so Instance is 100 (0x64) and Attribute is 1.



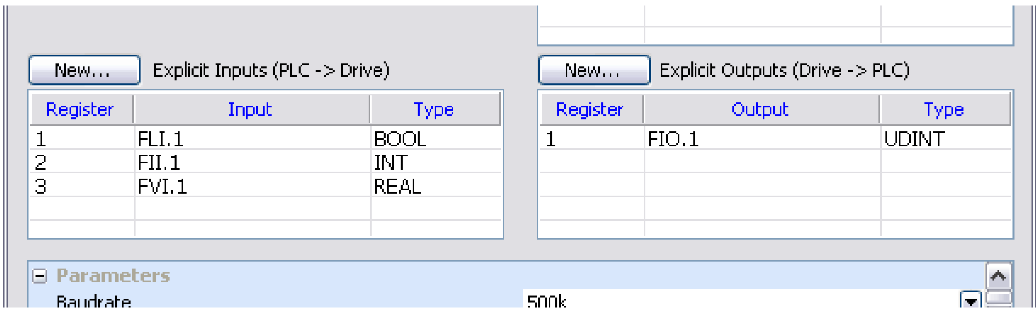
The Data Format for this object is fixed as follows:

Data Type	Data Format	PLC Size
BOOL	0x00 = FALSE, 0x01 = TRUE	1 byte
INTEGER	32-bit signed integer	4 bytes
REAL	IEEE-754 32-bit floating point	4 bytes

User Defined Register Set Object

Class 0x65, Instances 0x01 to 0x05, Attributes 0x01 to 0xFF

The User Defined Register Set Object provides access to the registers as declared in the DSE configuration. Each register is mapped to be a Polled Input, Polled Output, Cyclic Output, Explicit Input or Explicit Output. Also, its size and encoding are selected.



The Instance number selects either Input or Output register and the Attribute is the number of the Register within that address space. Instance 1 contains all of the Explicit Input registers and Instance 2 contains all of the Explicit Output Registers.

In the example above, the User Defined register FII.1 is read and written using Class 0x65, Instance 1 and Attribute 2. It is type INT, so will be transferred as 2 bytes. The User Defined register FIO.1 is read using Class 0x65, Instance 2, Attribute 1. It is type UDINT, so will be transferred as 4 bytes.

Instances 3, 4 and 5 can be used to read registers mapped as Polled Input, Polled Output and COS/Cyclic Output.

Identity Object

Class 0x01, Instance 0x01

Attribute Number	Attribute Name	Attribute Value	Description
1	VENDOR ID	0x0261 (609)	PARKER SSD DRIVES Vendor ID managed by the ODVA
2	DEVICE TYPE	0x0000	GENERIC DEVICE
3	PRODUCT CODE	0x8903	890 DeviceNet Product number
4	REVISION MAJOR	1	Major Revision Number
	MINOR	1	Minor Revision Number
5	Status	WORD	Device Status: NO ERROR all Bit's = 0 BIT 0 = OWNED BIT 2 = CONFIGURED BIT 8 = MINOR RECOVERABLE FAULT BIT 9 = MINOR UNRECOVERABLE FAULT BIT 10 = MAJOR RECOVERABLE FAULT BIT 11 = MAJOR UNRECOVERABLE FAULT
6	Serial Number	UDINT	
7	Product Name	STRING	"SSD DRIVES-AC8903/DN"
8	State	USINT 0 1 2 3 4 5	CONNECTION state: = NON EXISTENT = DEVICE SELF TESTING = STANDBY = OPERATIONAL = MAJOR RECOVERABLE FAULT = MAJOR UNRECOVERABLE FAULT

DeviceNet Object

Class 0x03, Instance 0x01

Attribute Number	Attribute Name	Attribute Value	Description
1	MAC ID	USINT	Node Address
2	Baud Rate	USINT	Baud Rate
3	BOI	BOOL	Bus Off Interrupt
4	Bus-Off Counter	USINT	Number of times CAN went to BUS off state
5	Allocation Information	BYTE	Allocation Choice Byte 00h default
		USINT	MAC ID of Master 0FFh default
6	MAC ID Switch changed	BOOL	1 = Change since last Reset or Power up
7	Baud Rate Switch changed	BOOL	1 = Change since last Reset or Power up
8	MAC ID Switch Value	USINT	Actual value of Node Address Switches 0-63
9	Baud Rate Switch Value	USINT	Actual value of Baud Rate Switches 0-2

Appendix A : Troubleshooting

890 DeviceNet Option Status LEDs

At power-on, the first action is an LED Test for both LED's:

Green ON
Red ON
Green ON

Colour	LED Indication	Description
MODULE LED		
OFF	OFF	**No Power**
GREEN	ON	**Device operational**
GREEN/OFF	FLASH	**Device in Stand by**
RED	ON	**Unrecoverable Fault**
RED/OFF	FLASH	**Recoverable Fault**
NETWORK LED		
OFF	OFF	**No Power**
GREEN	ON	**Online, Connected**
GREEN/OFF	FLASH	**Online, Not Connected**
RED	ON	**Critical Link Failure**
RED/OFF	FLASH	**Connection Time-Out**

Appendix B : DSE/DeviceNet Conversion Rules

The rules governing the conversion between 890 data types and DeviceNet PLC data types are given below. Note carefully that some conversions will result in rounding, limiting and truncation of the original value.

LOGIC Type Connector

	Data from PLC	Data to 890
From BOOL to LOGIC	False True	False True
From SINT to LOGIC	Zero Non-zero	False True
From INT to LOGIC	Zero Non-zero	False True
From DINT to LOGIC	Zero Non-zero	False True
From USINT to LOGIC	Zero Non-zero	False True
From UINT to LOGIC	Zero Non-zero	False True
From UDINT to LOGIC	Zero Non-zero	False True
From REAL to LOGIC	Zero Non-zero	False True

	Data from 890	Data to PLC
From LOGIC to BOOL	False True	False True
From LOGIC to SINT	False True	0 1
From LOGIC to INT	False True	0 1
From LOGIC to DINT	False True	0 1
From LOGIC to USINT	False True	0 1
From LOGIC to UINT	False True	0 1
From LOGIC to UDINT	False True	0 1
From LOGIC to REAL	False True	0.0 1.0

INTEGER Type Connector

	Data from PLC	Data to 890
From BOOL to INTEGER	False True	0x0000 0000 0x0000 0001
From SINT to INTEGER	-128 to 127	-128 to 127
From INT to INTEGER	-32,768 to 32,767	-32,768 to 32,767
From DINT to INTEGER	-2,147,483,648 to 2,147,483,547	-2,147,483,648 to 2,147,483,547
From USINT to INTEGER	0 to 255	0 to 255
From UINT to INTEGER	0 to 65,535	0 to 65,535
From UDINT to INTEGER	0 to 4,294,967,295	0 to 2,147,483,647 limits apply
From REAL to INTEGER	32-bit IEEE floating-point	-2,147,483,648 to 2,147,483,547 Fractional part rounded

	Data from 890	Data to PLC
From INTEGER to BOOL	Zero Non-zero	True False
From INTEGER to SINT	-2,147,483,648 to 2,147,483,647	-128 to 127 limits apply
From INTEGER to INT	-2,147,483,648 to 2,147,483,647	-32768 to 32767 limits apply
From INTEGER to DINT	-2,147,483,648 to 2,147,483,647	-2,147,483,648 to 2,147,483,647
From INTEGER to USINT	-2,147,483,648 to 2,147,483,647	0 to 255 limits apply
From INTEGER to UINT	-2,147,483,648 to 2,147,483,647	0 to 65,535 limits apply
From INTEGER to UDINT	-2,147,483,648 to 2,147,483,647	0 to 2,147,483,647 limits apply
From INTEGER to REAL	-2,147,483,648 to 2,147,483,647	32-bit IEEE floating-point

VALUE Type Connector

	Data from PLC	Data to 890
From BOOL to VALUE	False True	0.0 1.0
From SINT to VALUE	-128 to 127	-128.0 to 127.0
From INT to VALUE	-32,768 to 32,767	-32,768.0 to 32,767.0
From DINT to VALUE	-2,147,483,648 to 2,147,483,547	-32,768.0 to 32,767.0 limits apply
From USINT to VALUE	0 to 255	0.0 to 255.0
From UINT to VALUE	0 to 65,535	0.0 to 32,767.0 limits apply
From UDINT to VALUE	0 to 4,294,967,295	0.0 to 32,767.0 limits apply
From REAL to VALUE	32-bit IEEE floating-point	-32,768.0 to 32,767.9999

	Data from 890	Data to PLC
From VALUE to BOOL	Zero Non-zero	False True
From VALUE to SINT	-32,768.0 to 32,767.9999	-128 to 127 limits apply/ rounding applies
From VALUE to INT	-32,768.0 to 32,767.9999	-32,768 to 32,767 limits apply/ rounding applies
From VALUE to DINT	-32,768.0 to 32,767.9999	-32768 to 32,767 limits apply/ rounding applies
From VALUE to USINT	-32,768.0 to 32,767.9999	0 to 255 limits apply/ rounding applies
From VALUE to UINT	-32,768.0 to 32,767.9999	0 to 32767 limits apply/ rounding applies
From VALUE to UDINT	-32,768.0 to 32,767.9999	0 to 32767 limits apply/ rounding applies
From VALUE to REAL	-32,768.0 to 32,767.9999	32-bit IEEE floating-point

ISS.	MODIFICATION	ECN No.	DATE	DRAWN	CHK'D
1	Initial Issue (HA469264U001)	17320	21/03/06	CM	KJ
2	Company name change. DSE configuration added.	19591	14/03/07	CM	KJ
3	Updated Warranty information and conditions of sale. Photos and screenshots updated. Standardised Safety pages over 3 pages. Product Code – added new coding. Replaced TechCard with Option and Replaced DSE 890 with DSE. Page 12 Replaced six with seven and added FB Val to Int Output. Other minor corrections and amendments.	(20358) 20814	12 Feb 09	FEP	MF

FIRST USED ON	MODIFICATION RECORD DeviceNet Communications Interface	
Parker	DRAWING NUMBER ZZ469264C001	SHT. 1 OF 1