FD67 QUICK START GUIDE

DEVICENET

FD67 Quickstart guide.

DeviceNet

The FD67 system consists of a Fieldbus node to which can be connected up to 16 Input / output modules via system communication cables.
Each system communication line can be connected to up to 4 I/O modules and can be a maximum 5 metres long.
This gives a total of 256 I/O connected to one node.
Up to 4 analogue I/O modules may be connected to each node.

Assembly.

Mount the node in a convenient position and connect the required I/O modules using system cables. Connect the node power cable to a suitable 24v DC supply but do not turn power on yet.

The power cable connections are …

Pin number	Function	Wire number & colour
Pin 1	0v	Black 1
Pin 2	0v	Black 2
Pin 3	PE	Green/Yellow
Pin 4	Sensor & Bus supply +24v	Black 3
Pin 5	Actuator supply +24v	Black 4

The power connections for DeviceNet FD67 are split over the bus supply and sensor/actuator supply.
Power for the node is taken from the DeviceNet connection V- & V+ and power for the I/O modules is taken from the sensor supply to the 7/8" main power connector.

The I/O modules are connected to the node using system cables.
 The maximum length of one system communication line is 5 metres with up to 4 I/O modules per line.
Analogue modules have to be fitted at the end of a line because they only have an incoming connector.
Terminating resistor plugs must be fitted in the outgoing system connector on each line (except where analogue modules are fitted).

Remove the three screws from the node top cover and set the node address on the switches provided. Each node on a DeviceNet network requires a unique address. Addresses in the range 0-63 can be used.

The baud rate can be set on the third switch at this time, settings are
        0 = 125k baud
        1 = 250k baud
        2 = 500k baud
        All other positions = 125k baud.

The Fieldbus cable may be connected at this point.
Standard DeviceNet M12 connections for field wireable connectors are

Pin 1 Bus screen
Pin 2 V+ (24vDC bus node supply Red)
Pin 3 V- (0v bus node supply   Black)
Pin 4 CAN_H (White)
Pin 5 CAN_L (Blue)

Replace the cover and apply power to the node (sensor, network and optionally actuator supplies) The LEDs on the I/O modules will flash and eventually stabilise with the 'Us' and 'Ua' LEDs on all modules GREEN
The 'Ua' LEDs indicate that Actuator supply is present and above 18 volts.
If the actuator supply is not connected at this point then 'Ua' LEDs will be off.
All '1' LEDs on M12 DIO modules will be RED because the default I/O configuration for these modules is diagnostics on pin 2 of the M12 connector and is indicating an open circuit. If "Desina" sensors with diagnostic functions have been fitted at this stage then the red indication may not be present.

The system is now ready for configuration.

Configuration

For an Allen Bradley (Rockwell) SLC500 PLC with 1747-SDN scanner using RSNetworx software the process is as follows.

If configuring on-line then run RSLinx software and configure the connection to DeviceNet – remember to set the correct baud rate.
Minimise the RSLinx screen and open RSNetworx.
Configuration of an FD67 system can be performed on or off-line but the settings must be downloaded to the nodes on-line before they can be used (unless the default setting is acceptable).

Before an FD67 system can be configured the .EDS file needs to be loaded into the product catalogue,
Run the EDS wizard from the menu "Tools – EDS wizard – Register an EDS file – Register a directory of EDS files " Set the path to the directory containing the EDS files and follow the wizard's instructions.

The FD67 entry should now appear in the catalogue section "Vendor, IMI Norgren Limited, General purpose discrete I/O, Norgren FD67 BN"
Only the node is shown in the catalogue at this stage.

Configuration Off-Line

The scanner and communications adapter can be dragged & dropped from the "category" section of the catalogue to the bus line and their addresses can be set.

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To add an FD67 node it is dragged from the vendor section and dropped on to the bus. The address that was set on the switches can be entered at this stage.

Double click on the node to open up the configuration box for that node.

The "Module configuration" tab is selected and consists of a catalog of FD67 I/O modules on the left side and a 16-slot table on the right.

Starting at system port 0 of the node drag & Drop the first I/O module that is connected to the node from the catalogue to the table slot 0. Working along the system lines and around the ports add the remaining modules in the order that they are connected.
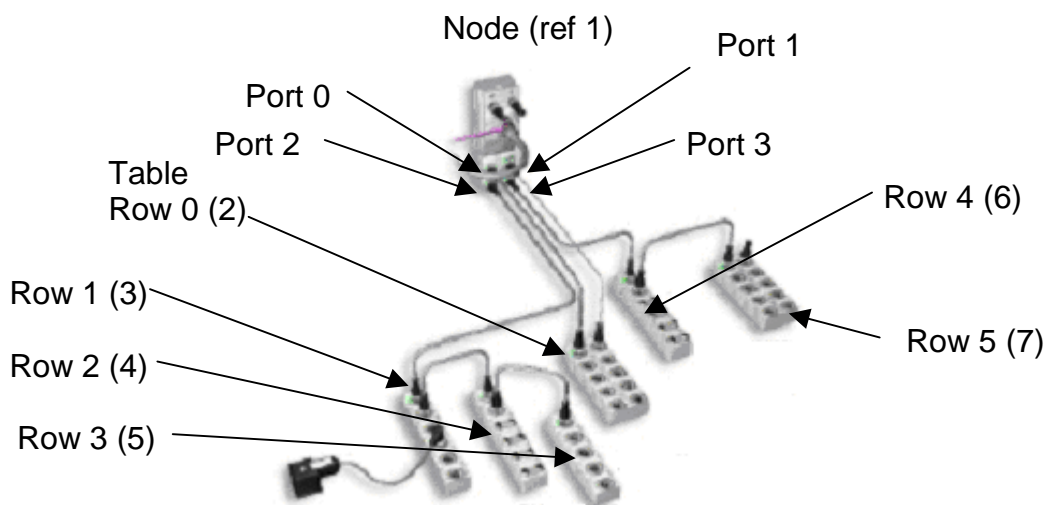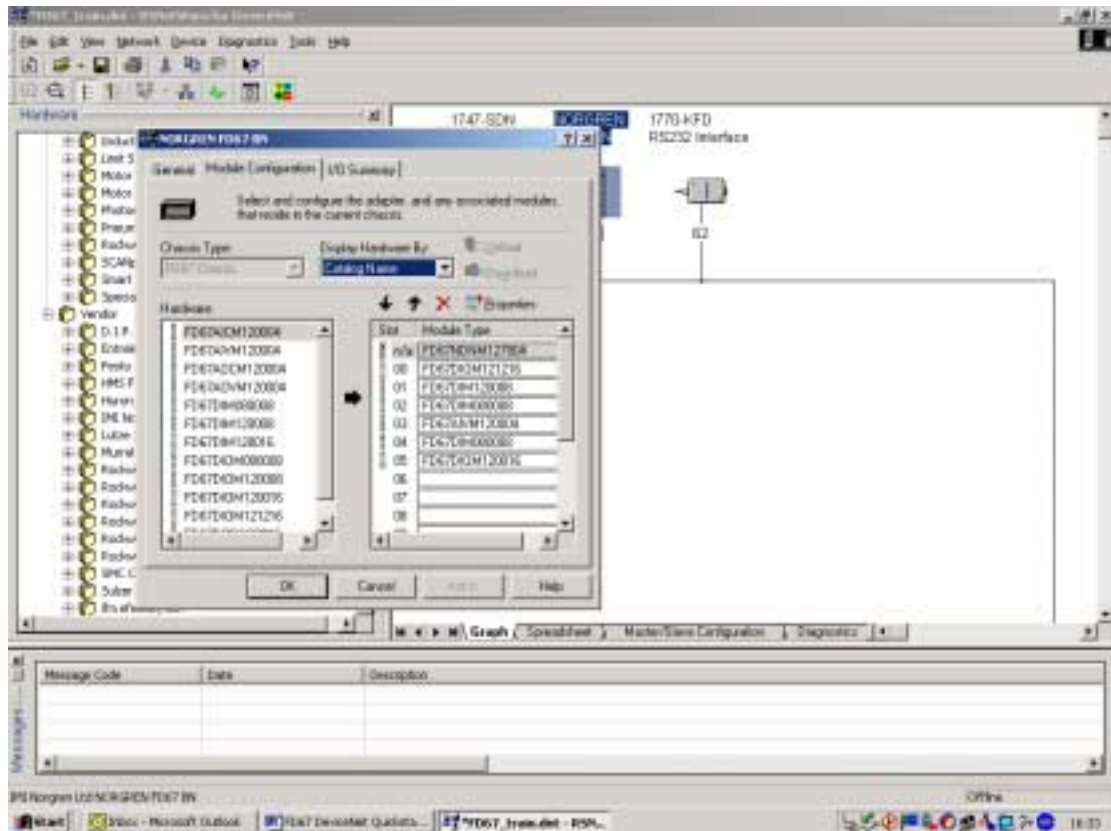
(ref) numbers are used later in tables etc.

In the above example, node port 1 is used to supply extra actuator power to the FD67DIOM121216 module connected to port 0

When the I/O modules have been added to the table they may be opened by double-clicking to set the required parameters.
Select the required parameter on the "Advanced Parameters" tab and select the function for each pin.
The default is no tick and is the first option – tick to select the other option.
The node parameters can also be set by double-clicking the entry at the top of the table. Unwanted diagnostic features may be disabled at this stage.
The configuration can be saved and must be downloaded to the node on-line before the node can be used.
The process is repeated for all connected nodes.
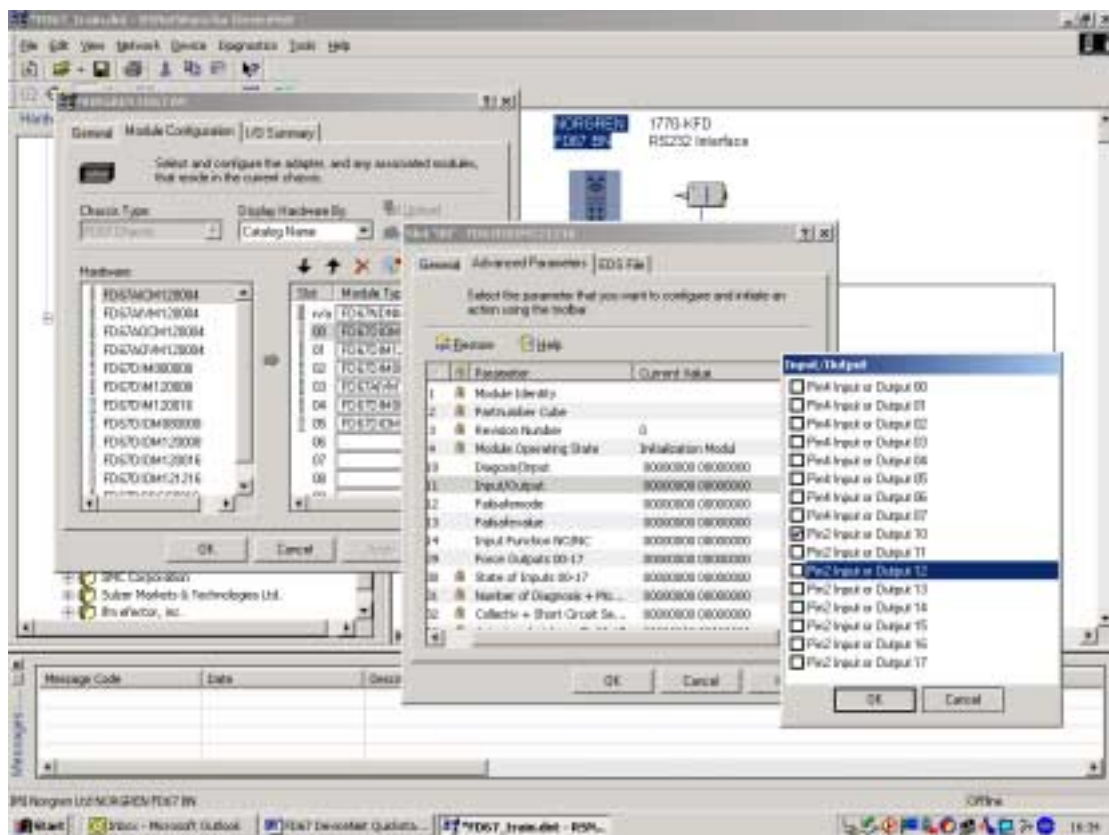
Configuration On-line

If RSNetworx is set on-line the bus can be "browsed" to find connected nodes. When the nodes are found they may be opened by double-clicking and the configuration can be uploaded and the parameters for each I/O module can be set in the same way as with the off-line method.
Remember to save the parameters to PC memory before closing RSNetworx to ensure that both project and node settings match for next time the project is opened on-line.

Downloading configuration to node.

After the parameters for each node have been set according to requirements
they must be downloaded to the node. If the node has been configured off-line
then the pre-configured parameters can be downloaded at this stage by going
on-line.
When on-line the "download" button of the screen will set the new parameters
in the node which will set the I/O module pin and diagnostic functions. In order
for this to work the node must not be in the "scan list" of a scanner while the
download takes place – see later.
After downloading the configuration the new data must be stored in the
memory of the node otherwise it will be lost during the next power cycle.
This is done by opening the node configuration box and choosing "save all
parameters" from the "set parameters" option and downloading the setting
again. The parameter changes must be downloaded before the save
parameters because save has a higher priority than changes and new
changes will not be stored.

Scanner configuration.

Before the configured nodes can be controlled by the PLC the I/O and
diagnostics of the nodes has to be mapped onto the PLC I/O system
The scanner contains two I/O memory areas, which can be accessed by the
PLC. One of these areas can be directly accessed from within the control
program as individual I/O (Discrete) and another can only be accessed by
user programmed data transfers from scanner to PLC memory and vice-versa
(M0/M1 files)
If the scanner icon is double-clicked the configuration box will open and the
address can be set using the "General" tab. The PLC slot address can be set
using the "Module" tab and scan rate settings for the bus can be set here.
The "Scanlist" tab is opened and will list all I/O devices on the bus in a box on
the left side (Available devices) and the scanner "scanlist" on the right.
The nodes that are to be controlled by this scanner are moved from the
"Available devices" list to the Scanlist using the arrow buttons.
If the "Automap on add" box is ticked then they will be mapped to the scanner
I/O automatically.

I/O layout

Each DIO module occupies an equal number of Input and Output bytes.
DIM modules only occupy Input bytes.

Each 16 I/O M12 module occupies 2 bytes Inputs and 2 bytes Outputs.
All pins marked 0-7 (pin 4) will be in the lower byte and all pins marked 10-17
(pin 2) will be in the upper byte.

Each 8 I/O M12 module also occupies 2 byte Inputs and 2 byte Outputs. Pins
marked 0-3 (pin 4) will be in the lower byte and pins marked 10-13 (pin 2) will
be in the upper byte. Bits 4-7 and 14-17 are allocated but not used.

Each 8 I/O M8 module occupies 1 byte Inputs and 1 byte outputs.

In addition to the actual inputs a node has diagnostic inputs which are added
to the total size of inputs mapped to the input memory area.
The amount of actual inputs and diagnostic inputs and their position can be
found in the FD67 manual under the section for each I/O module and is
described under Attribute 11

For every node the layout of I/O is the same and generates the following I/O
data.

    4 bytes of node diagnostic data
    A variable number of bytes of actual Input data
    A variable number of bytes of diagnostic data

    A variable number of bytes of Output data

How many bytes are generated depends on the type and number of I/O
modules connected to a node.
The data may be split over both I/O memory areas of the scanner to enable
actual Inputs to be located in the direct access area (discrete) and diagnostic
data located in the M1 file area.
This is called "Partial Mapping" and is explained in the relevant Rockwell
manuals for the scanner.
The screenshot below shows the scanner Input memory area with the
example system mapped.
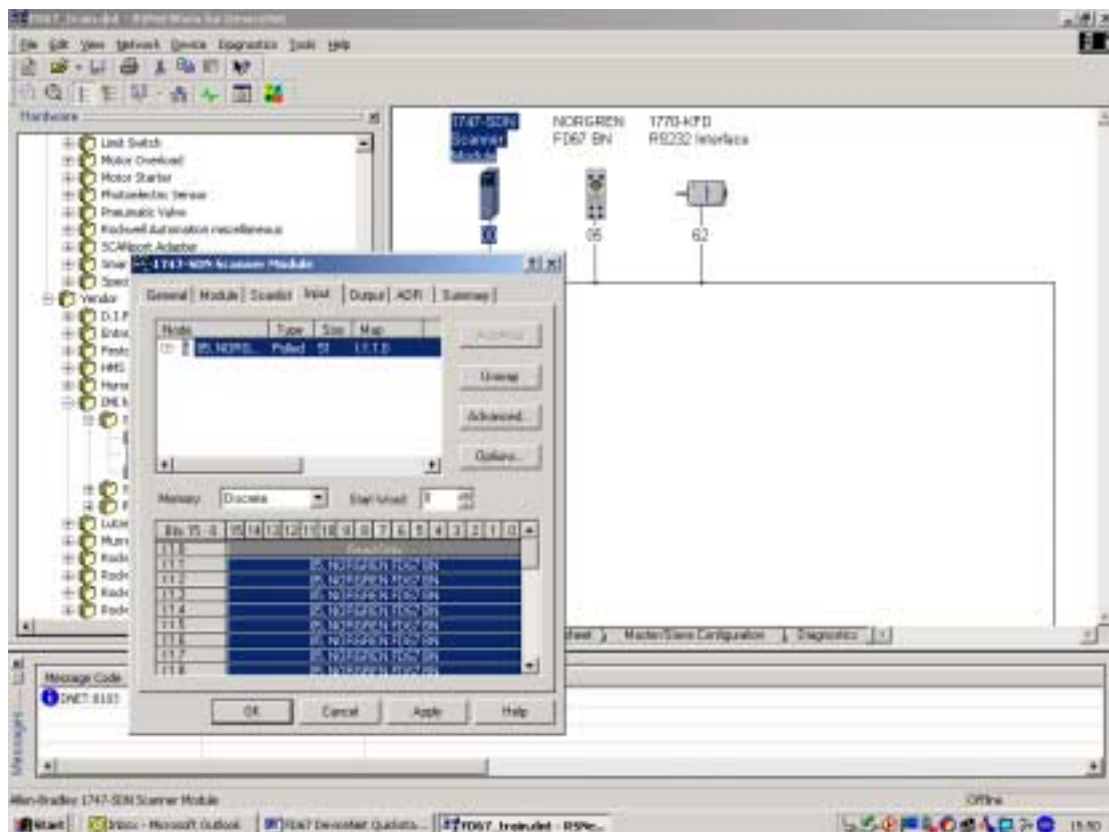
The locations of the Input and diagnostic information for the example system are shown below. In this example the actual and diagnostic inputs have not been separated but as can be seen one node occupies almost all of the available 32-word discrete input memory area.

In this example the first input data of this node is mapped to the first available input after the scanner status word.
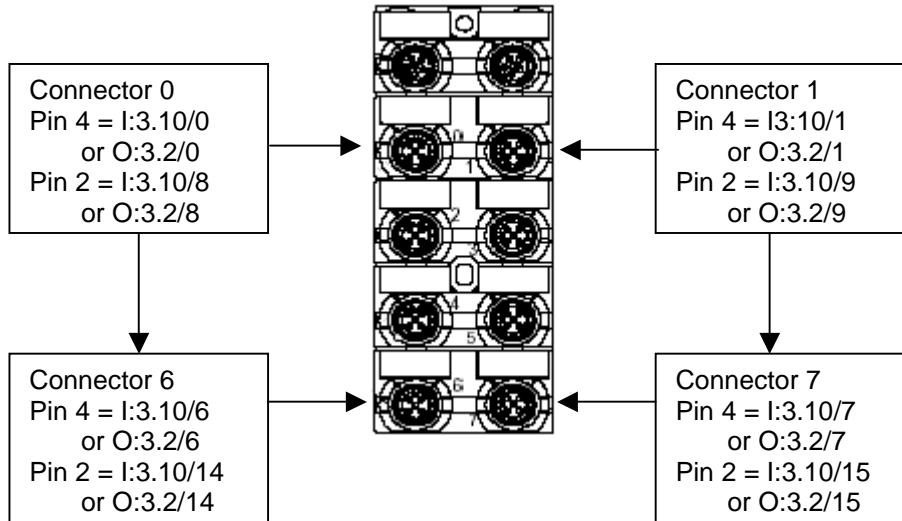
Word	15	Bits	0	
0	Scanner status			Node
1	Node			Diagnostics
2	Diagnostics			
3	FD67DIOM121216 Inputs (2)			
4	FD67DIM120008 Inputs (3)			
5	FD67AIV CH0 Inp (5)	FD67DIM080008 Inp (4)		
6	FD67AIV CH1 Inp (5)	FD67AIV CH0 Inp (5)		
7	FD67AIV CH2 Inp (5)	FD67AIV CH1 Inp (5)		Inputs
8	FD67AIV CH3 Inp (5)	FD67AIV CH2 Inp (5)		
9	FD67DIM08008 Inp (6)	FD67AIV CH3 Inp (5)		
10	FD67DIOM120016 Inputs (7)			
11	FD67DIOM121216 Diagnostics (2)			
12				
13				
14				
15	FD67DIM0008 Diagnostics (3)			
16				
17	FD67DIM08008 Diagnostics (4)			
18	FD67AIVM120004			
19	Diagnostics (5)			Diagnostics
20				
21	FD67DIM08008 Diagnostics (6)			
22				
23	FD67DIOM120016 Diagnostics (7)			
24				
25				
26	Next node diagnostics			

Location of Output data for the same system

0	Scanner status
1	FD67DIOM121216 Outputs (2)
2	FD67DIOM120016 outputs (7)

I/O addresses for an FD67DIOM120016 module mapped to Input word 10 and Output word 2 in an Allen Bradley SLC500 PLC. Scanner is located in slot 3.

Each pin can be configured as an Input or Output

Connector 0
Pin 4 = I:3.10/0
   or O:3.2/0
Pin 2 = I:3.10/8
   or O:3.2/8

Connector 1
Pin 4 = I3:10/1
   or O:3.2/1
Pin 2 = I:3.10/9
   or O:3.2/9

Connector 6
Pin 4 = I:3.10/6
   or O:3.2/6
Pin 2 = I:3.10/14
   or O:3.2/14

Connector 7
Pin 4 = I:3.10/7
   or O:3.2/7
Pin 2 = I:3.10/15
   or O:3.2/15

I/O addresses for an FD67DIM120008 module mapped to Input word 4 in an Allen Bradley SLC500 PLC

Connector 0
Pin 4 = I:3.4/0
Pin 2 = I:3.4/8

Connector 3
Pin 4 = I:3.4/3
Pin 2 = I:3.4/11

I/O bits 4-7 & 12-5 are allocated but not used

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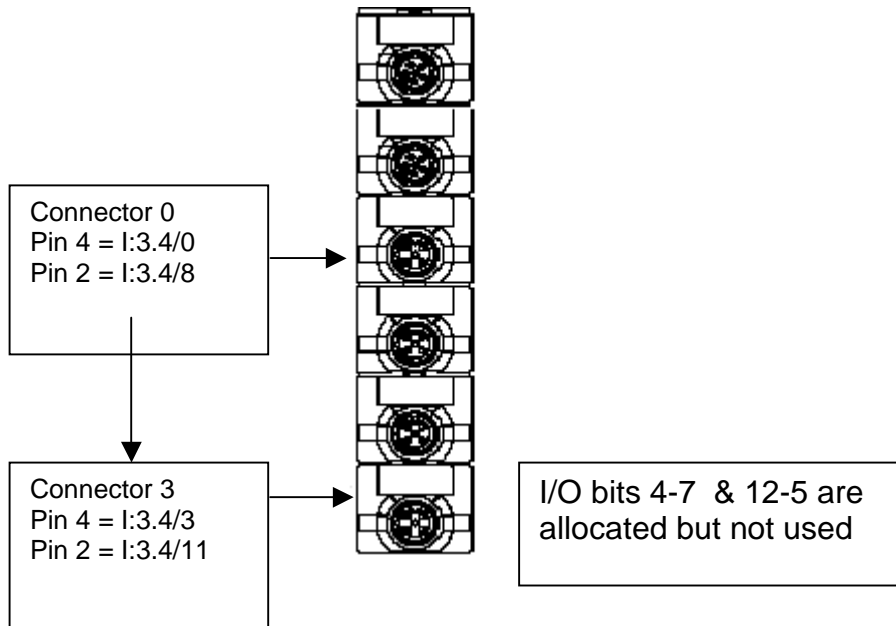
Basic diagnostics using LEDs

Node

<u>**M**odule **S**tatus LED</u>

Off   Self test not completed
                                  Wait until complete
Green   Self test complete

<u>**N**etwork **S**tatus LED</u>

Off   Duplicate MAC check in progress
                                  Wait until complete
Green flashing   Duplicate MAC check complete
                                  Waiting for communications to start
Green   Link to master complete – normal state
Red flashing   Link to the master interrupted
                                  Timeout, bus connection interrupted – see master
                                  diagnostics
Red   Bus connection interrupted,
                                  General physical bus error – voltage reset required

See FD67 manual section 5.1 for full details of fault indication and solutions.

I/O modules

<u>Us LED</u>   (Sensor voltage & system operation)

Green   Working correctly
Flashing green   No data exchange (normal at start)
                                  Check system cables
Off   No sensor supplies (<12v)
                                  Check power supply connections & system cables
Red   Sensor supply undervoltage (<18v)
                                  Check power supply connections & system cables

<u>Ua LED</u> (Actuator voltage)

Green   Working correctly
Off   No actuator supply
                                  Check power supply connections & system cables
Red   Actuator supply undervoltage
                                  Check power supply connections & system cables

See FD67 manual section 5.1 for full details of I/O module LED diagnostics.