



GEM80 GEMTEQ I/O

Series Controllers

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Technical Manual

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GEM80

GEMTEQ I/O

Technical Manual

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Manufacturer

Converteam UK Ltd.

West Avenue,

Kidsgrove,

Stoke-on-Trent,

Staffordshire,

ST7 1TW

England.

Tel: +44 (0) 1782 781000

Fax: +44 (0) 1782 781133

e-mail: product.service-uk@converteam.com

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This technical manual should be regarded as part of the product. It should be stored with the product and passed on to any subsequent owner or user.

Local safety laws and regulations must always be observed.

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Scope

This publication provides details of the GEM80 GEMCAN I/O Scanner module and GEMTEQ I/O structure, which is a distributed I/O system for GEM80-500 controllers. An overview of the product and its features and specification are included in this publication as well as details to enable system Configuration, Programming, Installation and Commissioning, Maintenance and Fault Finding to be carried out.

The host GEM80 controller Technical Manual should be read in conjunction with this GEMTEQ I/O Technical Manual. This publication (T2031En) should be regarded as part of the GEMTEQ I/O product. It should be retained for the life of the product and passed on to any subsequent owner or user.

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1. INTRODUCTION

GEMTEQ is a generation of distributed I/O modules specifically for the GEM80-500 range of programmable logic controllers. Designed as the interface between the plant and the GEM80 controller, the complete modular family provides a flexible, simple and intelligent device.

GEMTEQ I/O is designed with advanced features and functions making them intelligent and capable, yet easy and intuitive to use. GEMTEQ's diagnostics and ability to use dual networks and redundant/changeover masters makes it ideal where high availability, high reliability architecture is required.

Features

- I/O wherever you need it
 - Local to PLC or
 - Distributed I/O
- Modular and scaleable architecture
- Redundant PLC and high availability configurations
- Cost efficient solutions
 - Fast installation
 - Reduced wiring
- GEMTEQ I/O can save system builders and end users considerable time and money
- Quick connect wiring
- Distributed I/O modules
- Redundant link capability
- 125 modules per scanner module
- Dual Network Ports
- Each link independently configurable
- Scanner can be configured as master, slave, redundant, change over
- Network length up to 5000 metres
- In current mode configurable 0-20ma or 4-20ma
- Communication speed up to 1M baud
- Digital inputs configurable DBounce time
- Freeze/Fallback configuration on output on a per I/O point basis

1.1 THE GEM80 GEMTEQ I/O SYSTEM

Converteam's distributed I/O module system provides the latest in compact flexibility allowing the user to install the required amount of I/O where it is required.

- Redundant link capability allows the user to change modules without shutting down their machine, optimising productivity and minimising downtime.
- Extensive diagnostics make identifying faults a matter of routine maximising up-time.
- Dual network ports.
- Redundant cabling – I/O modules will always be connected to minimise downtime.
 - Module freeze/fall back facility on loss of communications.
- Distributed plant – modules where you require them

1.2 NETWORK OVERVIEW

Each GEMTEQ I/O system consists of GEMCAN I/O Scanner module fitted in a host GEM80-500 PLC, GEMTEQ slave I/O modules, with the option of GEM80-500 PLC as slave devices.

1.2.1 GEMCAN I/O Scanner

The GEMCAN I/O scanner fits into the GEM80-500 controller to provide the interface to the GEMTEQ I/O system.

- Up to 125 nodes per scanner
- 2 ports per scanner
- 2 scanners per host PLC

1.2.2 GEMTEQ I/O Modules

- Advanced diagnostics and embedded LED I/O indicators speed up troubleshooting and increase productivity.
- Hot-swap minimises downtime by allowing failed I/O modules to be changed without shutting down the plant.
- Convenient rotary switches are used for setting bus address and baud rate therefore no programming required.
- Removable wiring connectors save time and speed up commissioning.
- DIN rail mounting – no special tools required.
- Configurable digital DBounce and analogue filter times.

1.3 COMPATIBILITY WITH OTHER GEM80 PRODUCTS

GEMTEQ I/O is only available on the GEM80-500 Series of Controllers. This functionality was added in the following software releases:-

00S172-4002 Issue “C”

00S203-4001 Issue “E”

For further assistance please contact Customer Support.

1.4 ASSOCIATED PUBLICATIONS

CONVERTEAM Publications associated with this technical manual are now listed.

T391 GEM80 Ladder Diagram Language Programming Manual

This manual provides a competent user, who is familiar with programming GEM80 controllers, details for all aspects of programming, including the language, the Standard Instruction Set and all the GEM80 Special Functions. It does not include some Additional Instructions which are used for the GEM80-400 and 500 Series Controllers that are described in the GEM80-400 manual.

T2025En GEM80-500 Series Controllers Technical Manual

This manual provides a competent user who is familiar with GEM80 controllers details for the installation, commissioning, operation and maintenance of the GEM80-500 Series Controllers. It includes some software details which are cross-referenced from the GEM80-400 manual.

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2. INTRODUCTION

The GEMCAN network is based on the CANopen communication model and uses standard CAN hardware and cabling.

The CANopen standard consists of an addressing scheme, several small communication protocols and an application layer defined by a device profile. The communication protocols have support for network management, device monitoring and communication between nodes.

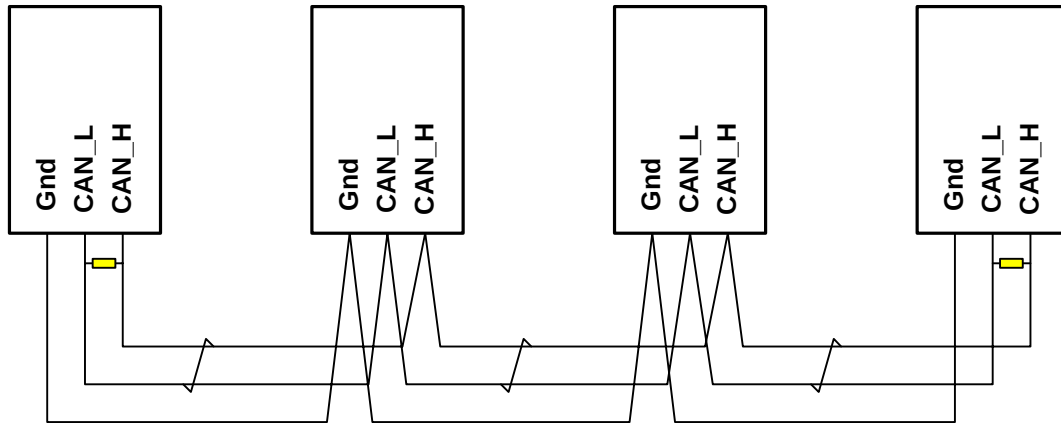


Figure 2-1 Network Cabling between 4 Nodes

2.1 INTRODUCTION TO CAN NETWORKS

Modules on the CAN network must have a unique node address. One node (NMT Master) is responsible for issuing all the relevant commands to take all the other nodes on the network to an “operational” state.

Data transfer on a CANopen network is via a Producer and Consumer architecture. Each data packet has a unique identifier, with each node separately configured to define which packet/packets it will Produce and Consume. This allows a large flexibility in which modules can talk to each other, but also requires a complex configuration procedure.

There are two types of data packets:

- PDO (Process Data Objects)
- SDO (Service Data Object)

PDO have a high priority for system data exchange and can contain up to 8 bytes of data. The size and number of PDO's a module will use on the network is variable and described by the module hardware profile.

SDO have a low priority and are used for module configuration and can contain more than 8 bytes.

GEMTEQ has simplified the configuration of the CAN network with the introduction of a theoretical master slave architecture.

When a master scanner module is declared on a GEMTEQ system it will not only perform all the functions of an NMT master .i.e. ensuring all slaves are taken to the operational state, but will also become the hub of all message transfers. It will produce all of the slaves consumed PDO's and consume of all the slaves produced PDO's. The mapping between data within the GEM80-500 controller and the slave modules is a simple correlation between the Node address and the controllers C/D tables see Appendix A.

Note: There is not facility for a slave module to transfer data directly to another slave module.

Slave GEMTEQ modules have a fixed size and number of PDO's assigned to each module. There are 16 C/D tables (a maximum of 4 transmit and receive PDO's) per node ID.

Any configuration data for the module is included within the 16 words of output PDO data, the GEMTEQ network does not use SDO's to configure slave modules.

To reduce the network traffic on the GEMTEQ link, data is only normally transmitted when data changes. A slave input module will transmit data to the GEMTEQ scanner module when it detects an input change. The scanner will transmit data to a slave output module when it detects that the output data PDO has changed within the scanner module.

2.2 DATA EXCHANGE TO THE HOST CONTROLLER

The GEMCAN I/O Scanner module resides in the host PLC and provides an interface between the PLC and the module's two CAN communication ports. Typically before the host PLC Ladder Scan, data is transferred between the GEMCAN I/O Scanner module and the host Data Table memory. At the end of the host Ladder Scan, data is transferred from the host Data Table memory to the GEMCAN I/O Scanner for transmission on the CAN network. Transfer depends on the scanner sub mode as detailed in section 4.2.4.2.

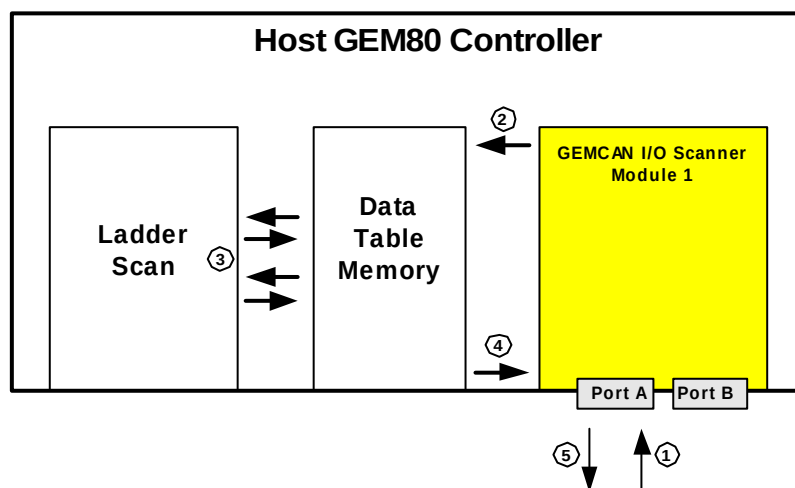


Figure 2-2 GEMCAN I/O Scanner Data Exchange with Host PLC

- 1 - Slave devices transmit their data to the GEMCAN I/O Scanner, as and when the Input data from the plant changes
- 2 - At the beginning of the Ladder Scan, new Input data is transferred from the GEMCAN I/O Scanner to the Host PLC Data Table memory
- 3 - During the Ladder Scan data is read from/ written to the Data Table memory
- 4 - At the end of the Ladder Scan, Output data is transferred from the Data Table memory, to the GEMCAN I/O Scanner.
- 5 - If the Output data has changed for a given Slave device, then new Output data is transmitted to that Slave via the CAN network

3. GEM80 GEMCAN NETWORK

3.1 INTRODUCTION

A GEMCAN network operates on a Master / Slave principle, with a single Master and multiple Slaves. Although a second Master may be connected to the network, only one Master is active at any one time. Typically a GEMCAN network consists of a host GEM80 PLC with a GEMCAN I/O Scanner module and a number of GEMTEQ I/O modules, all communicating via the GEMCAN network.

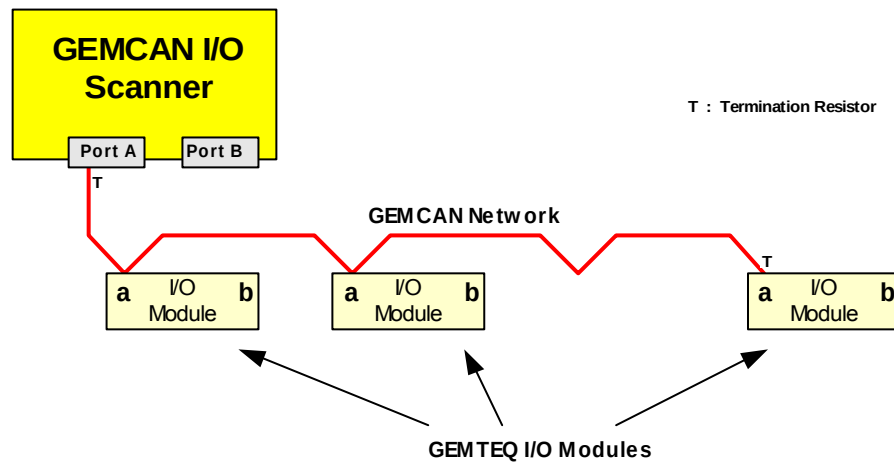


Figure 3-1 Simple GEMTEQ I/O Network

Further GEMCAN I/O Scanner modules may be attached to the network as a Change-over Masters or as further Slave devices.

Data exchange between the Master and Slaves utilises Process Data Objects (PDOs) on the GEMCAN network.

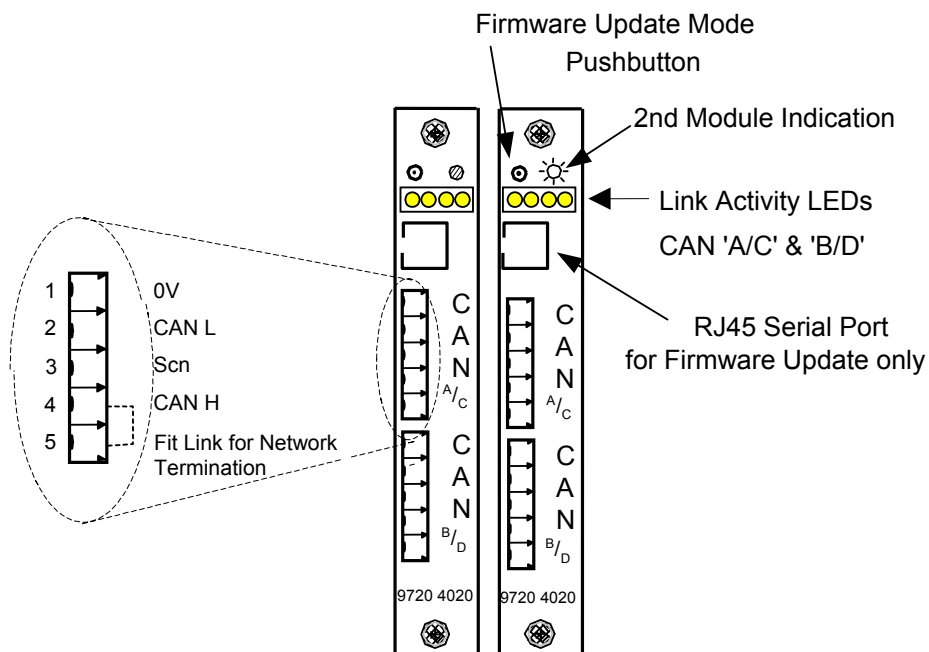
3.2 GEMCAN I/O SCANNER MODULE



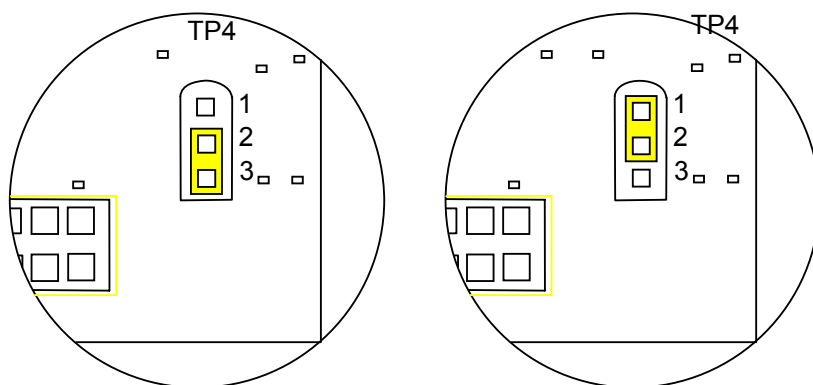
Figure 3-2 9720-4020 GEMCAN I/O Scanner Module

GEMTEQ I/O 3. GEM80 GEMCAN NETWORK

The GEM80-500 Controller can have up to two GEMCAN I/O Scanner modules fitted; each module providing two ports; CAN 'A' & CAN 'B' on Module 1, CAN 'C' & CAN 'D' on Module 2.



Jumper Link Positions



9720-4020 1st Module
GEMCAN I/O Scanner

9720-4020 2nd Module
GEMCAN I/O Scanner

Figure 3-3 9720-4020 GEMCAN I/O Scanner Port Identification and Configuration

3.3 GEMCAN NETWORK CONFIGURATIONS

The GEMCAN I/O Scanner Ports may be configured to operate in four different modes.

Slave

Standard Master

Redundant Master

Change-over Master

The following sections describe the operation of each of these modes and any restrictions on the combination of modes on a given GEMCAN I/O Scanner module.

3.3.1 Slave

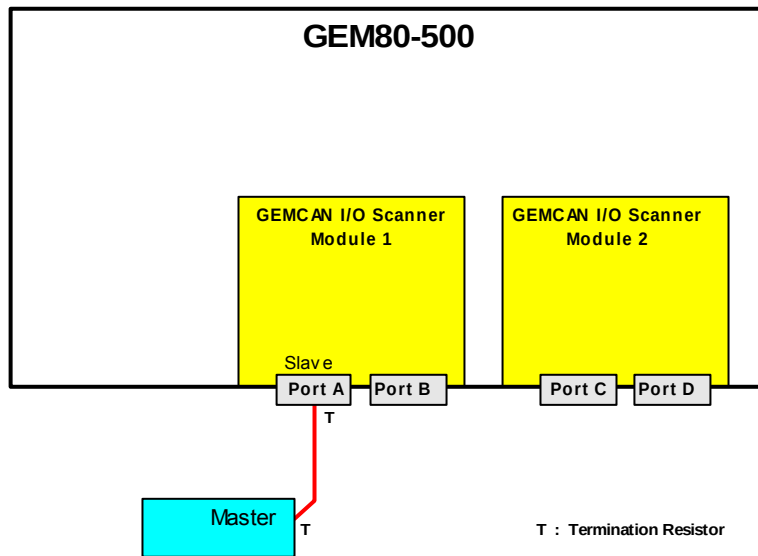


Figure 3-4 GEMCAN I/O Scanner – Slave Operation

When the GEMCAN I/O Scanner Port is configured as a Slave, it is capable of exchanging up to 16 words (4 PDOs) of Input Data and 16 words (4 PDOs) of Output Data with a Master device.

3.3.2 Standard Master

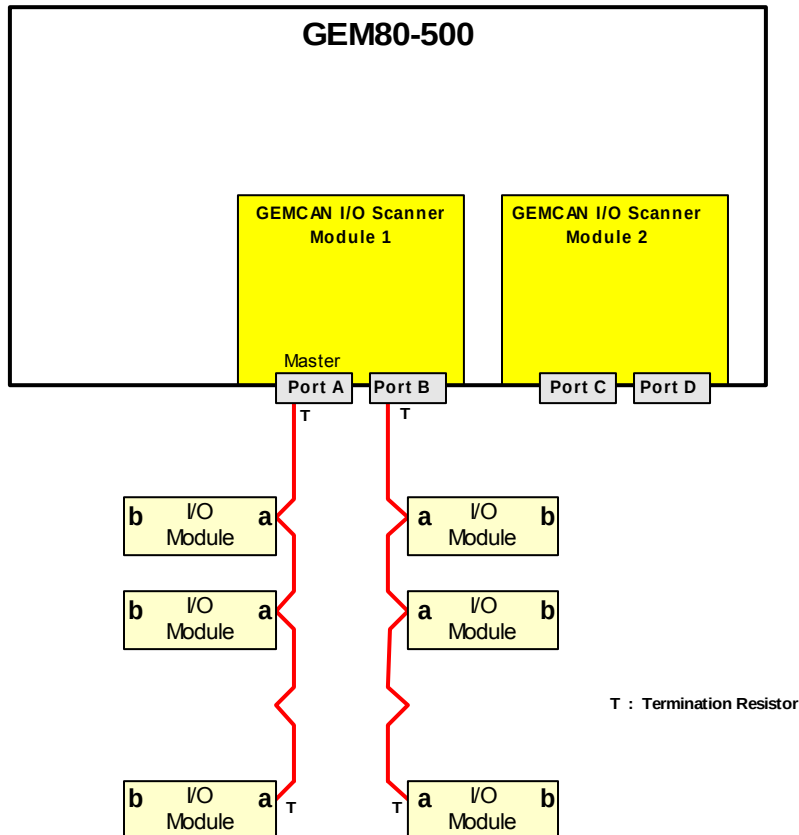


Figure 3-5 GEMCAN I/O Scanner – Master Operation

When configured as a Master, a GEMCAN I/O Scanner Port is capable of exchanging up to 16 words (4 PDOs) of Input Data and 16 words (4 PDOs) of Output Data with each Slave device. A maximum of 125 Slave devices may be connected to a single GEMCAN I/O Scanner module. If for example Port A is communicating with Slaves 1 to 25, then Port B can only communicate with Slaves 26 to 125.

The Master periodically sends Node Guard messages to each node, to check for their presence on the CAN network and that they are in an operational state.

3.3.3 Redundant Master

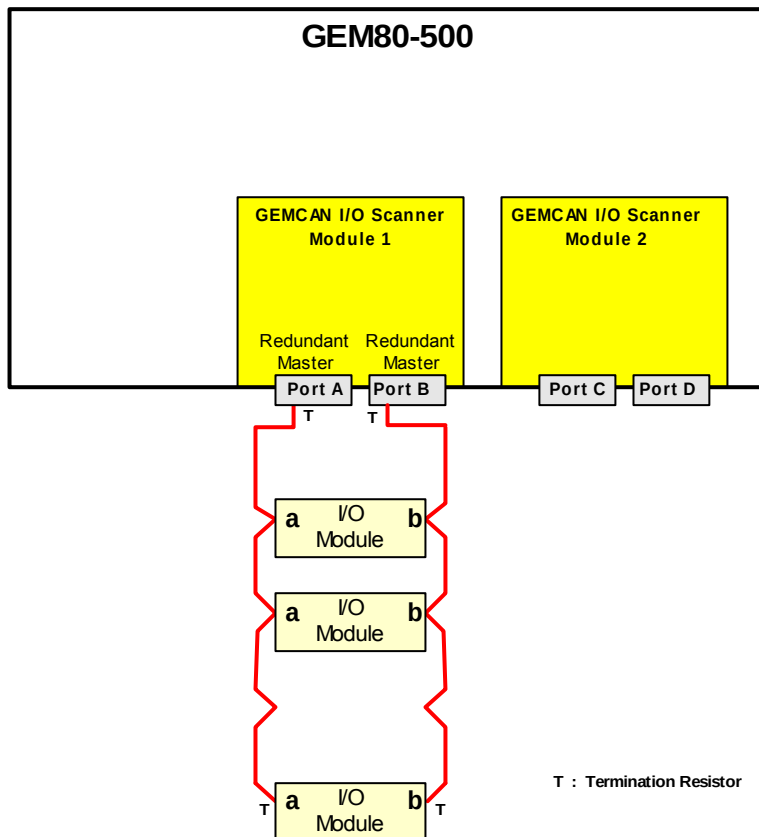


Figure 3-6 GEMCAN I/O Scanner – Redundant Master Operation

A Redundant Master generally operates the same as a Standard Master, except that both Port A and Port B can communicate with Slaves 1 to 125. It is assumed that Slave 'x' on Port A and Slave 'x' on Port B are the same physical device. Similarly for Ports C and D on GEMCAN I/O Scanner 2.

In this configuration an I/O Module will transmit its data on both CAN networks and then the GEMCAN I/O Scanner Ports will then place this in the same area of memory. Conversely the same data will be taken by Ports A and B and transmitted to the same Slave Node ID. As long as an I/O Module detects that the network attached to Port A is operational, it is this data that the I/O Module will use, otherwise data from Port B will be used.

If Port A/C is configured as a Redundant Master, then Port B/D must also be configured as a Redundant Master and visa versa.

The Masters periodically send Node Guard messages to each node, to check for their presence on the CAN networks and that they are in an operational state.

3.3.4 Change-Over Master

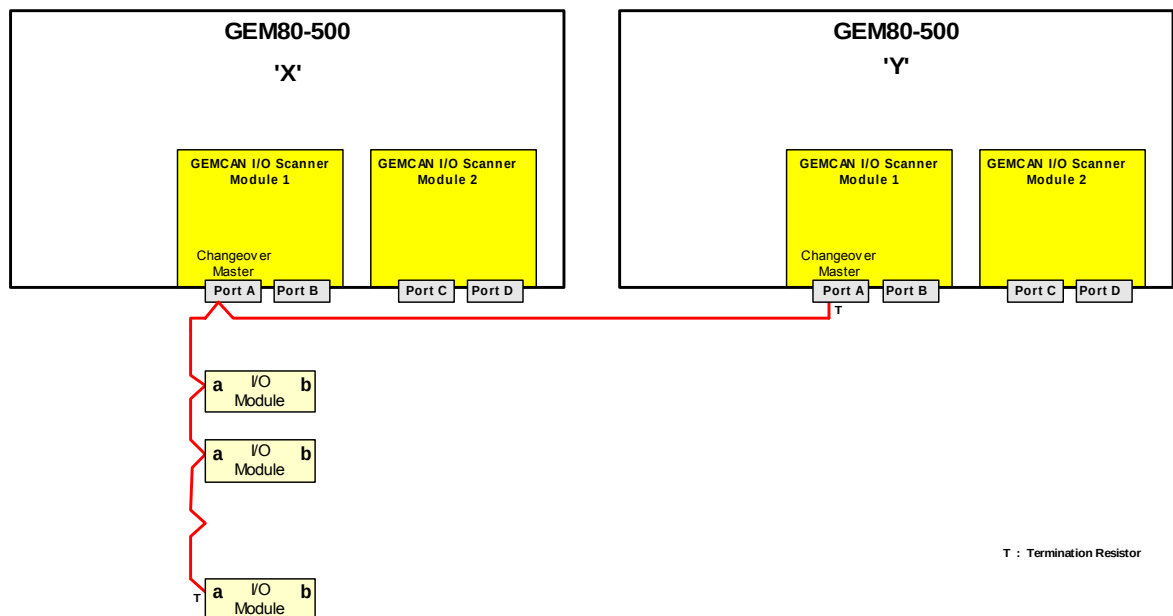


Figure 3-7 GEMCAN I/O Scanner – Change-over Master Operation

A Change-over Master is intended to be used when the host PLCs are configured to operate as a change-over pair. The two host PLCs and I/O Module slaves should be connected to the same CAN network. Whichever PLC ('X' or 'Y') first becomes active on the CAN network, it will adopt master-ship and by virtue of it producing node guard packets, hold the 2nd changeover master off.

3.4 DATA EXCHANGE WITH HOST CONTROLLER

Each slave device on a GEMCAN network can exchange a maximum of 16 words of input data and a maximum of 16 words of output data, with the master host GEM80 controller. These 16 words are received and transmitted as 4 Process Data Objects (PDOs) each of length 4 words.

When the GEMTEQ scanner is configured as a master the module uses the declared C/D tables within the ladder to determine if a slave module should be present. When declared the master will try and transfer data and node guard the module ID associated with the declared C/D table.

If no C/D tables are declared then no communication will take place on the GEMTEQ network.

In the case of the GEM80-500, the master determines which PDOs to transmit and which PDOs it expects to receive by which C & D-Tables are present in the user program. The following C/D-Table allocation is used to communicate with Node ID 1.

Table 3-1 C/D-Table Allocation – Node ID 1

PDO	C/D-Table
PDO 0	0
	1
	2
	3
PDO 1	4
	5
	6
	7
PDO 2	8
	9
	10
	11
PDO 3	12
	13
	14
	15

Node 2 is allocated the next 16 words of C & D-Tables and a further 16 words for each device up to Node ID 125. For a complete list of C/D-Table usage for GEMCAN I/O Scanner module one, please refer to Appendix A.

If the user program contains D1, then the GEMCAN I/O Scanner will transmit the first PDO, with a length of 2 words to Slave device 1.

If the user program contains D15, then the fourth PDO will be transmitted with a length of 4 words to Slave Device 1.

If the GEMCAN I/O Scanner is configured as a Slave device, with a Node ID of 4, then it should use C/D48 to 63 in the user program, in order to exchange data with the Master.

Therefore you must declare all relevant C/D tables within the ladder program, see the appropriate module data sheet.

3.5 STATES OF THE HOST GEM80 CONTROLLER

Data is only received from and transmitted to the GEMCAN network if the host GEM80 controller is in a Running-Normal Inputs state. In all other states, Halted, Test Inputs and Single Cycle, no messages are transmitted by the GEMCAN I/O Scanner module and hence all GEMTEQ I/O modules will adopt Freeze/Fallback strategy as defined by the application .

4. GEMCAN I/O SCANNER CONFIGURATION

4.1 INTRODUCTION

This section describes the P-Table configuration data that is required to allow a GEMCAN I/O Scanner module to take part in the data exchanges on a GEMCAN network, either as a Master or as a Slave device.

4.2 GEMCAN I/O SCANNER CONFIGURATION DATA

The GEMCAN I/O Scanner module(s) configuration parameters must be entered into the P-Table of the host GEM80 controller by the user before the module(s) can be used. These parameters are read by the GEMCAN I/O Scanner on power-up and whenever a re-compile is performed of the host controller.

For the GEMCAN I/O Scanner module(s) to access the configuration data successfully, a value must be written into P73. This value acts as a pointer to the first P-Table location containing GEMCAN I/O Scanner configuration data, e.g. if P73 contains a value of 500, configuration data begins at P500. The user must ensure that there are sufficient "P" tables declared for the configuration data.

Inserting a value of 0 into P73 renders inactive all GEMCAN I/O Scanner modules belonging to the host controller.

A detailed description of each configuration parameter is provided in the following paragraphs. Table 4-1 provides a reference table for the configuration data.

Table 4-1 P-Tables reserved for GEMCAN I/O Scanner Configuration Data

P-Table	Value	Description	
P73		Pointer to the GEMCAN I/O Scanner Configuration Data	
Px	@CAF1	Module 1: Validity Flag	See 4.2.1
Px+1		Module 1, Port A : CAN Node ID	See 4.2.2
Px+2		Module 1, Port A : Baud Rate	See 4.2.3
Px+3		Module 1, Port A : Port Mode / Sub Mode	See 4.2.4
Px+4		Module 1, Port A : Master C/O Time mS	See 4.2.5
Px+5		Module 1, Port A : Max. Input Data Delay mS	See 4.2.6
Px+6		Module 1, Port A : Max. Output Data Delay mS	See 4.2.7
Px+7		Module 1, Port A : Split Offset (Must always be zero)	See 4.2.8
Px+8		Module 1, Port A : Sync Period mS	See 4.2.9
Px+9		Module 1, Port A : Node Guard Period mS	See 4.2.10
Px+10		Reserved	
Px+11		Reserved	
Px+12		Module 1, Port B : CAN Node ID	See 4.2.2
Px+13		Module 1, Port B : Baud Rate	See 4.2.3
Px+14		Module 1, Port B : Port Mode	See 4.2.4
Px+15		Module 1, Port B : Master C/O Time mS	See 4.2.5
Px+16		Module 1, Port B : Max. Input Data Delay mS	See 4.2.6

P-Table	Value	Description	
Px+17		Module 1, Port B : Max. Output Data Delay mS (*2)	See 4.2.7
Px+18		Module 1, Port B : Split Offset	See 4.2.8
Px+19		Module 1, Port B : Sync Period mS	See 4.2.9
Px+20		Module 1, Port B : Node Guard Period mS	See 4.2.10
Px+21		Reserved	
Px+22		Reserved	
Px+23		Module 1 : Table Letter, Node Data (Type)	See 4.2.11
Px+24		Module 1 : Table Offset, Node Data (Type)	
Px+25		Module 1 : Table Letter, Input PDO Fault Data	
Px+26		Module 1 : Table Offset, Input PDO Fault Data	
Px+27		Module 1 : Table Letter, Output PDO Fault Data	
Px+28		Module 1 : Table Offset, Output PDO Fault Data	
Px+29	@CAF2	Module 2: Validity Flag	See 4.2.1
Px+30		Module 2, Port C : CAN Node ID	See 4.2.2
Px+31		Module 2, Port C : Baud Rate	See 4.2.3
Px+32		Module 2, Port C : Port Mode / Sub Mode	See 4.2.4
Px+33		Module 2, Port C : Master C/O Time mS	See 4.2.5
Px+34		Module 2, Port C : Max. Input Data Delay mS	See 4.2.6
Px+35		Module 2, Port C : Max. Output Data Delay mS	See 4.2.7
Px+36		Module 2, Port C : Split Offset (Must always be zero)	See 4.2.8
Px+37		Module 2, Port C : SYNC Period mS	See 4.2.9
Px+38		Module 2, Port C : Node Guard Period mS	See 4.2.10
Px+39		Reserved	
Px+40		Reserved	
Px+41		Module 2, Port D : CAN Node ID	See 4.2.2
Px+42		Module 2, Port D : Baud Rate	See 4.2.3
Px+43		Module 2, Port D : Port Mode	See 4.2.4
Px+44		Module 2, Port D : Master C/O Time mS	See 4.2.5
Px+45		Module 2, Port D : Max. Input Data Delay mS	See 4.2.6
Px+46		Module 2, Port D : Max. Output Data Delay mS	See 4.2.7
Px+47		Module 2, Port D : Split Offset	See 4.2.8
Px+48		Module 2, Port D : SYNC Period mS	See 4.2.9
Px+49		Module 2, Port D : Node Guard Period mS	See 4.2.10
Px+50		Reserved	
Px+51		Reserved	
Px+52		Module 2 : Table Letter, Node Data (Type)	See 4.2.11
Px+53		Module 2 : Table Offset, Node Data (Type)	
Px+54		Module 2 : Table Letter, Input PDO Fault Data	
Px+55		Module 2 : Table Offset, Input PDO Fault Data	
Px+56		Module 2 : Table Letter, Output PDO Fault Data	
Px+57		Module 2 : Table Offset, Output PDO Fault Data	

4.2.1 Validity Flag

Module 1 Px / Module 2 Px29)

The first P-Table address for each module's configuration data contains the validity flag. Its function is to prevent an uninitialised P-Table being used as valid configuration data. The user must insert the hexadecimal value @CAF1 for Module 1 and @CAF2 for Module 2, into the appropriate table to signify the GEMCAN I/O Scanner module configuration data is valid.

The insertion of any other value into the table renders inactive the respective GEMCAN I/O Scanner module belonging to the host controller.

4.2.2 Node ID

Module 1 (Port A Px+1, Port B Px+12) / Module 2 (Port C Px+30, Port D Px+41)

Range 0 to 127

Each device on a GEMCAN network must have a unique Node ID (Address). The user should allocate these Node IDs as follows :-

Table 4-2 GEMCAN I/O Scanner - Node ID Selection

Node ID	Description
0	Reserved, device not active on the network
1 - 125	Available for any slave device. i.e. GEMCAN I/O Scanner (Slave) GEMTEQ I/O Module
126	Master device. i.e. GEMCAN I/O Scanner
127	Master device. i.e. GEMCAN I/O Scanner

Note: Devices with lower Node IDs have a higher priority access to the network.

Note: The two ports on a GEMCAN I/O Scanner module cannot be configured at the same Node ID.
i.e. If Port A is configured as a Master at node 126, then if Port B is configured as a Master, it must have Node ID 127.

ID 126 and ID127 are reserved for GEMTEQ scanner masters, any master must be set to one of these ID's. It is possible to have two masters on a GEMCAN network when configured as change-over masters.

4.2.3 Baud Rate

Module 1 (Port A Px+2, Port B Px+13) / Module 2 (Port C Px+31, Port D Px+42)

Range 0 to 8

All devices on a GEMCAN network must operate at the same Baud Rate.

Table 4-3 GEMCAN I/O Scanner - Baud Rate Selection & Maximum Bus Length

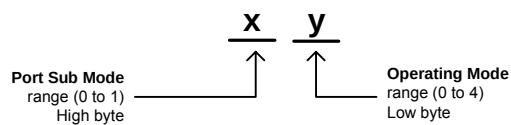
Value	Baud Rate	Transfer Rate in PDOs per second	Maximum Bus Length (m)
0	1M	10000	30
1	800k	8000	50
2	500k	5000	100
3	250k	2500	250
4	125k	1250	500
5	100k	1000	650
6	50k	500	1000
7	20k	200	2500
8	10k	100	5000

Note: The individual GEMTEQ module baud rate is configured by setting switch 5 on the unit, please refer to the relevant module data sheet.

4.2.4 Port Mode

Module 1 (PortA Px+3, PortB Px+14) / Module 2 (PortC Px+32, PortD Px+43)

Operating Mode Range 0 to 4
Port Sub Mode Range 0 to 1



4.2.4.1 Operating Mode (X)

The GEMCAN I/O Scanner module has four modes of operation, as detailed in Table 4-4 below. Further explanation of these modes may be found in Section 3.

Table 4-4 GEMCAN I/O Scanner - Operating Mode

Operating Mode	Description
0	Not Configured
1	Slave
2	Standard Master
3	Redundant Master

	If Port A/C is a Redundant Master, then Port B/D must also be a redundant Master and visa versa.
4	Change-Over Master

4.2.4.2 Port Sub Mode (Y)

When operating as a master, the GEMCAN I/O Scanner port may be operated in two sub-modes, as detailed below in Table 4-5.

Table 4-5 GEMCAN I/O Scanner – Port Sub Mode

Port Sub Mode	Description
0	Wait At the end of the host controller ladder scan, if all the previous changed output data has not been transmitted on the GEMCAN network then the system waits until this is complete. A new set of output data is then passed to the GEMCAN I/O Scanner module. An updated set of input data is then read and a new ladder scan commenced. In this mode all output changes will be transmitted to the output modules but a lengthening of the scan time may be observed, especially at low baud rates.
1	NoWait At the end of the host controller ladder scan, if all the previous output data has been transmitted on the GEMCAN network, an updated set of output data is passed to the GEMCAN I/O Scanner module. If all previous output data has not been transmitted, then the system does not wait but moves on to reading the input data. A updated set of input data is always read at the end of the ladder scan and a new ladder scan commenced. In this mode output data is only passed to the GEMCAN I/O Scanner module, to be transmitted on the GEMCAN network, as fast as the network can take it. This may mean that fleeting outputs may be missed but no extended scantimes should be seen.

If the system is operating at low baud rates and there is a lot of data to output, then it is possible to observe long ladder scantimes which may affect other parts of the control system. In this case it may be preferable to operate the master in NoWait mode.

4.2.5 Master Changeover Time (mS)

Module 1 (Port A Px+4, Port B Px+15) / Module 2 (Port C Px+33, Port D Px+44)

Range 1 to 32000 mS

On a Change-over Master, this is the amount of time a given master will wait and expect to see master Node Guard events on the network. If no such messages are observed then the master will take mastership of the GEMCAN network.

Please refer to application note Appendix C.

4.2.6 Maximum Input Delay Time (mS)

Module 1 (Port A Px+5, Port B Px+16) / Module 2 (Port C Px+34, Port D Px+45)

Range 1 to 32000 mS 0 = 500 mS (Default)

If after the Maximum Input Delay Time, the GEMCAN I/O Scanner has not received a new set of data from an input device, an update of data will be requested; as long as the device is known to exist on the network.

This parameter has no operation if the GEMCAN I/O Scanner Port is configured as a Slave.

4.2.7 Maximum Output Delay Time (mS)

Module 1 (Port A Px+6, Port B Px+17) / Module 2 (Port C Px+35, Port D Px+46)

Range 1 to 32000 mS 0 = 500 mS (Default)

If after the Maximum Output Delay Time, the GEMCAN I/O Scanner has not received a change in data from the host controller for a given device, an update of data will be transmitted; as long as the device is known to exist on the network.

4.2.8 Split Offset

Module 1 (Port A Px+7, Port B Px+18) / Module 2 (Port C Px+36, Port D Px+47)

Range 1 to 125

This parameter has no action for Port A/C and should be set to zero. The parameter defines the split between which Node IDs will operate on Port A/C and which Nodes IDs will operate on Port B/D of the GEMCAN I/O Scanner module.

e.g. If Px+18 = 50 then

Port A will exchange data with Nodes 1 to 49
Port B will exchange data with Nodes 50 to 125

4.2.9 Sync Period (mS)

Module 1 (Port A Px+8, Port B Px+19) / Module 2 (Port C Px+37, Port D Px+48)

Range 1 to 32000 mS

Any non-zero value in this parameter will cause the Master to send a Synchronisation message on the CAN network at the interval specified (not used for future use).

4.2.10 Node Guard Period (mS)

Module 1 (Port A Px+9, Port B Px+20) / Module 2 (Port C Px+38, Port D Px+49)

Range 1 to 32000 mS 0 = Default see table below

When configured as a master, the GEMCAN I/O Scanner periodically sends Node Guard messages on the CAN network. These are used to test which slaves devices are present on the network and also to enforce mastership of the bus to any other connected bus maseters. By default the interval between these messages is dependant upon the Baud Rate.

Table 4-6 Default Node Guard Period

Baud Rate	Default Node Guard Period (mS)
1M	10
800k	20
500k	40
250k	80
125k	160
100k	320
50k	640
20k	1280
10k	2560

If required, the default timing can be overridden by entering a value into this parameter. This value is the time between Node Guard events to slave devices on the network.

It is the lack of Node Guard messages that initiate a GEMTEQ I/O module detects and causes it to go into freeze/fallback mode, and also bus master change-over

Each slave node will be node guarded according to the node guard period. The time to node guard all nodes within a GEMTEQ network is calculated by the following:-

$n \times T$ where n= Number of nodes configured and T= Node Guard period

Therefore care must be taken to ensure that a modules freeze/fallback time is not less than the time taken to be node guarded (see appendix C). A change-over Master configuration also uses the loss of node guard message to initiate a change-over, again care must be taken to ensure that this is not less than the change-over period as detailed in section 4.2.5.

Please refer to application note Appendix C

4.2.11 Configuration of Optional Diagnostics Data

In addition to the Statistics, for each GEMCAN I/O Scanner module the user can optionally configure three sections of additional Diagnostics Data:-

- Node Data
- Input PDO Fault Data

- Output PDO Fault Data

For each section of Diagnostics data, the first configuration word gives the Data Table letter (A .. W) and the second configuration word the offset within the Data Table, of where the Diagnostics data is to be placed.

e.g. If Px+23 = 'G' (71 dec, @47 hex) and Px+24 = 400, then the Node Data for Module 1 would be placed in G400 onwards.

If Px+25 = 'G' (71 dec, @47 hex) and Px+26 = 500, then the Input PDO fault Data for Module 1 would be placed in G500 onwards.

If Px+27 = 'H' (72 dec, @48 hex) and Px+28 = 400, then the Output PDO fault Data for Module 1 would be placed in H400 onwards.

4.2.11.1 Node Data

Module 1 (Px+23 and Px+24) / Module 2 (Px+52 and Px+53)

One word should be allocated per slave device. This contains the module type located at the Node ID. Further details can be found in Section 8.3.1

4.2.11.2 Input PDO Fault Data

Module 1 (Px+25 and Px+26) / Module 2 (Px+54 and Px+55)

Each slave device should be allocated two words of Input PDO Fault Data. Further details can be found in Section 8.3.2.

4.2.11.3 Output PDO Fault Data

Module 1 (Px+27 and Px+28) / Module 2 (Px+56 and Px+57)

Each slave device should be allocated two words of Output PDO Fault Data. Further details can be found in Section 8.3.3.

5. GEMCAN SPECIAL FUNCTION

5.1 INTRODUCTION

The application interface to the GEMCAN I/O Scanner consists of P-Table configuration data and a Special Function: CANCEMD (T114). This function is only required when operating the GEMCAN network with Masters operating in Change-over mode.

The Special Function validates the parameters supplied by the user and writes a report in the function Status Word and Q rung output. If errors are detected during the validation phase, no further action is performed by the Special Function and bit 15 of the Status Word and Q rung output are set.

If no errors are detected the request is passed to the appropriate GEMCAN I/O Scanner module and the Status Word and Q rung output updated. The GEMCAN I/O Scanner module actions the request. The result of the request may be found by monitoring the respective Statistics in the F-Tables.

WARNING

When using this software, the user program must include the correct use of the diagnostic data to ensure that the data exchanged is valid, error-free and current.

5.2 T114 CANCMD SPECIAL FUNCTION

The CANCMD Special Function requests a Change-over Master to Release or Request mastership of a GEMCAN Network.

5.2.1 Control Language

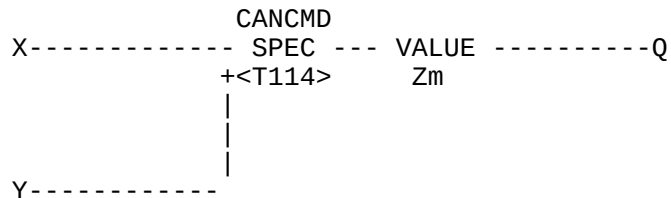


Table 5-1 CANCMD - Program Rung Data

Symbol	Location	Use	Range
X	Rung input	Command	1 to 2 0 = No operation As detailed in section 5.2.4.
Y	Rung input	Module / Port / Node ID	As detailed in section 5.2.3.
Zm	Value location	Start of parameter list (5 locations)	Any write enabled table usable by Special Functions
Q	Rung output	Function status	As detailed in section 5.2.2.

Table 5-2 CANCMD - Value Data

Location	Use	Details
Zm	Status word	As detailed in section 5.2.2.
Zm+1 }	Reserved for future use	
Zm+2 }	Reserved for future use	
Zm+3 }	Reserved for future use	
Zm+4 }	Reserved for future use	

5.2.2 Status Word (Zm) and Rung Output (Q)

The function Status Word (Zm) and Rung Output (Q) provide information about the action of the Special Function. If execution of the Special Function is successful, bit 0 is set and all other bits are cleared. If an error is detected bit 0 is cleared and bit 15 is set. In addition, the remaining bits indicate the type of error detected. The same data is written to both the (Zm) and (Q) word.

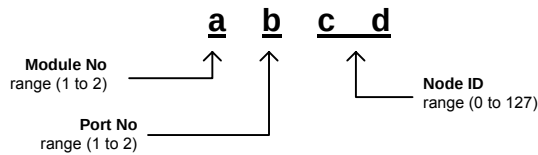
The following information describes each bit of the function status word for CANCMD. Bits 7 to 14 are reserved for future use.

Table 5-3 CANCMD – Status Word and Rung Output Values

Code in Zm and Q			Condition	Comment
Numeric Value (dec)	Numeric Value (hex)	Bits On		
1	@0001	0	Success. Command request passed to respective GEMCAN I/O Scanner module.	Command request passed to respective GEMCAN I/O Scanner module.
-32766	@8002	15 & 1	X Rung Input, out of range.	X Rung Input <0 or >2, modify user program.
-32764	@8004	15 & 2	Y Rung Input, Module No. out of range.	Module No. <1 or >2, modify user program.
-32760	@8008	15 & 3	Y Rung Input, Port No. out of range.	Port No. <1 or >2, modify user program.
-32752	@8010	15 & 4	Y Rung Input, Node ID. out of range.	Node ID <0 or >127, modify user program.
-32836	@8020	15 & 5	GEMCAN I/O Scanner module not fitted.	Check installation of GEMCAN I/O Scanner module by monitoring V-Table contents. If fault persists, replace module.
-32704	@8040	15 & 6	Timeout while passing data to GEMCAN I/O Scanner module	Check installation of GEMCAN I/O Scanner module by monitoring V-Table contents. If fault persists, replace module.

5.2.3 Y Rung Input – Module, Port & Node ID Selection

The Y Rung may be considered to be made up of 4 parts or nibbles:-



Module No	The GEMCAN I/O Scanner module that the Command is to be actioned by.
Port No	The Port number on the GEMCAN I/O Scanner module that the Command is to be actioned by.
Node ID	The Node Id of the slave device the GEMCAN network that the Command is to be actioned by.

5.2.4 X Rung Input - Command

The GEMCAN I/O Scanner module accepts two commands:-

Table 5-4 CANCMD – Command Data

Command	Details
0	No operation
1	Request mastership of the GEMCAN network
2	Request release of mastership of the GEMCAN network

5.2.4.1 Request Mastership Command (1)

This is used when configured as a change over master, the GEMCAN I/O Scanner will transmit to the active master a request to gain mastership of the GEMCAN network. If it is successful then the master will be seen to go into the Operational state, by monitoring appropriate port statistics see Table 8-1.

This command does not require and data to be passed to the device and no data will be returned by the device, hence Zm+1 to Zm+4 should be left at zero.

5.2.4.2 Release Mastership Command (2)

The GEMCAN I/O Scanner will transmit to any other master a request for it to gain mastership of the GEMCAN network. If it is successful then the master will be seen to go from Operational to Pre-operational state, and this can be seen by monitoring the appropriate port statistics see Table 8-4.

This command does not require and data to be passed to the device and no data will be returned by the device, hence Zm+1 to Zm+4 should be left at zero.

When a GEMCAN scanner has bus mastership the operational state (see Table 8-4) is set to “operational”, the slave scanner state is set to “stopped”. If a change-over occurs then the above

states are reversed. To detect which unit is bus master the operational state can be monitored within the ladder program.

6. GEMTEQ I/O MODULES

6.1 INTRODUCTION

This section describes the GEMTEQ I/O modules in more detail than can be found in their respective Instruction Sheets. Details of the module configuration data, comprehensive fault finding and diagnostics information, as well as connection details are given.

6.2 GEMTEQ I/O MODULES

The GEMTEQ range of I/O presently consists of the following types of I/O module:-

Table 6-1 GEMTEQ I/O Modules

Order Code	Description
9730-4012	24V d.c., 16 way Input Module, Normal/Inverse Logic
9731-4012	24V d.c., 0.5A, 16 way Output Module
9732-4012	110V a.c., 16 way Input Module
9733-4012	110V a.c., 1A, 16 way Output Module
9734-4012	8 Input / 8 Output Combination Analogue Module
9735-4012	Relay, 3A, 16 way Output Module
9736-4012	4 Channel Counter Module
9737-4012	16 Input / 8 Output Combination Analogue Module

6.2.1 24 V d.c 16-way Input Module, Normal/Inverse Logic (9730)

For a complete technical specification, please refer to the Instruction Sheet T1981En.

6.2.2 24 V d.c., 0.5A, 16-way Output Module (9731)

For a complete technical specification, please refer to the Instruction Sheet T1982En.

6.2.3 110 V a.c. 16-way Input Module (9732)

For a complete technical specification, please refer to the Instruction Sheet T1983En.

6.2.4 110 V a.c., 1A, 16-way Output Module (9733)

For a complete technical specification, please refer to the Instruction Sheet T1984En.

6.2.5 8 In / 8 Out Combination Analogue Module (9734)

For a complete technical specification, please refer to the Instruction Sheet T1985En.

6.2.6 Relay, 3A, 16-way Output Module (9735)

For a complete technical specification, please refer to the Instruction Sheet T1986En.

6.2.7 4 Channel Counter Module (9736)

For a complete technical specification, please refer to the Instruction Sheet T1995En.

6.2.8 16 Input / 8 Output Combination Analogue Module (9737)

For a complete technical specification, please refer to the Instruction T2113En.

6.3 MODULE CONFIGURATION

Before a GEMTEQ I/O module may be connected to the GEMCAN network, the following two items must be setup on the module.

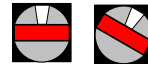
- Node ID
- Baud Rate

6.3.1 Node ID

Each device on a GEMCAN network must have a unique Node ID. This is setup on the hexadecimal rotary switches SW3 and SW4, as detailed below.

Table 6-2 GEMTEQ I/O Module – Node ID Selection

SW3 / SW4 Switch Position	Value
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11
C	12
D	13
E	14
F	15



Node ID = (SW3 * 16) + SW4

e.g.

SW3 = 0, SW4 = A NODE ID = 10

SW3 = 1, SW4 = 6 NODE ID = (1*16) + 6 = 22

SW3 = 7, SW4 = D NODE ID = (7*16) + 13 = 125

The Node ID determines which C/D tables are used within the GEM80-500 controller to communicated with the slave modules (see Appendix A).

6.3.2 Baud Rate

The baud rate is selected by the hexadecimal rotary switch SW5, see Table 6-3. All devices on a GEMCAN network should have the same Baud Rate selection.

Table 6-3 GEMTEQ I/O Module - Baud Rate Selection

Value	Baud Rate	Maximum Bus Length (m)
0	1M	30
1	800k	50
2	500k	100
3	250k	250
4	125k	500
5	100k	650
6	50k	1000
7	20k	2500
8	10k	5000

6.4 CONNECTIONS

6.4.1 CAN Network Connections

The GEMCAN network(s) should be wired to CAN A (PL4) and CAN B (PL5) connections of the GEMTEQ I/O module. Generally all CAN A connections on the GEMTEQ I/O modules will be wired together and all CAN B connections.

If the GEMTEQ I/O module is fitted to the middle of a GEMCAN network, then they should be wired up as per Figure 6-1.

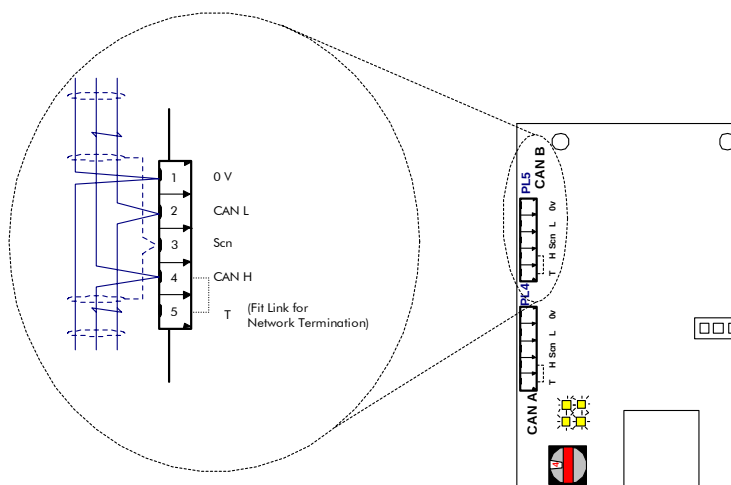


Figure 6-1 CAN Network Connections – Middle of Link

If the GEMTEQ I/O module is fitted to the end of a GEMCAN network, then they should be wired up as per Figure 6-2.

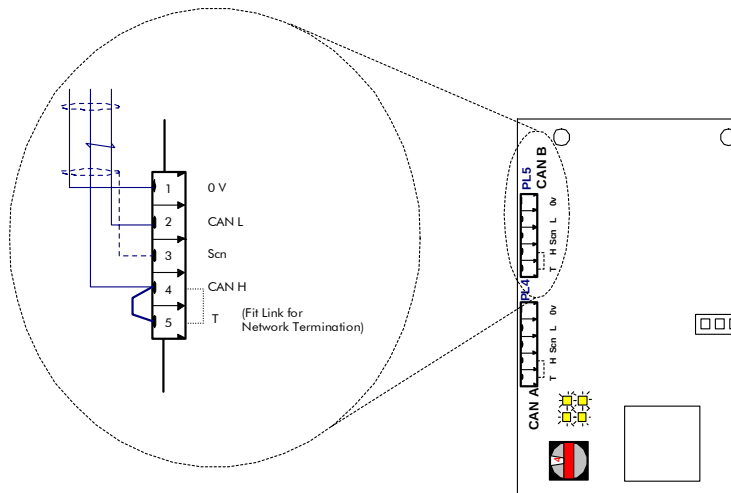


Figure 6-2 CAN Network Connections – End of Link

If for any reason the device on the end of the GEMCAN link needs to be able to be disconnected, while maintaining the operation of all other devices, then a 120 Ohm resistor should be fitted between CAN_H and CAN_L, in place of the link between terminals 4 & 5.

6.4.2 Power Supply Connections

A 24V d.c. power supply should be connected to PL7, as detailed in Figure 6-3.

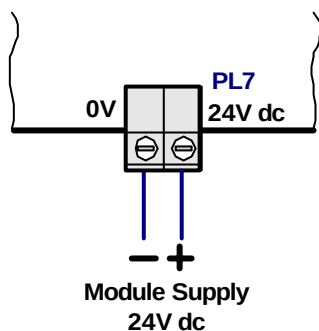


Figure 6-3 GEMTEQ I/O Module – Power Supply Connections

6.4.3 Plant I/O Connections

Details of the plant I/O connections can be found in the appropriate module Instruction Sheet.

6.5 MODULE DIAGNOSTICS

Each GEMTEQ I/O module is fitted with a comprehensive set of diagnostics LEDs, to help with rapid system fault finding. Details of the LED locations can be found in the appropriate module Instruction Sheet.

6.5.1 Power Supply LEDs

The power supply LEDs should be lit at all times. If not then check Module Supply and/or replace module.

6.5.2 OK LED

The OK LED has four operational states, as detailed in Table 6-4.

Table 6-4 GEMTEQ I/O Module – OK LED

OK LED	Description	Comment
ON	Incorrect Node ID and/or Baud Rate selection. Faulty module.	Check SW3, SW4 and SW5 positions and power cycle module. If problem persists replace GEMTEQ I/O module.
OFF	Incorrect Node ID and/or Baud Rate selection. Faulty module.	Check SW3, SW4 and SW5 positions and power cycle module. If problem persists replace GEMTEQ I/O module.
Flashing Quickly	The module has read the Node ID and Baud Rate switches but is awaiting a start command from the GEMCAN network master.	Check configuration of master and network cabling.
Flashing Slowly	Normal operational state.	Module is healthy.

6.5.3 Communications LEDs

CAN A and CAN B each have a pair of Tx / Rx LEDs.

Rx - Indicates that traffic can be seen on the GEMCAN network.

Tx - Indicates that data has been transmitted onto the GEMCAN network.

6.6 APPLICATION CONFIGURATION DATA

GEMTEQ modules can be configured by the application code within the GEM80-500 Controller.

Configuration data is sent to an individual module using the appropriate "D" table for that module. This is achieved by transmitting data to the GEMTEQ I/O module via the GEMCAN network using an output PDO.

The following details the options available:

- Input Filter Time
- PDO Silence Time
- Freeze/Fallback Strategy

The available configuration options for a particular module are described in the modules data sheets.

For example a digital output module has a freeze/fallback option but no input filter time, whereas an input module has an input filter time but no freeze fallback data.

6.6.1 Input Filter Time

Range	1 to 32000 mS
-------	---------------

Each input module has a hardware filter time. If the application requires it, additional software filtering may be implemented by transmitting a non zero value in the Input Filter Time. For further details please refer to the appropriate Instruction Sheet.

6.6.2 PDO Silence Time

Range	1 to 32000 mS	0 = 20 mS (Default)
-------	---------------	---------------------

Each time an input changes state, the GEMTEQ Input module will report this input value to the master. Hence if a digital input is 'chattering' or an analogue input has a lot of noise on it, then a lot of network traffic will take place to report these changing values. The input module may be configured to only report changes every X ms by transmitting the value X to the input module in the PDO Silence Time. For further details please refer to the appropriate Instruction Sheet.

6.6.3 Freeze/Fallback

A GEMTEQ Output module detects Node Guard messages on the GEMCAN Network. If the module does not see these messages for the Freeze/Fallback Timeout period, see section 6.6.3.1, then the module will adopt Freeze/Fallback as defined by the Freeze/Fallback Value, see section 6.6.3.2.

See application note Appendix C.

6.6.3.1 Freeze/Fallback Timeout (mS)

Range	1 to 32000 mS	0 = 500 mS (Default)
-------	---------------	----------------------

If the application requires the default freeze/fallback time to be overridden then a value can be transmitted to the module in the Freeze/Fallback Time. For further details please refer to the appropriate Instruction Sheet.

6.6.3.2 Freeze/Fallback Value

By using one bit per channel (Bit 0 = Channel 0), this signifies whether freeze or fallback should be adopted, when loss of Node Guard messages has been detected by the I/O module.

0	Fallback to zero
1	Freeze present value

For further details please refer to the appropriate Instruction Sheet.

6.6.4 Analog Input – Voltage or Current Input Mode

By using one bit per channel (Bit 0 = Channel 0), this signifies whether the Analog I/P channel should operate as Voltage or Current input mode.

0	Voltage Input mode
1	Current Input mode

6.6.5 Analog Input – 0-20mA or 4-20mA Input Mode

By using one bit per channel (Bit 0 = Channel 0), this signifies whether the Analog I/P channel, when configured in Current input mode, should operate as 0 to 20mA or 4 to 20mA.

0	0 to 20mA input mode
1	4 to 20mA input mode

7. INSTALLATION AND COMMISSIONING

WARNING

Radio Transmitters

Do not use mobile phones or walkie talkies within 2 metres (6 feet) of the equipment.

CAUTION

This equipment contains solid state devices which may be affected by electrostatic discharge. Observe static handling precautions.

7.1 INTRODUCTION

This section describes the receipt of the GEMTEQ I/O modules at a site and provides instructions for their installation and commissioning. For details of the installation of the GEMCAN I/O Scanner module in the host GEM80 controller, please refer to the respective controller Technical Manual.

7.1.1 Unpacking and Checking the Consignment

When the equipment arrives on site it should be carefully unpacked and inspected for any sign of damage. Handling precautions for equipment containing Electrostatic Sensitive Devices (ESD) should be followed.

The complete consignment should be checked against the delivery note for any loss in transit.

7.1.2 What to do if something is missing or damaged

If any damage has occurred, or any parts are missing, CONVERTEAM Kidsgrove, should be contacted immediately and the following details quoted:

- (1) List of damaged or missing items;
- (2) Description of any damage;
- (3) Package numbers;
- (4) Delivery/Advice Note numbers, dates and any other reference numbers such as order and item numbers.

Note:

Failure to inform CONVERTEAM Kidsgrove, of damage to goods or shortages within three days from receipt of equipment will be held to free Converteam from liability.

7.2 STORING GEM80 EQUIPMENT BEFORE INSTALLATION

7.2.1 Environmental Conditions and Protection

Equipment which is not required for immediate installation should be stored in a clean, dry atmosphere at a reasonably constant temperature (-20 to +70°C). To minimise the ingress of fine dust, the equipment should be kept in the original packing, which should be re-sealed after the delivery inspection.

Where equipment is unavoidably subjected to high humidity (e.g. for short pre-commissioning periods during installation in a humid location) it is recommended that any enclosure, into which the controller is to be mounted, should be fitted with anti-condensation heaters and the equipment be thoroughly dried out prior to the first application of power. Such heaters should then be automatically switched on whenever the GEM80 equipment is subsequently shut down.

7.3 SITE REQUIREMENTS

The area in which the GEM80 equipment is to be installed must meet the following conditions:

- (a) Comply with the Environmental Specification
- (b) Have adequate access for installation, commissioning and maintenance.

7.3.1 Protection of Equipment from Static Damage

Protective measures are required when handling any of the optional modules to prevent damage to Electrostatic Sensitive Devices (ESDs). The following rules must be observed:

- (a) Personnel handling the modules should NOT wear outer clothing which will generate a static charge, e.g. synthetic materials like nylon, cotton is preferable.
- (b) All personnel handling the modules should put themselves in contact with a grounded surface before removing any modules from their protective packing or from equipment. The antistatic equipment should be kept on during all module handling.
- (c) Avoid finger contact with devices on the modules and with its connectors
- (d) If it is necessary to place any module down 'unprotected', place on a static shielding bag, or other equivalent material
- (e) Modules should be protected by a static-shielding bag when out of the equipment.

7.4 COMMISSIONING GUIDANCE

The GEMCAN I/O Scanner and GEMTEQ I/O will have to be configured to meet particular application requirements. Because these requirements vary for each GEM80 application this section of the manual only includes general commissioning guidance about the method to be followed. The instructions required for each application should be discussed with CONVERTEAM or an approved System Builder.

7.4.1 Preparation

Before starting to commission a GEM 80 system, you should already have:

- (a) Installed the equipment and cabled it up, including all earth (ground) connections as given in this section;
- (b) Cabled up the watchdog and safety circuits in accordance with the guidelines given in this section and checked their operation;
- (c) A suitable GEM80 Programming Package with a stock of suitable storage media;
- (d) Ensured that all pertinent regulations for earthing/grounding of the equipment have been adhered to.

7.4.2 Documents Required

During commissioning the following documents will be required in addition to this manual:

- (a) A User/Technical Manual for the particular GEM 80 Programming Package in use;
- (b) 'GEM 80 Ladder Diagram Programming Manual', Publication No.T300;

These documents will enable test programs to be written to check out the equipment.

7.4.3 Handling Precautions During Setting Up of Equipment

The following precautions must be taken during testing/setting up operations on equipment containing printed circuit boards (PCBs) with Electrostatic Sensitive Devices (ESDs):

- (a) All test equipment must be grounded to a common earth point;
- (b) The system power and test equipment must be switched OFF before making or breaking any connections;
- (c) When possible, power supply voltages should be applied before signal inputs, and should be maintained until signal inputs are removed;
- (d) Dielectric strength and insulation resistance tests should not be carried out with the PCBs installed in the equipment;
- (e) Do not use audible continuity tests on PCBs;
- (f) Do not use 'Freeze' Aerosols on PCBs.

7.4.4 Radio Frequency Interference (RFI)

This clause is intended as a guide for users who wish to operate GEM80 equipment in the vicinity of a radio transmitter. The transmitter may be of the static or the hand-held portable type. Unrestricted use of a transmitting device could result in a malfunction of the equipment. This in turn could cause a breakdown of plant equipment and injury to personnel. GEM80 equipment is designed to function satisfactorily within a RFI field strength of 10V/m over a frequency range of 30 MHz to 1 GHz.

8. MAINTENANCE AND FAULT FINDING

8.1 GENERAL GUIDANCE FOR MAINTENANCE

This section includes general guidance for the upkeep and maintenance of a system containing GEMCAN I/O Scanners and GEMTEQ I/O modules and includes fault finding information which can be used in the event of either an in-service fault or faults which occur because of ladder program development.

This information should be read in conjunction with the Technical Manual for the host GEM80 controller.

A GEMTEQ I/O system requires very little maintenance.

8.2 FAULT TABLE DATA

A number of diagnostics F-Tables are provided to assist the user with fault finding a GEMCAN system. Table 8-1 provides a reference table for the diagnostics data.

Table 8-1 GEMCAN I/O Scanner - F-Table Fault Data

F-Table	Description	
F330	Module 1: Error	See section 8.2.1.
F331	Module 1: Pointer 1	
F332	Module 1: Pointer 2	
F333	Module 2: Error	See section 8.2.1.
F334	Module 2: Pointer 1	
F335	Module 2: Pointer 2	
F336	Module 1, Port A : Stats, Status	See section 8.2.2.
F337	Module 1, Port A : Stats, Tx Count	
F338	Module 1, Port A : Stats, Rx Count	
F339	Module 1, Port A : Stats, Bus Off Count	
F340	Module 1, Port A : Stats, Operational State	
F341	Module 1, Port B : Stats, Status	See section 8.2.2.
F342	Module 1, Port B : Stats, Tx Count	
F343	Module 1, Port B : Stats, Rx Count	
F344	Module 1, Port B : Stats, Bus Off Count	
F345	Module 1, Port B : Stats, Operational State	
F346	Module 2, Port C : Stats, Status	See section 8.2.2.
F347	Module 2, Port C : Stats, Tx Count	
F348	Module 2, Port C : Stats, Rx Count	
F349	Module 2, Port C : Stats, Bus Off Count	
F350	Module 2, Port C : Stats, Operational State	
F351	Module 2, Port D : Stats, Status	See section 8.2.2.
F352	Module 2, Port D : Stats, Tx Count	
F353	Module 2, Port D : Stats, Rx Count	
F354	Module 2, Port D : Stats, Bus Off Count	
F355	Module 2, Port D : Stats, Operational State	
F356	Module 1 : Node Presence	See section 8.2.3.
F357	"	
F358	"	
F359	"	

F-Table	Description	
F360	"	
F361	"	
F362	"	
F363	"	
F364	Module 2 : Node Presence	See section 8.2.3.
F365	"	
F366	"	
F367	"	
F368	"	
F369	"	
F370	"	
F371	"	

8.2.1 Module P-Table Configuration Data Errors

When the host GEM80 controller is powered up or is recompiled, the GEMCAN I/O Scanner is configured. Syntax checking is performed on the configuration data and configuration errors are reported as follows:-

Module 1 F330 - F332

Module 2 F333 - F335

Table 8-2 GEMCAN I/O Scanner Module Configuration Errors

Module 1	Module 2	Description
F330	F333	Configuration Error Number. For details see Table 8-3.
F331	F334	Points to 1st P-Table that is considered to be in error.
F332	F335	Points to 2nd P-Table that is considered to be in error.

Table 8-3 Configuration Error Codes

Code in F330 or F333 Numeric Value (dec)	States On	Fault or Warning	Condition	Comment
5	2 & 0	Fault	Table fault	The data tables declared in the user program are read only or are not large enough to accommodate the diagnostics data. Modify user program.
9	3 & 0	Fault	Parameter fault	The configuration parameter is out of range. Modify user program.
17	4 & 0	Fault	Configuration timeout	A timeout has occurred while trying to write new configuration data to the GEMCAN I/O Scanner module. If problem persists, replace GEMCAN I/O Scanner module and/or host controller.
34	5 & 1	Warning	Input I/O data timeout	A timeout has occurred while trying to read new input data from the GEMCAN I/O Scanner module. If problem persists, replace GEMCAN I/O Scanner module and/or host controller.
66	6 & 1	Warning	Output I/O data timeout	A timeout has occurred while trying to write new output data to the GEMCAN I/O Scanner module. If problem persists, replace GEMCAN I/O Scanner module and/or host controller.
130	7 & 1	Warning	Statistics data timeout	A timeout has occurred while trying to read new statistics data from the GEMCAN I/O Scanner module. If problem persists, replace GEMCAN I/O Scanner module and/or host controller.
258	8 & 1	Warning	New output data timeout	A timeout has occurred while trying to inform the GEMCAN I/O Scanner module that new output data is available. If problem persists, replace GEMCAN I/O Scanner module and/or host controller.

Code in F330 or F333 Numeric Value (dec)	States On	Fault or Warning	Condition	Comment
513	9 & 0	Fault	Table allocation fault	Incorrect allocation of C/D- Tables. Modify user program.

8.2.2 Communications Statistics

A set of communications statistics is maintained for each active GEMCAN I/O Scanner port, as detailed in Table 8-4.

Table 8-4 Communications Statistics

Module 1	Module 2	Description
F336	F341	Status 0 = Offline 1 = Online 2 = Bus Off 3 = Error / Warning
F337	F342	Tx Count per second
F338	F343	Rx Count per second
F339	F344	Bus Off Count per second
F340	F345	Operational State 01 = Disconnected 02 = Connecting 03 = Preparing 04 = Stopped 05 = Operational 7D = Reset Communications 7E = Initialising 7F = Pre-operational

Note

Loss of an individual node ID will not produce an error/warning status, however loss of all communications will produce an error / warning i.e. Status = 3.

8.2.3 Node Presence

A master on a GEMCAN network will maintain a bit array of the devices present, as detailed in Table 8-5.

Table 8-5 Node Presence

Module 1	Module 2	Description
F356	F364	Node Presence Word 0 (Nodes 1 to 16)
F357	F365	“ Word 1 (Nodes 17 to 32)
F358	F366	“ Word 2 (Nodes 33 to 48)
F359	F367	“ Word 3 (Nodes 49 to 64)
F360	F368	“ Word 4 (Nodes 65 to 80)
F361	F369	“ Word 5 (Nodes 81 to 96)
F362	F370	“ Word 6 (Nodes 97 to 112)
F363	F371	“ Word 7 (Nodes 113 to 128)

Node presence provides the easiest way for the application to detect the loss of I/O modules and be able to take appropriate action.

8.3 DIAGNOSTICS DATA

The Diagnostics Data can greatly assist the user during commissioning and fault finding a GEMCAN system.

8.3.1 Node Data (Px+23-24, Px52-P53)

The Node Data is one word per slave device and gives the type of device fitted at a given Node ID. The information is shown in the module node data area as defined in the configuration “P” tables.

Px+23 defines the table letter for module 1, Px+52 for module 2.

Px+24 defines the table offset for module 1, Px+53 for module 2.

For example if Px+23 = 71 dec @47hex ASCII “G” and Px+24 = 1 then node ID1 data will be placed table G1, node ID2 in G2, node ID10 in G10 etc (see table below).

Table 8-6 Node Data

Data Table	Node Data	Node Add.	Module Fitted
G1	9730	1	24V d.c., 16-way Input Module
G2	9731	2	24V d.c., 0.5A, 16-way Output Module
G3	9732	3	110V a.c., 16-way Input Module
G4	9733	4	110V a.c., 1A, 16-way Output Module
G5	9734	5	8 In / 8 Out Combination Analogue Module
G6	9735	6	Relay, 3A, 16-way Output Module

Data Table	Nod e Data	Nod e Add.	Module Fitted
G7	9736	7	4 Channel Counter Module
G8	9737	8	16 Input / 8 Output Combination Analogue Module

8.3.2 Input PDO Fault Data

The Input PDO Fault Data consists of two words per slave device. For network A and B there is 1-bit allocated for each word of input data. Bits will only be seen for network B if a Redundant Master has been configured. The 32 bits of data are allocated as detailed in Table 8-7 below. The location of the fault data words are defined in the scanner configuration 'p' table in section 4.2.

Table 8-7 Input PDO Fault Data

Input PDO Fault Data	Network	Description
Word 0 .0	A	Input Data Word 0 Cx + 0
Word 0 .1	B	Input Data Word 0 Cx + 0
Word 0 .2	A	Input Data Word 1 Cx + 1
Word 0 .3	B	Input Data Word 1 Cx + 1
Word 0 .4	A	Input Data Word 2 Cx + 2
Word 0 .5	B	Input Data Word 2 Cx + 2
Word 0 .6	A	Input Data Word 3 Cx + 3
Word 0 .7	B	Input Data Word 3 Cx + 3
Word 0 .8	A	Input Data Word 4 Cx + 4
Word 0 .9	B	Input Data Word 4 Cx + 4
Word 0 .10	A	Input Data Word 5 Cx + 5
Word 0 .11	B	Input Data Word 5 Cx + 5
Word 0 .12	A	Input Data Word 6 Cx + 6
Word 0 .13	B	Input Data Word 6 Cx + 6
Word 0 .14	A	Input Data Word 7 Cx + 7
Word 0 .15	B	Input Data Word 7 Cx + 7
Word 1 .0	A	Input Data Word 8 Cx + 8
Word 1 .1	B	Input Data Word 8 Cx + 8
Word 1 .2	A	Input Data Word 9 Cx + 9
Word 1 .3	B	Input Data Word 9 Cx + 9
Word 1 .4	A	Input Data Word 10 Cx + 10
Word 1 .5	B	Input Data Word 10 Cx + 10
Word 1 .6	A	Input Data Word 11 Cx + 11
Word 1 .7	B	Input Data Word 11 Cx + 11
Word 1 .8	A	Input Data Word 12 Cx + 12
Word 1 .9	B	Input Data Word 12 Cx + 12
Word 1 .10	A	Input Data Word 13 Cx + 13
Word 1 .11	B	Input Data Word 13 Cx + 13
Word 1 .12	A	Input Data Word 14 Cx + 14
Word 1 .13	B	Input Data Word 14 Cx + 14
Word 1 .14	A	Input Data Word 15 Cx + 15
Word 1 .15	B	Input Data Word 15 Cx + 15

Where Cx = (Node ID – 1) * 16

The Input PDO Fault Data will be set if a configured slave device has at some time transmitted more or less data than the master device is expecting, or if a slave device is no longer connected to the GEMCAN network.

8.3.3 Output PDO Fault Data

The Input PDO Fault Data consists of two words per slave device. For network A and B there is 1-bit allocated for each word of input data. Bits will only be seen for network B if a Redundant Master has been configured. The 32 bits of data are allocated as detailed in Table 8-8 below. The location of the fault data words are defined in the scanner configuration 'p' table in section 4.2.

Table 8-8 Output PDO Fault Data

Output PDO Fault Data	Network	Description
Word 0 .0	A	Output Data Word 0 Dx + 0
Word 0 .1	B	Output Data Word 0 Dx + 0
Word 0 .2	A	Output Data Word 1 Dx + 1
Word 0 .3	B	Output Data Word 1 Dx + 1
Word 0 .4	A	Output Data Word 2 Dx + 2
Word 0 .5	B	Output Data Word 2 Dx + 2
Word 0 .6	A	Output Data Word 3 Dx + 3
Word 0 .7	B	Output Data Word 3 Dx + 3
Word 0 .8	A	Output Data Word 4 Dx + 4
Word 0 .9	B	Output Data Word 4 Dx + 4
Word 0 .10	A	Output Data Word 5 Dx + 5
Word 0 .11	B	Output Data Word 5 Dx + 5
Word 0 .12	A	Output Data Word 6 Dx + 6
Word 0 .13	B	Output Data Word 6 Dx + 6
Word 0 .14	A	Output Data Word 7 Dx + 7
Word 0 .15	B	Output Data Word 7 Dx + 7
Word 1 .0	A	Output Data Word 8 Dx + 8
Word 1 .1	B	Output Data Word 8 Dx + 8
Word 1 .2	A	Output Data Word 9 Dx + 9
Word 1 .3	B	Output Data Word 9 Dx + 9
Word 1 .4	A	Output Data Word 10 Dx + 10
Word 1 .5	B	Output Data Word 10 Dx + 10
Word 1 .6	A	Output Data Word 11 Dx + 11
Word 1 .7	B	Output Data Word 11 Dx + 11
Word 1 .8	A	Output Data Word 12 Dx + 12
Word 1 .9	B	Output Data Word 12 Dx + 12
Word 1 .10	A	Output Data Word 13 Dx + 13
Word 1 .11	B	Output Data Word 13 Dx + 13
Word 1 .12	A	Output Data Word 14 Dx + 14
Word 1 .13	B	Output Data Word 14 Dx + 14
Word 1 .14	A	Output Data Word 15 Dx + 15
Word 1 .15	B	Output Data Word 15 Dx + 15

Where $Dx = (\text{Node ID} - 1) * 16$

The Output PDO Fault Data will usually only be set if a configured slave device is no longer connected to the GEMCAN network.

8.4 REPAIRS TO GEM80 EQUIPMENT

GEM 80 equipment is repaired by replacement of faulty modules and units. GEM 80 modules are not considered to be user repairable and any attempt to carry out repairs to modules will invalidate all warranties and guarantees. Converteam cannot accept responsibility for GEM 80 equipment that has been repaired, other than by Converteam Customer Support Department.

8.5 FAULT FINDING BACK-UP AND MODULE REPAIR SERVICE

To assist the user in the diagnosis and rectification of faults to GEM 80 equipment, the following services are available from Converteam:

- (a) Product Service Centre Customer Support - available to any GEM 80 user.
- (b) A 'service contract' scheme for complete GEM 80 systems.
- (c) A Normal and Priority Repair Service - available for repair of GEM 80 equipment.

For Customer Support on any aspect of GEM 80 applications, please call:

Product Service Centre Customer Support

Telephone: +44 (0) 1782 781000

Fax: +44 (0) 1782 781133

e-mail: product.service-uk@converteam.com

Any faulty modules should be returned for repair to:

Product Service Centre – Spares and Repairs Dept,
Converteam Ltd.,
West Avenue,
Kidsgrove,
Stoke-on-Trent,
Staffs.,
ST7 1TW
England.
Tel: +44 (0) 1782 781128
Fax: +44 (0) 1782 781133
e-mail: product.service-uk@converteam.com

Faulty modules or units for repair, should be returned in packing which includes antistatic bags next to the electronic circuitry. Where possible the original packing should be used.

8.6 DISPOSAL

The GEMCAN I/O Scanner and GEMTEQ I/O modules should be disposed of in accordance with the laws of the country of use.

Modern high technology materials have been used in the manufacture of the controller to ensure optimum performance. Care has been taken with the selection of these materials to minimise risks to health and safety. However, some materials require special consideration during disposal e.g. the battery which is a Lithium Thionyl Chloride type.

It is recommended that the controller be returned to Converteam for safe disposal. Prior arrangements should be made for return to the address at Section 8.5. Alternatively the controller may be returned to the nearest Converteam service centre.

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APPENDIX A GEM80-500 GEMCAN I/O SCANNER : MODULE 1 DATA SUMMARY

Node ID			PDO	C/D Table	Presence	PDO Fault Data	
	SW3	SW4				A	B
1	0	1	PDO 0	0	F356.0	n.0	n.1
				1		n.2	n.3
				2		n.4	n.5
			PDO 1	3		n.6	n.7
				4		n.8	n.9
				5		n.10	n.11
				6		n.12	n.13
				7		n.14	n.15
			PDO 2	8		n+1.0	n+1.1
				9		n+1.2	n+1.3
				10		n+1.4	n+1.5
			PDO 3	11		n+1.6	n+1.7
				12		n+1.8	n+1.9
				13		n+1.10	n+1.11
				14		n+1.12	n+1.13
				15		n+1.14	n+1.15
2	0	2	PDO 0	16	F356.1	n+2.0	n+2.1
				17		n+2.2	n+2.3
				18		n+2.4	n+2.5
			PDO 1	19		n+2.6	n+2.7
				20		n+2.8	n+2.9
				21		n+2.10	n+2.11
				22		n+2.12	n+2.13
				23		n+2.14	n+2.15
			PDO 2	24		n+3.0	n+3.1
				25		n+3.2	n+3.3
				26		n+3.4	n+3.5
			PDO 3	27		n+3.6	n+3.7
				28		n+3.8	n+3.9
				29		n+3.10	n+3.11
				30		n+3.12	n+3.13
				31		n+3.14	n+3.15
3	0	3	PDO 0	32	F356.2	n+4.0	n+4.1
				33		n+4.2	n+4.3
				34		n+4.4	n+4.5
			PDO 1	35		n+4.6	n+4.7
				36		n+4.8	n+4.9
				37		n+4.10	n+4.11
				38		n+4.12	n+4.13
				39		n+4.14	n+4.15
			PDO 2	40		n+5.0	n+5.1
				41		n+5.2	n+5.3
				42		n+5.4	n+5.5
			PDO 3	43		n+5.6	n+5.7
				44		n+5.8	n+5.9
				45		n+5.10	n+5.11
				46		n+5.12	n+5.13
				47		n+5.14	n+5.15
4	0	4	PDO 0	48	F356.3	n+6.0	n+6.1
				49		n+6.2	n+6.3
				50		n+6.4	n+6.5
			PDO 1	51		n+6.6	n+6.7
				52		n+6.8	n+6.9
				53		n+6.10	n+6.11
				54		n+6.12	n+6.13
				55		n+6.14	n+6.15
			PDO 2	56		n+7.0	n+7.1
				57		n+7.2	n+7.3
				58		n+7.4	n+7.5
			PDO 3	59		n+7.6	n+7.7
				60		n+7.8	n+7.9
				61		n+7.10	n+7.11
				62		n+7.12	n+7.13
				63		n+7.14	n+7.15
5	0	5	PDO 0	64	F356.4	n+8.0	n+8.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				65		n+8.2	n+8.3
				66		n+8.4	n+8.5
				67		n+8.6	n+8.7
			PDO 1	68		n+8.8	n+8.9
				69		n+8.10	n+8.11
				70		n+8.12	n+8.13
				71		n+8.14	n+8.15
			PDO 2	72		n+9.0	n+9.1
				73		n+9.2	n+9.3
				74		n+9.4	n+9.5
				75		n+9.6	n+9.7
			PDO 3	76		n+9.8	n+9.9
				77		n+9.10	n+9.11
				78		n+9.12	n+9.13
				79		n+9.14	n+9.15
6	0	6	PDO 0	80	F356.5	n+10.0	n+10.1
				81		n+10.2	n+10.3
				82		n+10.4	n+10.5
				83		n+10.6	n+10.7
			PDO 1	84		n+10.8	n+10.9
				85		n+10.10	n+10.11
				86		n+10.12	n+10.13
				87		n+10.14	n+10.15
			PDO 2	88		n+11.0	n+11.1
				89		n+11.2	n+11.3
				90		n+11.4	n+11.5
				91		n+11.6	n+11.7
			PDO 3	92		n+11.8	n+11.9
				93		n+11.10	n+11.11
				94		n+11.12	n+11.13
				95		n+11.14	n+11.15
7	0	7	PDO 0	96	F356.6	n+12.0	n+12.1
				97		n+12.2	n+12.3
				98		n+12.4	n+12.5
				99		n+12.6	n+12.7
			PDO 1	100		n+12.8	n+12.9
				101		n+12.10	n+12.11
				102		n+12.12	n+12.13
				103		n+12.14	n+12.15
			PDO 2	104		n+13.0	n+13.1
				105		n+13.2	n+13.3
				106		n+13.4	n+13.5
				107		n+13.6	n+13.7
			PDO 3	108		n+13.8	n+13.9
				109		n+13.10	n+13.11
				110		n+13.12	n+13.13
				111		n+13.14	n+13.15
8	0	8	PDO 0	112	F356.7	n+14.0	n+14.1
				113		n+14.2	n+14.3
				114		n+14.4	n+14.5
				115		n+14.6	n+14.7
			PDO 1	116		n+14.8	n+14.9
				117		n+14.10	n+14.11
				118		n+14.12	n+14.13
				119		n+14.14	n+14.15
			PDO 2	120		n+15.0	n+15.1
				121		n+15.2	n+15.3
				122		n+15.4	n+15.5
				123		n+15.6	n+15.7
			PDO 3	124		n+15.8	n+15.9
				125		n+15.10	n+15.11
				126		n+15.12	n+15.13
				127		n+15.14	n+15.15
9	0	9	PDO 0	128	F356.8	n+16.0	n+16.1
				129		n+16.2	n+16.3
				130		n+16.4	n+16.5

Node ID	SW3		PDO	C/D Table	Presence	PDO Fault Data	
	SW3	SW4				A	B
				131		n+16.6	n+16.7
			PDO 1	132		n+16.8	n+16.9
				133		n+16.10	n+16.11
				134		n+16.12	n+16.13
				135		n+16.14	n+16.15
			PDO 2	136		n+17.0	n+17.1
				137		n+17.2	n+17.3
				138		n+17.4	n+17.5
				139		n+17.6	n+17.7
			PDO 3	140		n+17.8	n+17.9
				141		n+17.10	n+17.11
				142		n+17.12	n+17.13
				143		n+17.14	n+17.15
10	0	A	PDO 0	144	F356.9	n+18.0	n+18.1
				145		n+18.2	n+18.3
				146		n+18.4	n+18.5
				147		n+18.6	n+18.7
			PDO 1	148		n+18.8	n+18.9
				149		n+18.10	n+18.11
				150		n+18.12	n+18.13
				151		n+18.14	n+18.15
			PDO 2	152		n+19.0	n+19.1
				153		n+19.2	n+19.3
				154		n+19.4	n+19.5
				155		n+19.6	n+19.7
			PDO 3	156		n+19.8	n+19.9
				157		n+19.10	n+19.11
				158		n+19.12	n+19.13
				159		n+19.14	n+19.15
11	0	B	PDO 0	160	F356.10	n+20.0	n+20.1
				161		n+20.2	n+20.3
				162		n+20.4	n+20.5
				163		n+20.6	n+20.7
			PDO 1	164		n+20.8	n+20.9
				165		n+20.10	n+20.11
				166		n+20.12	n+20.13
				167		n+20.14	n+20.15
			PDO 2	168		n+21.0	n+21.1
				169		n+21.2	n+21.3
				170		n+21.4	n+21.5
				171		n+21.6	n+21.7
			PDO 3	172		n+21.8	n+21.9
				173		n+21.10	n+21.11
				174		n+21.12	n+21.13
				175		n+21.14	n+21.15
12	0	C	PDO 0	176	F356.11	n+22.0	n+22.1
				177		n+22.2	n+22.3
				178		n+22.4	n+22.5
				179		n+22.6	n+22.7
			PDO 1	180		n+22.8	n+22.9
				181		n+22.10	n+22.11
				182		n+22.12	n+22.13
				183		n+22.14	n+22.15
			PDO 2	184		n+23.0	n+23.1
				185		n+23.2	n+23.3
				186		n+23.4	n+23.5
				187		n+23.6	n+23.7
			PDO 3	188		n+23.8	n+23.9
				189		n+23.10	n+23.11
				190		n+23.12	n+23.13
				191		n+23.14	n+23.15
13	0	D	PDO 0	192	F356.12	n+24.0	n+24.1
				193		n+24.2	n+24.3
				194		n+24.4	n+24.5
				195		n+24.6	n+24.7
			PDO 1	196		n+24.8	n+24.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				197		n+24.10	n+24.11
				198		n+24.12	n+24.13
				199		n+24.14	n+24.15
			PDO 2	200		n+25.0	n+25.1
				201		n+25.2	n+25.3
				202		n+25.4	n+25.5
				203		n+25.6	n+25.7
			PDO 3	204		n+25.8	n+25.9
				205		n+25.10	n+25.11
				206		n+25.12	n+25.13
				207		n+25.14	n+25.15
14	0	E	PDO 0	208	F356.13	n+26.0	n+26.1
				209		n+26.2	n+26.3
				210		n+26.4	n+26.5
				211		n+26.6	n+26.7
			PDO 1	212		n+26.8	n+26.9
				213		n+26.10	n+26.11
				214		n+26.12	n+26.13
				215		n+26.14	n+26.15
			PDO 2	216		n+27.0	n+27.1
				217		n+27.2	n+27.3
				218		n+27.4	n+27.5
				219		n+27.6	n+27.7
			PDO 3	220		n+27.8	n+27.9
				221		n+27.10	n+27.11
				222		n+27.12	n+27.13
				223		n+27.14	n+27.15
15	0	F	PDO 0	224	F356.14	n+28.0	n+28.1
				225		n+28.2	n+28.3
				226		n+28.4	n+28.5
				227		n+28.6	n+28.7
			PDO 1	228		n+28.8	n+28.9
				229		n+28.10	n+28.11
				230		n+28.12	n+28.13
				231		n+28.14	n+28.15
			PDO 2	232		n+29.0	n+29.1
				233		n+29.2	n+29.3
				234		n+29.4	n+29.5
				235		n+29.6	n+29.7
			PDO 3	236		n+29.8	n+29.9
				237		n+29.10	n+29.11
				238		n+29.12	n+29.13
				239		n+29.14	n+29.15
16	1	0	PDO 0	240	F356.15	n+30.0	n+30.1
				241		n+30.2	n+30.3
				242		n+30.4	n+30.5
				243		n+30.6	n+30.7
			PDO 1	244		n+30.8	n+30.9
				245		n+30.10	n+30.11
				246		n+30.12	n+30.13
				247		n+30.14	n+30.15
			PDO 2	248		n+31.0	n+31.1
				249		n+31.2	n+31.3
				250		n+31.4	n+31.5
				251		n+31.6	n+31.7
			PDO 3	252		n+31.8	n+31.9
				253		n+31.10	n+31.11
				254		n+31.12	n+31.13
				255		n+31.14	n+31.15
17	1	1	PDO 0	256	F357.0	n+32.0	n+32.1
				257		n+32.2	n+32.3
				258		n+32.4	n+32.5
				259		n+32.6	n+32.7
			PDO 1	260		n+32.8	n+32.9
				261		n+32.10	n+32.11
				262		n+32.12	n+32.13

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				263		n+32.14	n+32.15
			PDO 2	264		n+33.0	n+33.1
				265		n+33.2	n+33.3
				266		n+33.4	n+33.5
				267		n+33.6	n+33.7
			PDO 3	268		n+33.8	n+33.9
				269		n+33.10	n+33.11
				270		n+33.12	n+33.13
				271		n+33.14	n+33.15
18	1	2	PDO 0	272	F357.1	n+34.0	n+34.1
				273		n+34.2	n+34.3
				274		n+34.4	n+34.5
				275		n+34.6	n+34.7
			PDO 1	276		n+34.8	n+34.9
				277		n+34.10	n+34.11
				278		n+34.12	n+34.13
				279		n+34.14	n+34.15
			PDO 2	280		n+35.0	n+35.1
				281		n+35.2	n+35.3
				282		n+35.4	n+35.5
				283		n+35.6	n+35.7
			PDO 3	284		n+35.8	n+35.9
				285		n+35.10	n+35.11
				286		n+35.12	n+35.13
				287		n+35.14	n+35.15
19	1	3	PDO 0	288	F357.2	n+36.0	n+36.1
				289		n+36.2	n+36.3
				290		n+36.4	n+36.5
				291		n+36.6	n+36.7
			PDO 1	292		n+36.8	n+36.9
				293		n+36.10	n+36.11
				294		n+36.12	n+36.13
				295		n+36.14	n+36.15
			PDO 2	296		n+37.0	n+37.1
				297		n+37.2	n+37.3
				298		n+37.4	n+37.5
				299		n+37.6	n+37.7
			PDO 3	300		n+37.8	n+37.9
				301		n+37.10	n+37.11
				302		n+37.12	n+37.13
				303		n+37.14	n+37.15
20	1	4	PDO 0	304	F357.3	n+38.0	n+38.1
				305		n+38.2	n+38.3
				306		n+38.4	n+38.5
				307		n+38.6	n+38.7
			PDO 1	308		n+38.8	n+38.9
				309		n+38.10	n+38.11
				310		n+38.12	n+38.13
				311		n+38.14	n+38.15
			PDO 2	312		n+39.0	n+39.1
				313		n+39.2	n+39.3
				314		n+39.4	n+39.5
				315		n+39.6	n+39.7
			PDO 3	316		n+39.8	n+39.9
				317		n+39.10	n+39.11
				318		n+39.12	n+39.13
				319		n+39.14	n+39.15
21	1	5	PDO 0	320	F357.4	n+40.0	n+40.1
				321		n+40.2	n+40.3
				322		n+40.4	n+40.5
				323		n+40.6	n+40.7
			PDO 1	324		n+40.8	n+40.9
				325		n+40.10	n+40.11
				326		n+40.12	n+40.13
				327		n+40.14	n+40.15
			PDO 2	328		n+41.0	n+41.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				329		n+41.2	n+41.3
				330		n+41.4	n+41.5
				331		n+41.6	n+41.7
			PDO 3	332		n+41.8	n+41.9
				333		n+41.10	n+41.11
				334		n+41.12	n+41.13
				335		n+41.14	n+41.15
22	1	6	PDO 0	336	F357.5	n+42.0	n+42.1
				337		n+42.2	n+42.3
				338		n+42.4	n+42.5
				339		n+42.6	n+42.7
			PDO 1	340		n+42.8	n+42.9
				341		n+42.10	n+42.11
				342		n+42.12	n+42.13
				343		n+42.14	n+42.15
			PDO 2	344		n+43.0	n+43.1
				345		n+43.2	n+43.3
				346		n+43.4	n+43.5
				347		n+43.6	n+43.7
			PDO 3	348		n+43.8	n+43.9
				349		n+43.10	n+43.11
				350		n+43.12	n+43.13
				351		n+43.14	n+43.15
23	1	7	PDO 0	352	F357.6	n+44.0	n+44.1
				353		n+44.2	n+44.3
				354		n+44.4	n+44.5
				355		n+44.6	n+44.7
			PDO 1	356		n+44.8	n+44.9
				357		n+44.10	n+44.11
				358		n+44.12	n+44.13
				359		n+44.14	n+44.15
			PDO 2	360		n+45.0	n+45.1
				361		n+45.2	n+45.3
				362		n+45.4	n+45.5
				363		n+45.6	n+45.7
			PDO 3	364		n+45.8	n+45.9
				365		n+45.10	n+45.11
				366		n+45.12	n+45.13
				367		n+45.14	n+45.15
24	1	8	PDO 0	368	F357.7	n+46.0	n+46.1
				369		n+46.2	n+46.3
				370		n+46.4	n+46.5
				371		n+46.6	n+46.7
			PDO 1	372		n+46.8	n+46.9
				373		n+46.10	n+46.11
				374		n+46.12	n+46.13
				375		n+46.14	n+46.15
			PDO 2	376		n+47.0	n+47.1
				377		n+47.2	n+47.3
				378		n+47.4	n+47.5
				379		n+47.6	n+47.7
			PDO 3	380		n+47.8	n+47.9
				381		n+47.10	n+47.11
				382		n+47.12	n+47.13
				383		n+47.14	n+47.15
25	1	9	PDO 0	384	F357.8	n+48.0	n+48.1
				385		n+48.2	n+48.3
				386		n+48.4	n+48.5
				387		n+48.6	n+48.7
			PDO 1	388		n+48.8	n+48.9
				389		n+48.10	n+48.11
				390		n+48.12	n+48.13
				391		n+48.14	n+48.15
			PDO 2	392		n+49.0	n+49.1
				393		n+49.2	n+49.3
				394		n+49.4	n+49.5

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				395		n+49.6	n+49.7
			PDO 3	396		n+49.8	n+49.9
				397		n+49.10	n+49.11
				398		n+49.12	n+49.13
				399		n+49.14	n+49.15
26	1	A	PDO 0	400	F357.9	n+50.0	n+50.1
				401		n+50.2	n+50.3
				402		n+50.4	n+50.5
				403		n+50.6	n+50.7
			PDO 1	404		n+50.8	n+50.9
				405		n+50.10	n+50.11
				406		n+50.12	n+50.13
				407		n+50.14	n+50.15
			PDO 2	408		n+51.0	n+51.1
				409		n+51.2	n+51.3
				410		n+51.4	n+51.5
				411		n+51.6	n+51.7
			PDO 3	412		n+51.8	n+51.9
				413		n+51.10	n+51.11
				414		n+51.12	n+51.13
				415		n+51.14	n+51.15
27	1	B	PDO 0	416	F357.10	n+52.0	n+52.1
				417		n+52.2	n+52.3
				418		n+52.4	n+52.5
				419		n+52.6	n+52.7
			PDO 1	420		n+52.8	n+52.9
				421		n+52.10	n+52.11
				422		n+52.12	n+52.13
				423		n+52.14	n+52.15
			PDO 2	424		n+53.0	n+53.1
				425		n+53.2	n+53.3
				426		n+53.4	n+53.5
				427		n+53.6	n+53.7
			PDO 3	428		n+53.8	n+53.9
				429		n+53.10	n+53.11
				430		n+53.12	n+53.13
				431		n+53.14	n+53.15
28	1	C	PDO 0	432	F357.11	n+54.0	n+54.1
				433		n+54.2	n+54.3
				434		n+54.4	n+54.5
				435		n+54.6	n+54.7
			PDO 1	436		n+54.8	n+54.9
				437		n+54.10	n+54.11
				438		n+54.12	n+54.13
				439		n+54.14	n+54.15
			PDO 2	440		n+55.0	n+55.1
				441		n+55.2	n+55.3
				442		n+55.4	n+55.5
				443		n+55.6	n+55.7
			PDO 3	444		n+55.8	n+55.9
				445		n+55.10	n+55.11
				446		n+55.12	n+55.13
				447		n+55.14	n+55.15
29	1	D	PDO 0	448	F357.12	n+56.0	n+56.1
				449		n+56.2	n+56.3
				450		n+56.4	n+56.5
				451		n+56.6	n+56.7
			PDO 1	452		n+56.8	n+56.9
				453		n+56.10	n+56.11
				454		n+56.12	n+56.13
				455		n+56.14	n+56.15
			PDO 2	456		n+57.0	n+57.1
				457		n+57.2	n+57.3
				458		n+57.4	n+57.5
				459		n+57.6	n+57.7
			PDO 3	460		n+57.8	n+57.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
	SW3	SW4				A	B
				461		n+57.10	n+57.11
				462		n+57.12	n+57.13
				463		n+57.14	n+57.15
30	1	E	PDO 0	464	F357.13	n+58.0	n+58.1
				465		n+58.2	n+58.3
				466		n+58.4	n+58.5
				467		n+58.6	n+58.7
			PDO 1	468		n+58.8	n+58.9
				469		n+58.10	n+58.11
				470		n+58.12	n+58.13
				471		n+58.14	n+58.15
			PDO 2	472		n+59.0	n+59.1
				473		n+59.2	n+59.3
				474		n+59.4	n+59.5
				475		n+59.6	n+59.7
			PDO 3	476		n+59.8	n+59.9
				477		n+59.10	n+59.11
				478		n+59.12	n+59.13
				479		n+59.14	n+59.15
31	1	F	PDO 0	480	F357.14	n+60.0	n+60.1
				481		n+60.2	n+60.3
				482		n+60.4	n+60.5
				483		n+60.6	n+60.7
			PDO 1	484		n+60.8	n+60.9
				485		n+60.10	n+60.11
				486		n+60.12	n+60.13
				487		n+60.14	n+60.15
			PDO 2	488		n+61.0	n+61.1
				489		n+61.2	n+61.3
				490		n+61.4	n+61.5
				491		n+61.6	n+61.7
			PDO 3	492		n+61.8	n+61.9
				493		n+61.10	n+61.11
				494		n+61.12	n+61.13
				495		n+61.14	n+61.15
32	2	0	PDO 0	496	F357.15	n+62.0	n+62.1
				497		n+62.2	n+62.3
				498		n+62.4	n+62.5
				499		n+62.6	n+62.7
			PDO 1	500		n+62.8	n+62.9
				501		n+62.10	n+62.11
				502		n+62.12	n+62.13
				503		n+62.14	n+62.15
			PDO 2	504		n+63.0	n+63.1
				505		n+63.2	n+63.3
				506		n+63.4	n+63.5
				507		n+63.6	n+63.7
			PDO 3	508		n+63.8	n+63.9
				509		n+63.10	n+63.11
				510		n+63.12	n+63.13
				511		n+63.14	n+63.15
33	2	1	PDO 0	512	F358.0	n+64.0	n+64.1
				513		n+64.2	n+64.3
				514		n+64.4	n+64.5
				515		n+64.6	n+64.7
			PDO 1	516		n+64.8	n+64.9
				517		n+64.10	n+64.11
				518		n+64.12	n+64.13
				519		n+64.14	n+64.15
			PDO 2	520		n+65.0	n+65.1
				521		n+65.2	n+65.3
				522		n+65.4	n+65.5
				523		n+65.6	n+65.7
			PDO 3	524		n+65.8	n+65.9
				525		n+65.10	n+65.11
				526		n+65.12	n+65.13

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				527		n+65.14	n+65.15
34	2	2	PDO 0	528	F358.1	n+66.0	n+66.1
				529		n+66.2	n+66.3
				530		n+66.4	n+66.5
				531		n+66.6	n+66.7
			PDO 1	532		n+66.8	n+66.9
				533		n+66.10	n+66.11
				534		n+66.12	n+66.13
				535		n+66.14	n+66.15
			PDO 2	536		n+67.0	n+67.1
				537		n+67.2	n+67.3
				538		n+67.4	n+67.5
				539		n+67.6	n+67.7
			PDO 3	540		n+67.8	n+67.9
				541		n+67.10	n+67.11
				542		n+67.12	n+67.13
				543		n+67.14	n+67.15
35	2	3	PDO 0	544	F358.2	n+68.0	n+68.1
				545		n+68.2	n+68.3
				546		n+68.4	n+68.5
				547		n+68.6	n+68.7
			PDO 1	548		n+68.8	n+68.9
				549		n+68.10	n+68.11
				550		n+68.12	n+68.13
				551		n+68.14	n+68.15
			PDO 2	552		n+69.0	n+69.1
				553		n+69.2	n+69.3
				554		n+69.4	n+69.5
				555		n+69.6	n+69.7
			PDO 3	556		n+69.8	n+69.9
				557		n+69.10	n+69.11
				558		n+69.12	n+69.13
				559		n+69.14	n+69.15
36	2	4	PDO 0	560	F358.3	n+70.0	n+70.1
				561		n+70.2	n+70.3
				562		n+70.4	n+70.5
				563		n+70.6	n+70.7
			PDO 1	564		n+70.8	n+70.9
				565		n+70.10	n+70.11
				566		n+70.12	n+70.13
				567		n+70.14	n+70.15
			PDO 2	568		n+71.0	n+71.1
				569		n+71.2	n+71.3
				570		n+71.4	n+71.5
				571		n+71.6	n+71.7
			PDO 3	572		n+71.8	n+71.9
				573		n+71.10	n+71.11
				574		n+71.12	n+71.13
				575		n+71.14	n+71.15
37	2	5	PDO 0	576	F358.4	n+72.0	n+72.1
				577		n+72.2	n+72.3
				578		n+72.4	n+72.5
				579		n+72.6	n+72.7
			PDO 1	580		n+72.8	n+72.9
				581		n+72.10	n+72.11
				582		n+72.12	n+72.13
				583		n+72.14	n+72.15
			PDO 2	584		n+73.0	n+73.1
				585		n+73.2	n+73.3
				586		n+73.4	n+73.5
				587		n+73.6	n+73.7
			PDO 3	588		n+73.8	n+73.9
				589		n+73.10	n+73.11
				590		n+73.12	n+73.13
				591		n+73.14	n+73.15
38	2	6	PDO 0	592	F358.5	n+74.0	n+74.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				593		n+74.2	n+74.3
				594		n+74.4	n+74.5
				595		n+74.6	n+74.7
			PDO 1	596		n+74.8	n+74.9
				597		n+74.10	n+74.11
				598		n+74.12	n+74.13
				599		n+74.14	n+74.15
			PDO 2	600		n+75.0	n+75.1
				601		n+75.2	n+75.3
				602		n+75.4	n+75.5
				603		n+75.6	n+75.7
			PDO 3	604		n+75.8	n+75.9
				605		n+75.10	n+75.11
				606		n+75.12	n+75.13
				607		n+75.14	n+75.15
39	2	7	PDO 0	608	F358.6	n+76.0	n+76.1
				609		n+76.2	n+76.3
				610		n+76.4	n+76.5
				611		n+76.6	n+76.7
			PDO 1	612		n+76.8	n+76.9
				613		n+76.10	n+76.11
				614		n+76.12	n+76.13
				615		n+76.14	n+76.15
			PDO 2	616		n+77.0	n+77.1
				617		n+77.2	n+77.3
				618		n+77.4	n+77.5
				619		n+77.6	n+77.7
			PDO 3	620		n+77.8	n+77.9
				621		n+77.10	n+77.11
				622		n+77.12	n+77.13
				623		n+77.14	n+77.15
40	2	8	PDO 0	624	F358.7	n+78.0	n+78.1
				625		n+78.2	n+78.3
				626		n+78.4	n+78.5
				627		n+78.6	n+78.7
			PDO 1	628		n+78.8	n+78.9
				629		n+78.10	n+78.11
				630		n+78.12	n+78.13
				631		n+78.14	n+78.15
			PDO 2	632		n+79.0	n+79.1
				633		n+79.2	n+79.3
				634		n+79.4	n+79.5
				635		n+79.6	n+79.7
			PDO 3	636		n+79.8	n+79.9
				637		n+79.10	n+79.11
				638		n+79.12	n+79.13
				639		n+79.14	n+79.15
41	2	9	PDO 0	640	F358.8	n+80.0	n+80.1
				641		n+80.2	n+80.3
				642		n+80.4	n+80.5
				643		n+80.6	n+80.7
			PDO 1	644		n+80.8	n+80.9
				645		n+80.10	n+80.11
				646		n+80.12	n+80.13
				647		n+80.14	n+80.15
			PDO 2	648		n+81.0	n+81.1
				649		n+81.2	n+81.3
				650		n+81.4	n+81.5
				651		n+81.6	n+81.7
			PDO 3	652		n+81.8	n+81.9
				653		n+81.10	n+81.11
				654		n+81.12	n+81.13
				655		n+81.14	n+81.15
42	2	A	PDO 0	656	F358.9	n+82.0	n+82.1
				657		n+82.2	n+82.3
				658		n+82.4	n+82.5

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				659		n+82.6	n+82.7
			PDO 1	660		n+82.8	n+82.9
				661		n+82.10	n+82.11
				662		n+82.12	n+82.13
				663		n+82.14	n+82.15
			PDO 2	664		n+83.0	n+83.1
				665		n+83.2	n+83.3
				666		n+83.4	n+83.5
				667		n+83.6	n+83.7
			PDO 3	668		n+83.8	n+83.9
				669		n+83.10	n+83.11
				670		n+83.12	n+83.13
				671		n+83.14	n+83.15
43	2	B	PDO 0	672	F358.10	n+84.0	n+84.1
				673		n+84.2	n+84.3
				674		n+84.4	n+84.5
				675		n+84.6	n+84.7
			PDO 1	676		n+84.8	n+84.9
				677		n+84.10	n+84.11
				678		n+84.12	n+84.13
				679		n+84.14	n+84.15
			PDO 2	680		n+85.0	n+85.1
				681		n+85.2	n+85.3
				682		n+85.4	n+85.5
				683		n+85.6	n+85.7
			PDO 3	684		n+85.8	n+85.9
				685		n+85.10	n+85.11
				686		n+85.12	n+85.13
				687		n+85.14	n+85.15
44	2	C	PDO 0	688	F358.11	n+86.0	n+86.1
				689		n+86.2	n+86.3
				690		n+86.4	n+86.5
				691		n+86.6	n+86.7
			PDO 1	692		n+86.8	n+86.9
				693		n+86.10	n+86.11
				694		n+86.12	n+86.13
				695		n+86.14	n+86.15
			PDO 2	696		n+87.0	n+87.1
				697		n+87.2	n+87.3
				698		n+87.4	n+87.5
				699		n+87.6	n+87.7
			PDO 3	700		n+87.8	n+87.9
				701		n+87.10	n+87.11
				702		n+87.12	n+87.13
				703		n+87.14	n+87.15
45	2	D	PDO 0	704	F358.12	n+88.0	n+88.1
				705		n+88.2	n+88.3
				706		n+88.4	n+88.5
				707		n+88.6	n+88.7
			PDO 1	708		n+88.8	n+88.9
				709		n+88.10	n+88.11
				710		n+88.12	n+88.13
				711		n+88.14	n+88.15
			PDO 2	712		n+89.0	n+89.1
				713		n+89.2	n+89.3
				714		n+89.4	n+89.5
				715		n+89.6	n+89.7
			PDO 3	716		n+89.8	n+89.9
				717		n+89.10	n+89.11
				718		n+89.12	n+89.13
				719		n+89.14	n+89.15
46	2	E	PDO 0	720	F358.13	n+90.0	n+90.1
				721		n+90.2	n+90.3
				722		n+90.4	n+90.5
				723		n+90.6	n+90.7
			PDO 1	724		n+90.8	n+90.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				725		n+90.10	n+90.11
				726		n+90.12	n+90.13
				727		n+90.14	n+90.15
			PDO 2	728		n+91.0	n+91.1
				729		n+91.2	n+91.3
				730		n+91.4	n+91.5
				731		n+91.6	n+91.7
			PDO 3	732		n+91.8	n+91.9
				733		n+91.10	n+91.11
				734		n+91.12	n+91.13
				735		n+91.14	n+91.15
47	2	F	PDO 0	736	F358.14	n+92.0	n+92.1
				737		n+92.2	n+92.3
				738		n+92.4	n+92.5
				739		n+92.6	n+92.7
			PDO 1	740		n+92.8	n+92.9
				741		n+92.10	n+92.11
				742		n+92.12	n+92.13
				743		n+92.14	n+92.15
			PDO 2	744		n+93.0	n+93.1
				745		n+93.2	n+93.3
				746		n+93.4	n+93.5
				747		n+93.6	n+93.7
			PDO 3	748		n+93.8	n+93.9
				749		n+93.10	n+93.11
				750		n+93.12	n+93.13
				751		n+93.14	n+93.15
48	3	0	PDO 0	752	F358.15	n+94.0	n+94.1
				753		n+94.2	n+94.3
				754		n+94.4	n+94.5
				755		n+94.6	n+94.7
			PDO 1	756		n+94.8	n+94.9
				757		n+94.10	n+94.11
				758		n+94.12	n+94.13
				759		n+94.14	n+94.15
			PDO 2	760		n+95.0	n+95.1
				761		n+95.2	n+95.3
				762		n+95.4	n+95.5
				763		n+95.6	n+95.7
			PDO 3	764		n+95.8	n+95.9
				765		n+95.10	n+95.11
				766		n+95.12	n+95.13
				767		n+95.14	n+95.15
49	3	1	PDO 0	768	F359.0	n+96.0	n+96.1
				769		n+96.2	n+96.3
				770		n+96.4	n+96.5
				771		n+96.6	n+96.7
			PDO 1	772		n+96.8	n+96.9
				773		n+96.10	n+96.11
				774		n+96.12	n+96.13
				775		n+96.14	n+96.15
			PDO 2	776		n+97.0	n+97.1
				777		n+97.2	n+97.3
				778		n+97.4	n+97.5
				779		n+97.6	n+97.7
			PDO 3	780		n+97.8	n+97.9
				781		n+97.10	n+97.11
				782		n+97.12	n+97.13
				783		n+97.14	n+97.15
50	3	2	PDO 0	784	F359.1	n+98.0	n+98.1
				785		n+98.2	n+98.3
				786		n+98.4	n+98.5
				787		n+98.6	n+98.7
			PDO 1	788		n+98.8	n+98.9
				789		n+98.10	n+98.11
				790		n+98.12	n+98.13

Node ID			PDO	C/D Table	Presence	PDO Fault Data	
SW3	SW4	A				B	
				791		n+98.14	n+98.15
			PDO 2	792		n+99.0	n+99.1
				793		n+99.2	n+99.3
				794		n+99.4	n+99.5
				795		n+99.6	n+99.7
			PDO 3	796		n+99.8	n+99.9
				797		n+99.10	n+99.11
				798		n+99.12	n+99.13
				799		n+99.14	n+99.15
51	3	3	PDO 0	800	F359.2	n+100.0	n+100.1
				801		n+100.2	n+100.3
				802		n+100.4	n+100.5
				803		n+100.6	n+100.7
			PDO 1	804		n+100.8	n+100.9
				805		n+100.10	n+100.11
				806		n+100.12	n+100.13
				807		n+100.14	n+100.15
			PDO 2	808		n+101.0	n+101.1
				809		n+101.2	n+101.3
				810		n+101.4	n+101.5
				811		n+101.6	n+101.7
			PDO 3	812		n+101.8	n+101.9
				813		n+101.10	n+101.11
				814		n+101.12	n+101.13
				815		n+101.14	n+101.15
52	3	4	PDO 0	816	F359.3	n+102.0	n+102.1
				817		n+102.2	n+102.3
				818		n+102.4	n+102.5
				819		n+102.6	n+102.7
			PDO 1	820		n+102.8	n+102.9
				821		n+102.10	n+102.11
				822		n+102.12	n+102.13
				823		n+102.14	n+102.15
			PDO 2	824		n+103.0	n+103.1
				825		n+103.2	n+103.3
				826		n+103.4	n+103.5
				827		n+103.6	n+103.7
			PDO 3	828		n+103.8	n+103.9
				829		n+103.10	n+103.11
				830		n+103.12	n+103.13
				831		n+103.14	n+103.15
53	3	5	PDO 0	832	F359.4	n+104.0	n+104.1
				833		n+104.2	n+104.3
				834		n+104.4	n+104.5
				835		n+104.6	n+104.7
			PDO 1	836		n+104.8	n+104.9
				837		n+104.10	n+104.11
				838		n+104.12	n+104.13
				839		n+104.14	n+104.15
			PDO 2	840		n+105.0	n+105.1
				841		n+105.2	n+105.3
				842		n+105.4	n+105.5
				843		n+105.6	n+105.7
			PDO 3	844		n+105.8	n+105.9
				845		n+105.10	n+105.11
				846		n+105.12	n+105.13
				847		n+105.14	n+105.15
54	3	6	PDO 0	848	F359.5	n+106.0	n+106.1
				849		n+106.2	n+106.3
				850		n+106.4	n+106.5
				851		n+106.6	n+106.7
			PDO 1	852		n+106.8	n+106.9
				853		n+106.10	n+106.11
				854		n+106.12	n+106.13
				855		n+106.14	n+106.15
			PDO 2	856		n+107.0	n+107.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				857		n+107.2	n+107.3
				858		n+107.4	n+107.5
				859		n+107.6	n+107.7
			PDO 3	860		n+107.8	n+107.9
				861		n+107.10	n+107.11
				862		n+107.12	n+107.13
				863		n+107.14	n+107.15
55	3	7	PDO 0	864	F359.6	n+108.0	n+108.1
				865		n+108.2	n+108.3
				866		n+108.4	n+108.5
				867		n+108.6	n+108.7
			PDO 1	868		n+108.8	n+108.9
				869		n+108.10	n+108.11
				870		n+108.12	n+108.13
				871		n+108.14	n+108.15
			PDO 2	872		n+109.0	n+109.1
				873		n+109.2	n+109.3
				874		n+109.4	n+109.5
				875		n+109.6	n+109.7
			PDO 3	876		n+109.8	n+109.9
				877		n+109.10	n+109.11
				878		n+109.12	n+109.13
				879		n+109.14	n+109.15
56	3	8	PDO 0	880	F359.7	n+110.0	n+110.1
				881		n+110.2	n+110.3
				882		n+110.4	n+110.5
				883		n+110.6	n+110.7
			PDO 1	884		n+110.8	n+110.9
				885		n+110.10	n+110.11
				886		n+110.12	n+110.13
				887		n+110.14	n+110.15
			PDO 2	888		n+111.0	n+111.1
				889		n+111.2	n+111.3
				890		n+111.4	n+111.5
				891		n+111.6	n+111.7
			PDO 3	892		n+111.8	n+111.9
				893		n+111.10	n+111.11
				894		n+111.12	n+111.13
				895		n+111.14	n+111.15
57	3	9	PDO 0	896	F359.8	n+112.0	n+112.1
				897		n+112.2	n+112.3
				898		n+112.4	n+112.5
				899		n+112.6	n+112.7
			PDO 1	900		n+112.8	n+112.9
				901		n+112.10	n+112.11
				902		n+112.12	n+112.13
				903		n+112.14	n+112.15
			PDO 2	904		n+113.0	n+113.1
				905		n+113.2	n+113.3
				906		n+113.4	n+113.5
				907		n+113.6	n+113.7
			PDO 3	908		n+113.8	n+113.9
				909		n+113.10	n+113.11
				910		n+113.12	n+113.13
				911		n+113.14	n+113.15
58	3	A	PDO 0	912	F359.9	n+114.0	n+114.1
				913		n+114.2	n+114.3
				914		n+114.4	n+114.5
				915		n+114.6	n+114.7
			PDO 1	916		n+114.8	n+114.9
				917		n+114.10	n+114.11
				918		n+114.12	n+114.13
				919		n+114.14	n+114.15
			PDO 2	920		n+115.0	n+115.1
				921		n+115.2	n+115.3
				922		n+115.4	n+115.5

Node ID			PDO	C/D Table	Presence	PDO Fault Data	
	SW3	SW4				A	B
				923		n+115.6	n+115.7
			PDO 3	924		n+115.8	n+115.9
				925		n+115.10	n+115.11
				926		n+115.12	n+115.13
				927		n+115.14	n+115.15
59	3	B	PDO 0	928	F359.10	n+116.0	n+116.1
				929		n+116.2	n+116.3
				930		n+116.4	n+116.5
				931		n+116.6	n+116.7
			PDO 1	932		n+116.8	n+116.9
				933		n+116.10	n+116.11
				934		n+116.12	n+116.13
				935		n+116.14	n+116.15
			PDO 2	936		n+117.0	n+117.1
				937		n+117.2	n+117.3
				938		n+117.4	n+117.5
				939		n+117.6	n+117.7
			PDO 3	940		n+117.8	n+117.9
				941		n+117.10	n+117.11
				942		n+117.12	n+117.13
				943		n+117.14	n+117.15
60	3	C	PDO 0	944	F359.11	n+118.0	n+118.1
				945		n+118.2	n+118.3
				946		n+118.4	n+118.5
				947		n+118.6	n+118.7
			PDO 1	948		n+118.8	n+118.9
				949		n+118.10	n+118.11
				950		n+118.12	n+118.13
				951		n+118.14	n+118.15
			PDO 2	952		n+119.0	n+119.1
				953		n+119.2	n+119.3
				954		n+119.4	n+119.5
				955		n+119.6	n+119.7
			PDO 3	956		n+119.8	n+119.9
				957		n+119.10	n+119.11
				958		n+119.12	n+119.13
				959		n+119.14	n+119.15
61	3	D	PDO 0	960	F359.12	n+120.0	n+120.1
				961		n+120.2	n+120.3
				962		n+120.4	n+120.5
				963		n+120.6	n+120.7
			PDO 1	964		n+120.8	n+120.9
				965		n+120.10	n+120.11
				966		n+120.12	n+120.13
				967		n+120.14	n+120.15
			PDO 2	968		n+121.0	n+121.1
				969		n+121.2	n+121.3
				970		n+121.4	n+121.5
				971		n+121.6	n+121.7
			PDO 3	972		n+121.8	n+121.9
				973		n+121.10	n+121.11
				974		n+121.12	n+121.13
				975		n+121.14	n+121.15
62	3	E	PDO 0	976	F359.13	n+122.0	n+122.1
				977		n+122.2	n+122.3
				978		n+122.4	n+122.5
				979		n+122.6	n+122.7
			PDO 1	980		n+122.8	n+122.9
				981		n+122.10	n+122.11
				982		n+122.12	n+122.13
				983		n+122.14	n+122.15
			PDO 2	984		n+123.0	n+123.1
				985		n+123.2	n+123.3
				986		n+123.4	n+123.5
				987		n+123.6	n+123.7
			PDO 3	988		n+123.8	n+123.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				989		n+123.10	n+123.11
				990		n+123.12	n+123.13
				991		n+123.14	n+123.15
63	3	F	PDO 0	992	F359.14	n+124.0	n+124.1
				993		n+124.2	n+124.3
				994		n+124.4	n+124.5
				995		n+124.6	n+124.7
			PDO 1	996		n+124.8	n+124.9
				997		n+124.10	n+124.11
				998		n+124.12	n+124.13
				999		n+124.14	n+124.15
			PDO 2	1000		n+125.0	n+125.1
				1001		n+125.2	n+125.3
				1002		n+125.4	n+125.5
				1003		n+125.6	n+125.7
			PDO 3	1004		n+125.8	n+125.9
				1005		n+125.10	n+125.11
				1006		n+125.12	n+125.13
				1007		n+125.14	n+125.15
64	4	0	PDO 0	1008	F359.15	n+126.0	n+126.1
				1009		n+126.2	n+126.3
				1010		n+126.4	n+126.5
				1011		n+126.6	n+126.7
			PDO 1	1012		n+126.8	n+126.9
				1013		n+126.10	n+126.11
				1014		n+126.12	n+126.13
				1015		n+126.14	n+126.15
			PDO 2	1016		n+127.0	n+127.1
				1017		n+127.2	n+127.3
				1018		n+127.4	n+127.5
				1019		n+127.6	n+127.7
			PDO 3	1020		n+127.8	n+127.9
				1021		n+127.10	n+127.11
				1022		n+127.12	n+127.13
				1023		n+127.14	n+127.15
65	4	1	PDO 0	1024	F360.0	n+128.0	n+128.1
				1025		n+128.2	n+128.3
				1026		n+128.4	n+128.5
				1027		n+128.6	n+128.7
			PDO 1	1028		n+128.8	n+128.9
				1029		n+128.10	n+128.11
				1030		n+128.12	n+128.13
				1031		n+128.14	n+128.15
			PDO 2	1032		n+129.0	n+129.1
				1033		n+129.2	n+129.3
				1034		n+129.4	n+129.5
				1035		n+129.6	n+129.7
			PDO 3	1036		n+129.8	n+129.9
				1037		n+129.10	n+129.11
				1038		n+129.12	n+129.13
				1039		n+129.14	n+129.15
66	4	2	PDO 0	1040	F360.1	n+130.0	n+130.1
				1041		n+130.2	n+130.3
				1042		n+130.4	n+130.5
				1043		n+130.6	n+130.7
			PDO 1	1044		n+130.8	n+130.9
				1045		n+130.10	n+130.11
				1046		n+130.12	n+130.13
				1047		n+130.14	n+130.15
			PDO 2	1048		n+131.0	n+131.1
				1049		n+131.2	n+131.3
				1050		n+131.4	n+131.5
				1051		n+131.6	n+131.7
			PDO 3	1052		n+131.8	n+131.9
				1053		n+131.10	n+131.11
				1054		n+131.12	n+131.13

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1055		n+131.14	n+131.15
67	4	3	PDO 0	1056	F360.2	n+132.0	n+132.1
				1057		n+132.2	n+132.3
				1058		n+132.4	n+132.5
				1059		n+132.6	n+132.7
			PDO 1	1060		n+132.8	n+132.9
				1061		n+132.10	n+132.11
				1062		n+132.12	n+132.13
				1063		n+132.14	n+132.15
			PDO 2	1064		n+133.0	n+133.1
				1065		n+133.2	n+133.3
				1066		n+133.4	n+133.5
				1067		n+133.6	n+133.7
			PDO 3	1068		n+133.8	n+133.9
				1069		n+133.10	n+133.11
				1070		n+133.12	n+133.13
				1071		n+133.14	n+133.15
68	4	4	PDO 0	1072	F360.3	n+134.0	n+134.1
				1073		n+134.2	n+134.3
				1074		n+134.4	n+134.5
				1075		n+134.6	n+134.7
			PDO 1	1076		n+134.8	n+134.9
				1077		n+134.10	n+134.11
				1078		n+134.12	n+134.13
				1079		n+134.14	n+134.15
			PDO 2	1080		n+135.0	n+135.1
				1081		n+135.2	n+135.3
				1082		n+135.4	n+135.5
				1083		n+135.6	n+135.7
			PDO 3	1084		n+135.8	n+135.9
				1085		n+135.10	n+135.11
				1086		n+135.12	n+135.13
				1087		n+135.14	n+135.15
69	4	5	PDO 0	1088	F360.4	n+136.0	n+136.1
				1089		n+136.2	n+136.3
				1090		n+136.4	n+136.5
				1091		n+136.6	n+136.7
			PDO 1	1092		n+136.8	n+136.9
				1093		n+136.10	n+136.11
				1094		n+136.12	n+136.13
				1095		n+136.14	n+136.15
			PDO 2	1096		n+137.0	n+137.1
				1097		n+137.2	n+137.3
				1098		n+137.4	n+137.5
				1099		n+137.6	n+137.7
			PDO 3	1100		n+137.8	n+137.9
				1101		n+137.10	n+137.11
				1102		n+137.12	n+137.13
				1103		n+137.14	n+137.15
70	4	6	PDO 0	1104	F360.5	n+138.0	n+138.1
				1105		n+138.2	n+138.3
				1106		n+138.4	n+138.5
				1107		n+138.6	n+138.7
			PDO 1	1108		n+138.8	n+138.9
				1109		n+138.10	n+138.11
				1110		n+138.12	n+138.13
				1111		n+138.14	n+138.15
			PDO 2	1112		n+139.0	n+139.1
				1113		n+139.2	n+139.3
				1114		n+139.4	n+139.5
				1115		n+139.6	n+139.7
			PDO 3	1116		n+139.8	n+139.9
				1117		n+139.10	n+139.11
				1118		n+139.12	n+139.13
				1119		n+139.14	n+139.15
71	4	7	PDO 0	1120	F360.6	n+140.0	n+140.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1121		n+140.2	n+140.3
				1122		n+140.4	n+140.5
				1123		n+140.6	n+140.7
			PDO 1	1124		n+140.8	n+140.9
				1125		n+140.10	n+140.11
				1126		n+140.12	n+140.13
				1127		n+140.14	n+140.15
			PDO 2	1128		n+141.0	n+141.1
				1129		n+141.2	n+141.3
				1130		n+141.4	n+141.5
				1131		n+141.6	n+141.7
			PDO 3	1132		n+141.8	n+141.9
				1133		n+141.10	n+141.11
				1134		n+141.12	n+141.13
				1135		n+141.14	n+141.15
72	4	8	PDO 0	1136	F360.7	n+142.0	n+142.1
				1137		n+142.2	n+142.3
				1138		n+142.4	n+142.5
				1139		n+142.6	n+142.7
			PDO 1	1140		n+142.8	n+142.9
				1141		n+142.10	n+142.11
				1142		n+142.12	n+142.13
				1143		n+142.14	n+142.15
			PDO 2	1144		n+143.0	n+143.1
				1145		n+143.2	n+143.3
				1146		n+143.4	n+143.5
				1147		n+143.6	n+143.7
			PDO 3	1148		n+143.8	n+143.9
				1149		n+143.10	n+143.11
				1150		n+143.12	n+143.13
				1151		n+143.14	n+143.15
73	4	9	PDO 0	1152	F360.8	n+144.0	n+144.1
				1153		n+144.2	n+144.3
				1154		n+144.4	n+144.5
				1155		n+144.6	n+144.7
			PDO 1	1156		n+144.8	n+144.9
				1157		n+144.10	n+144.11
				1158		n+144.12	n+144.13
				1159		n+144.14	n+144.15
			PDO 2	1160		n+145.0	n+145.1
				1161		n+145.2	n+145.3
				1162		n+145.4	n+145.5
				1163		n+145.6	n+145.7
			PDO 3	1164		n+145.8	n+145.9
				1165		n+145.10	n+145.11
				1166		n+145.12	n+145.13
				1167		n+145.14	n+145.15
74	4	A	PDO 0	1168	F360.9	n+146.0	n+146.1
				1169		n+146.2	n+146.3
				1170		n+146.4	n+146.5
				1171		n+146.6	n+146.7
			PDO 1	1172		n+146.8	n+146.9
				1173		n+146.10	n+146.11
				1174		n+146.12	n+146.13
				1175		n+146.14	n+146.15
			PDO 2	1176		n+147.0	n+147.1
				1177		n+147.2	n+147.3
				1178		n+147.4	n+147.5
				1179		n+147.6	n+147.7
			PDO 3	1180		n+147.8	n+147.9
				1181		n+147.10	n+147.11
				1182		n+147.12	n+147.13
				1183		n+147.14	n+147.15
75	4	B	PDO 0	1184	F360.10	n+148.0	n+148.1
				1185		n+148.2	n+148.3
				1186		n+148.4	n+148.5

Node ID	SW3		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1187		n+148.6	n+148.7
			PDO 1	1188		n+148.8	n+148.9
				1189		n+148.10	n+148.11
				1190		n+148.12	n+148.13
				1191		n+148.14	n+148.15
			PDO 2	1192		n+149.0	n+149.1
				1193		n+149.2	n+149.3
				1194		n+149.4	n+149.5
				1195		n+149.6	n+149.7
			PDO 3	1196		n+149.8	n+149.9
				1197		n+149.10	n+149.11
				1198		n+149.12	n+149.13
				1199		n+149.14	n+149.15
76	4	C	PDO 0	1200	F360.11	n+150.0	n+150.1
				1201		n+150.2	n+150.3
				1202		n+150.4	n+150.5
				1203		n+150.6	n+150.7
			PDO 1	1204		n+150.8	n+150.9
				1205		n+150.10	n+150.11
				1206		n+150.12	n+150.13
				1207		n+150.14	n+150.15
			PDO 2	1208		n+151.0	n+151.1
				1209		n+151.2	n+151.3
				1210		n+151.4	n+151.5
				1211		n+151.6	n+151.7
			PDO 3	1212		n+151.8	n+151.9
				1213		n+151.10	n+151.11
				1214		n+151.12	n+151.13
				1215		n+151.14	n+151.15
77	4	D	PDO 0	1216	F360.12	n+152.0	n+152.1
				1217		n+152.2	n+152.3
				1218		n+152.4	n+152.5
				1219		n+152.6	n+152.7
			PDO 1	1220		n+152.8	n+152.9
				1221		n+152.10	n+152.11
				1222		n+152.12	n+152.13
				1223		n+152.14	n+152.15
			PDO 2	1224		n+153.0	n+153.1
				1225		n+153.2	n+153.3
				1226		n+153.4	n+153.5
				1227		n+153.6	n+153.7
			PDO 3	1228		n+153.8	n+153.9
				1229		n+153.10	n+153.11
				1230		n+153.12	n+153.13
				1231		n+153.14	n+153.15
78	4	E	PDO 0	1232	F360.13	n+154.0	n+154.1
				1233		n+154.2	n+154.3
				1234		n+154.4	n+154.5
				1235		n+154.6	n+154.7
			PDO 1	1236		n+154.8	n+154.9
				1237		n+154.10	n+154.11
				1238		n+154.12	n+154.13
				1239		n+154.14	n+154.15
			PDO 2	1240		n+155.0	n+155.1
				1241		n+155.2	n+155.3
				1242		n+155.4	n+155.5
				1243		n+155.6	n+155.7
			PDO 3	1244		n+155.8	n+155.9
				1245		n+155.10	n+155.11
				1246		n+155.12	n+155.13
				1247		n+155.14	n+155.15
79	4	F	PDO 0	1248	F360.14	n+156.0	n+156.1
				1249		n+156.2	n+156.3
				1250		n+156.4	n+156.5
				1251		n+156.6	n+156.7
			PDO 1	1252		n+156.8	n+156.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1253		n+156.10	n+156.11
				1254		n+156.12	n+156.13
				1255		n+156.14	n+156.15
			PDO 2	1256		n+157.0	n+157.1
				1257		n+157.2	n+157.3
				1258		n+157.4	n+157.5
				1259		n+157.6	n+157.7
			PDO 3	1260		n+157.8	n+157.9
				1261		n+157.10	n+157.11
				1262		n+157.12	n+157.13
				1263		n+157.14	n+157.15
80	5	0	PDO 0	1264	F360.15	n+158.0	n+158.1
				1265		n+158.2	n+158.3
				1266		n+158.4	n+158.5
				1267		n+158.6	n+158.7
			PDO 1	1268		n+158.8	n+158.9
				1269		n+158.10	n+158.11
				1270		n+158.12	n+158.13
				1271		n+158.14	n+158.15
			PDO 2	1272		n+159.0	n+159.1
				1273		n+159.2	n+159.3
				1274		n+159.4	n+159.5
				1275		n+159.6	n+159.7
			PDO 3	1276		n+159.8	n+159.9
				1277		n+159.10	n+159.11
				1278		n+159.12	n+159.13
				1279		n+159.14	n+159.15
81	5	1	PDO 0	1280	F361.0	n+160.0	n+160.1
				1281		n+160.2	n+160.3
				1282		n+160.4	n+160.5
				1283		n+160.6	n+160.7
			PDO 1	1284		n+160.8	n+160.9
				1285		n+160.10	n+160.11
				1286		n+160.12	n+160.13
				1287		n+160.14	n+160.15
			PDO 2	1288		n+161.0	n+161.1
				1289		n+161.2	n+161.3
				1290		n+161.4	n+161.5
				1291		n+161.6	n+161.7
			PDO 3	1292		n+161.8	n+161.9
				1293		n+161.10	n+161.11
				1294		n+161.12	n+161.13
				1295		n+161.14	n+161.15
82	5	2	PDO 0	1296	F361.1	n+162.0	n+162.1
				1297		n+162.2	n+162.3
				1298		n+162.4	n+162.5
				1299		n+162.6	n+162.7
			PDO 1	1300		n+162.8	n+162.9
				1301		n+162.10	n+162.11
				1302		n+162.12	n+162.13
				1303		n+162.14	n+162.15
			PDO 2	1304		n+163.0	n+163.1
				1305		n+163.2	n+163.3
				1306		n+163.4	n+163.5
				1307		n+163.6	n+163.7
			PDO 3	1308		n+163.8	n+163.9
				1309		n+163.10	n+163.11
				1310		n+163.12	n+163.13
				1311		n+163.14	n+163.15
83	5	3	PDO 0	1312	F361.2	n+164.0	n+164.1
				1313		n+164.2	n+164.3
				1314		n+164.4	n+164.5
				1315		n+164.6	n+164.7
			PDO 1	1316		n+164.8	n+164.9
				1317		n+164.10	n+164.11
				1318		n+164.12	n+164.13

Node ID	SW3		PDO	C/D Table	Presence	PDO Fault Data	
	SW3	SW4				A	B
				1319		n+164.14	n+164.15
			PDO 2	1320		n+165.0	n+165.1
				1321		n+165.2	n+165.3
				1322		n+165.4	n+165.5
				1323		n+165.6	n+165.7
			PDO 3	1324		n+165.8	n+165.9
				1325		n+165.10	n+165.11
				1326		n+165.12	n+165.13
				1327		n+165.14	n+165.15
84	5	4	PDO 0	1328	F361.3	n+166.0	n+166.1
				1329		n+166.2	n+166.3
				1330		n+166.4	n+166.5
				1331		n+166.6	n+166.7
			PDO 1	1332		n+166.8	n+166.9
				1333		n+166.10	n+166.11
				1334		n+166.12	n+166.13
				1335		n+166.14	n+166.15
			PDO 2	1336		n+167.0	n+167.1
				1337		n+167.2	n+167.3
				1338		n+167.4	n+167.5
				1339		n+167.6	n+167.7
			PDO 3	1340		n+167.8	n+167.9
				1341		n+167.10	n+167.11
				1342		n+167.12	n+167.13
				1343		n+167.14	n+167.15
85	5	5	PDO 0	1344	F361.4	n+168.0	n+168.1
				1345		n+168.2	n+168.3
				1346		n+168.4	n+168.5
				1347		n+168.6	n+168.7
			PDO 1	1348		n+168.8	n+168.9
				1349		n+168.10	n+168.11
				1350		n+168.12	n+168.13
				1351		n+168.14	n+168.15
			PDO 2	1352		n+169.0	n+169.1
				1353		n+169.2	n+169.3
				1354		n+169.4	n+169.5
				1355		n+169.6	n+169.7
			PDO 3	1356		n+169.8	n+169.9
				1357		n+169.10	n+169.11
				1358		n+169.12	n+169.13
				1359		n+169.14	n+169.15
86	5	6	PDO 0	1360	F361.5	n+170.0	n+170.1
				1361		n+170.2	n+170.3
				1362		n+170.4	n+170.5
				1363		n+170.6	n+170.7
			PDO 1	1364		n+170.8	n+170.9
				1365		n+170.10	n+170.11
				1366		n+170.12	n+170.13
				1367		n+170.14	n+170.15
			PDO 2	1368		n+171.0	n+171.1
				1369		n+171.2	n+171.3
				1370		n+171.4	n+171.5
				1371		n+171.6	n+171.7
			PDO 3	1372		n+171.8	n+171.9
				1373		n+171.10	n+171.11
				1374		n+171.12	n+171.13
				1375		n+171.14	n+171.15
87	5	7	PDO 0	1376	F361.6	n+172.0	n+172.1
				1377		n+172.2	n+172.3
				1378		n+172.4	n+172.5
				1379		n+172.6	n+172.7
			PDO 1	1380		n+172.8	n+172.9
				1381		n+172.10	n+172.11
				1382		n+172.12	n+172.13
				1383		n+172.14	n+172.15
			PDO 2	1384		n+173.0	n+173.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1385		n+173.2	n+173.3
				1386		n+173.4	n+173.5
				1387		n+173.6	n+173.7
			PDO 3	1388		n+173.8	n+173.9
				1389		n+173.10	n+173.11
				1390		n+173.12	n+173.13
				1391		n+173.14	n+173.15
88	5	8	PDO 0	1392	F361.7	n+174.0	n+174.1
				1393		n+174.2	n+174.3
				1394		n+174.4	n+174.5
				1395		n+174.6	n+174.7
			PDO 1	1396		n+174.8	n+174.9
				1397		n+174.10	n+174.11
				1398		n+174.12	n+174.13
				1399		n+174.14	n+174.15
			PDO 2	1400		n+175.0	n+175.1
				1401		n+175.2	n+175.3
				1402		n+175.4	n+175.5
				1403		n+175.6	n+175.7
			PDO 3	1404		n+175.8	n+175.9
				1405		n+175.10	n+175.11
				1406		n+175.12	n+175.13
				1407		n+175.14	n+175.15
89	5	9	PDO 0	1408	F361.8	n+176.0	n+176.1
				1409		n+176.2	n+176.3
				1410		n+176.4	n+176.5
				1411		n+176.6	n+176.7
			PDO 1	1412		n+176.8	n+176.9
				1413		n+176.10	n+176.11
				1414		n+176.12	n+176.13
				1415		n+176.14	n+176.15
			PDO 2	1416		n+177.0	n+177.1
				1417		n+177.2	n+177.3
				1418		n+177.4	n+177.5
				1419		n+177.6	n+177.7
			PDO 3	1420		n+177.8	n+177.9
				1421		n+177.10	n+177.11
				1422		n+177.12	n+177.13
				1423		n+177.14	n+177.15
90	5	A	PDO 0	1424	F361.9	n+178.0	n+178.1
				1425		n+178.2	n+178.3
				1426		n+178.4	n+178.5
				1427		n+178.6	n+178.7
			PDO 1	1428		n+178.8	n+178.9
				1429		n+178.10	n+178.11
				1430		n+178.12	n+178.13
				1431		n+178.14	n+178.15
			PDO 2	1432		n+179.0	n+179.1
				1433		n+179.2	n+179.3
				1434		n+179.4	n+179.5
				1435		n+179.6	n+179.7
			PDO 3	1436		n+179.8	n+179.9
				1437		n+179.10	n+179.11
				1438		n+179.12	n+179.13
				1439		n+179.14	n+179.15
91	5	B	PDO 0	1440	F361.10	n+180.0	n+180.1
				1441		n+180.2	n+180.3
				1442		n+180.4	n+180.5
				1443		n+180.6	n+180.7
			PDO 1	1444		n+180.8	n+180.9
				1445		n+180.10	n+180.11
				1446		n+180.12	n+180.13
				1447		n+180.14	n+180.15
			PDO 2	1448		n+181.0	n+181.1
				1449		n+181.2	n+181.3
				1450		n+181.4	n+181.5

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1451		n+181.6	n+181.7
			PDO 3	1452		n+181.8	n+181.9
				1453		n+181.10	n+181.11
				1454		n+181.12	n+181.13
				1455		n+181.14	n+181.15
92	5	C	PDO 0	1456	F361.11	n+182.0	n+182.1
				1457		n+182.2	n+182.3
				1458		n+182.4	n+182.5
				1459		n+182.6	n+182.7
			PDO 1	1460		n+182.8	n+182.9
				1461		n+182.10	n+182.11
				1462		n+182.12	n+182.13
				1463		n+182.14	n+182.15
			PDO 2	1464		n+183.0	n+183.1
				1465		n+183.2	n+183.3
				1466		n+183.4	n+183.5
				1467		n+183.6	n+183.7
			PDO 3	1468		n+183.8	n+183.9
				1469		n+183.10	n+183.11
				1470		n+183.12	n+183.13
				1471		n+183.14	n+183.15
93	5	D	PDO 0	1472	F361.12	n+184.0	n+184.1
				1473		n+184.2	n+184.3
				1474		n+184.4	n+184.5
				1475		n+184.6	n+184.7
			PDO 1	1476		n+184.8	n+184.9
				1477		n+184.10	n+184.11
				1478		n+184.12	n+184.13
				1479		n+184.14	n+184.15
			PDO 2	1480		n+185.0	n+185.1
				1481		n+185.2	n+185.3
				1482		n+185.4	n+185.5
				1483		n+185.6	n+185.7
			PDO 3	1484		n+185.8	n+185.9
				1485		n+185.10	n+185.11
				1486		n+185.12	n+185.13
				1487		n+185.14	n+185.15
94	5	E	PDO 0	1488	F361.13	n+186.0	n+186.1
				1489		n+186.2	n+186.3
				1490		n+186.4	n+186.5
				1491		n+186.6	n+186.7
			PDO 1	1492		n+186.8	n+186.9
				1493		n+186.10	n+186.11
				1494		n+186.12	n+186.13
				1495		n+186.14	n+186.15
			PDO 2	1496		n+187.0	n+187.1
				1497		n+187.2	n+187.3
				1498		n+187.4	n+187.5
				1499		n+187.6	n+187.7
			PDO 3	1500		n+187.8	n+187.9
				1501		n+187.10	n+187.11
				1502		n+187.12	n+187.13
				1503		n+187.14	n+187.15
95	5	F	PDO 0	1504	F361.14	n+188.0	n+188.1
				1505		n+188.2	n+188.3
				1506		n+188.4	n+188.5
				1507		n+188.6	n+188.7
			PDO 1	1508		n+188.8	n+188.9
				1509		n+188.10	n+188.11
				1510		n+188.12	n+188.13
				1511		n+188.14	n+188.15
			PDO 2	1512		n+189.0	n+189.1
				1513		n+189.2	n+189.3
				1514		n+189.4	n+189.5
				1515		n+189.6	n+189.7
			PDO 3	1516		n+189.8	n+189.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1517		n+189.10	n+189.11
				1518		n+189.12	n+189.13
				1519		n+189.14	n+189.15
96	6	0	PDO 0	1520	F361.15	n+190.0	n+190.1
				1521		n+190.2	n+190.3
				1522		n+190.4	n+190.5
				1523		n+190.6	n+190.7
			PDO 1	1524		n+190.8	n+190.9
				1525		n+190.10	n+190.11
				1526		n+190.12	n+190.13
				1527		n+190.14	n+190.15
			PDO 2	1528		n+191.0	n+191.1
				1529		n+191.2	n+191.3
				1530		n+191.4	n+191.5
				1531		n+191.6	n+191.7
			PDO 3	1532		n+191.8	n+191.9
				1533		n+191.10	n+191.11
				1534		n+191.12	n+191.13
				1535		n+191.14	n+191.15
97	6	1	PDO 0	1536	F362.0	n+192.0	n+192.1
				1537		n+192.2	n+192.3
				1538		n+192.4	n+192.5
				1539		n+192.6	n+192.7
			PDO 1	1540		n+192.8	n+192.9
				1541		n+192.10	n+192.11
				1542		n+192.12	n+192.13
				1543		n+192.14	n+192.15
			PDO 2	1544		n+193.0	n+193.1
				1545		n+193.2	n+193.3
				1546		n+193.4	n+193.5
				1547		n+193.6	n+193.7
			PDO 3	1548		n+193.8	n+193.9
				1549		n+193.10	n+193.11
				1550		n+193.12	n+193.13
				1551		n+193.14	n+193.15
98	6	2	PDO 0	1552	F362.1	n+194.0	n+194.1
				1553		n+194.2	n+194.3
				1554		n+194.4	n+194.5
				1555		n+194.6	n+194.7
			PDO 1	1556		n+194.8	n+194.9
				1557		n+194.10	n+194.11
				1558		n+194.12	n+194.13
				1559		n+194.14	n+194.15
			PDO 2	1560		n+195.0	n+195.1
				1561		n+195.2	n+195.3
				1562		n+195.4	n+195.5
				1563		n+195.6	n+195.7
			PDO 3	1564		n+195.8	n+195.9
				1565		n+195.10	n+195.11
				1566		n+195.12	n+195.13
				1567		n+195.14	n+195.15
99	6	3	PDO 0	1568	F362.2	n+196.0	n+196.1
				1569		n+196.2	n+196.3
				1570		n+196.4	n+196.5
				1571		n+196.6	n+196.7
			PDO 1	1572		n+196.8	n+196.9
				1573		n+196.10	n+196.11
				1574		n+196.12	n+196.13
				1575		n+196.14	n+196.15
			PDO 2	1576		n+197.0	n+197.1
				1577		n+197.2	n+197.3
				1578		n+197.4	n+197.5
				1579		n+197.6	n+197.7
			PDO 3	1580		n+197.8	n+197.9
				1581		n+197.10	n+197.11
				1582		n+197.12	n+197.13

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1583		n+197.14	n+197.15
100	6	4	PDO 0	1584	F362.3	n+198.0	n+198.1
				1585		n+198.2	n+198.3
				1586		n+198.4	n+198.5
				1587		n+198.6	n+198.7
			PDO 1	1588		n+198.8	n+198.9
				1589		n+198.10	n+198.11
				1590		n+198.12	n+198.13
				1591		n+198.14	n+198.15
			PDO 2	1592		n+199.0	n+199.1
				1593		n+199.2	n+199.3
				1594		n+199.4	n+199.5
				1595		n+199.6	n+199.7
			PDO 3	1596		n+199.8	n+199.9
				1597		n+199.10	n+199.11
				1598		n+199.12	n+199.13
				1599		n+199.14	n+199.15
101	6	5	PDO 0	1600	F362.4	n+200.0	n+200.1
				1601		n+200.2	n+200.3
				1602		n+200.4	n+200.5
				1603		n+200.6	n+200.7
			PDO 1	1604		n+200.8	n+200.9
				1605		n+200.10	n+200.11
				1606		n+200.12	n+200.13
				1607		n+200.14	n+200.15
			PDO 2	1608		n+201.0	n+201.1
				1609		n+201.2	n+201.3
				1610		n+201.4	n+201.5
				1611		n+201.6	n+201.7
			PDO 3	1612		n+201.8	n+201.9
				1613		n+201.10	n+201.11
				1614		n+201.12	n+201.13
				1615		n+201.14	n+201.15
102	6	6	PDO 0	1616	F362.5	n+202.0	n+202.1
				1617		n+202.2	n+202.3
				1618		n+202.4	n+202.5
				1619		n+202.6	n+202.7
			PDO 1	1620		n+202.8	n+202.9
				1621		n+202.10	n+202.11
				1622		n+202.12	n+202.13
				1623		n+202.14	n+202.15
			PDO 2	1624		n+203.0	n+203.1
				1625		n+203.2	n+203.3
				1626		n+203.4	n+203.5
				1627		n+203.6	n+203.7
			PDO 3	1628		n+203.8	n+203.9
				1629		n+203.10	n+203.11
				1630		n+203.12	n+203.13
				1631		n+203.14	n+203.15
103	6	7	PDO 0	1632	F362.6	n+204.0	n+204.1
				1633		n+204.2	n+204.3
				1634		n+204.4	n+204.5
				1635		n+204.6	n+204.7
			PDO 1	1636		n+204.8	n+204.9
				1637		n+204.10	n+204.11
				1638		n+204.12	n+204.13
				1639		n+204.14	n+204.15
			PDO 2	1640		n+205.0	n+205.1
				1641		n+205.2	n+205.3
				1642		n+205.4	n+205.5
				1643		n+205.6	n+205.7
			PDO 3	1644		n+205.8	n+205.9
				1645		n+205.10	n+205.11
				1646		n+205.12	n+205.13
				1647		n+205.14	n+205.15
104	6	8	PDO 0	1648	F362.7	n+206.0	n+206.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1649		n+206.2	n+206.3
				1650		n+206.4	n+206.5
				1651		n+206.6	n+206.7
			PDO 1	1652		n+206.8	n+206.9
				1653		n+206.10	n+206.11
				1654		n+206.12	n+206.13
				1655		n+206.14	n+206.15
			PDO 2	1656		n+207.0	n+207.1
				1657		n+207.2	n+207.3
				1658		n+207.4	n+207.5
				1659		n+207.6	n+207.7
			PDO 3	1660		n+207.8	n+207.9
				1661		n+207.10	n+207.11
				1662		n+207.12	n+207.13
				1663		n+207.14	n+207.15
105	6	9	PDO 0	1664	F362.8	n+208.0	n+208.1
				1665		n+208.2	n+208.3
				1666		n+208.4	n+208.5
				1667		n+208.6	n+208.7
			PDO 1	1668		n+208.8	n+208.9
				1669		n+208.10	n+208.11
				1670		n+208.12	n+208.13
				1671		n+208.14	n+208.15
			PDO 2	1672		n+209.0	n+209.1
				1673		n+209.2	n+209.3
				1674		n+209.4	n+209.5
				1675		n+209.6	n+209.7
			PDO 3	1676		n+209.8	n+209.9
				1677		n+209.10	n+209.11
				1678		n+209.12	n+209.13
				1679		n+209.14	n+209.15
106	6	A	PDO 0	1680	F362.9	n+210.0	n+210.1
				1681		n+210.2	n+210.3
				1682		n+210.4	n+210.5
				1683		n+210.6	n+210.7
			PDO 1	1684		n+210.8	n+210.9
				1685		n+210.10	n+210.11
				1686		n+210.12	n+210.13
				1687		n+210.14	n+210.15
			PDO 2	1688		n+211.0	n+211.1
				1689		n+211.2	n+211.3
				1690		n+211.4	n+211.5
				1691		n+211.6	n+211.7
			PDO 3	1692		n+211.8	n+211.9
				1693		n+211.10	n+211.11
				1694		n+211.12	n+211.13
				1695		n+211.14	n+211.15
107	6	B	PDO 0	1696	F362.10	n+212.0	n+212.1
				1697		n+212.2	n+212.3
				1698		n+212.4	n+212.5
				1699		n+212.6	n+212.7
			PDO 1	1700		n+212.8	n+212.9
				1701		n+212.10	n+212.11
				1702		n+212.12	n+212.13
				1703		n+212.14	n+212.15
			PDO 2	1704		n+213.0	n+213.1
				1705		n+213.2	n+213.3
				1706		n+213.4	n+213.5
				1707		n+213.6	n+213.7
			PDO 3	1708		n+213.8	n+213.9
				1709		n+213.10	n+213.11
				1710		n+213.12	n+213.13
				1711		n+213.14	n+213.15
108	6	C	PDO 0	1712	F362.11	n+214.0	n+214.1
				1713		n+214.2	n+214.3
				1714		n+214.4	n+214.5

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1715		n+214.6	n+214.7
			PDO 1	1716		n+214.8	n+214.9
				1717		n+214.10	n+214.11
				1718		n+214.12	n+214.13
				1719		n+214.14	n+214.15
			PDO 2	1720		n+215.0	n+215.1
				1721		n+215.2	n+215.3
				1722		n+215.4	n+215.5
				1723		n+215.6	n+215.7
			PDO 3	1724		n+215.8	n+215.9
				1725		n+215.10	n+215.11
				1726		n+215.12	n+215.13
				1727		n+215.14	n+215.15
109	6	D	PDO 0	1728	F362.12	n+216.0	n+216.1
				1729		n+216.2	n+216.3
				1730		n+216.4	n+216.5
				1731		n+216.6	n+216.7
			PDO 1	1732		n+216.8	n+216.9
				1733		n+216.10	n+216.11
				1734		n+216.12	n+216.13
				1735		n+216.14	n+216.15
			PDO 2	1736		n+217.0	n+217.1
				1737		n+217.2	n+217.3
				1738		n+217.4	n+217.5
				1739		n+217.6	n+217.7
			PDO 3	1740		n+217.8	n+217.9
				1741		n+217.10	n+217.11
				1742		n+217.12	n+217.13
				1743		n+217.14	n+217.15
110	6	E	PDO 0	1744	F362.13	n+218.0	n+218.1
				1745		n+218.2	n+218.3
				1746		n+218.4	n+218.5
				1747		n+218.6	n+218.7
			PDO 1	1748		n+218.8	n+218.9
				1749		n+218.10	n+218.11
				1750		n+218.12	n+218.13
				1751		n+218.14	n+218.15
			PDO 2	1752		n+219.0	n+219.1
				1753		n+219.2	n+219.3
				1754		n+219.4	n+219.5
				1755		n+219.6	n+219.7
			PDO 3	1756		n+219.8	n+219.9
				1757		n+219.10	n+219.11
				1758		n+219.12	n+219.13
				1759		n+219.14	n+219.15
111	6	F	PDO 0	1760	F362.14	n+220.0	n+220.1
				1761		n+220.2	n+220.3
				1762		n+220.4	n+220.5
				1763		n+220.6	n+220.7
			PDO 1	1764		n+220.8	n+220.9
				1765		n+220.10	n+220.11
				1766		n+220.12	n+220.13
				1767		n+220.14	n+220.15
			PDO 2	1768		n+221.0	n+221.1
				1769		n+221.2	n+221.3
				1770		n+221.4	n+221.5
				1771		n+221.6	n+221.7
			PDO 3	1772		n+221.8	n+221.9
				1773		n+221.10	n+221.11
				1774		n+221.12	n+221.13
				1775		n+221.14	n+221.15
112	7	0	PDO 0	1776	F362.15	n+222.0	n+222.1
				1777		n+222.2	n+222.3
				1778		n+222.4	n+222.5
				1779		n+222.6	n+222.7
			PDO 1	1780		n+222.8	n+222.9

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1781		n+222.10	n+222.11
				1782		n+222.12	n+222.13
				1783		n+222.14	n+222.15
			PDO 2	1784		n+223.0	n+223.1
				1785		n+223.2	n+223.3
				1786		n+223.4	n+223.5
				1787		n+223.6	n+223.7
			PDO 3	1788		n+223.8	n+223.9
				1789		n+223.10	n+223.11
				1790		n+223.12	n+223.13
				1791		n+223.14	n+223.15
113	7	1	PDO 0	1792	F363.0	n+224.0	n+224.1
				1793		n+224.2	n+224.3
				1794		n+224.4	n+224.5
				1795		n+224.6	n+224.7
			PDO 1	1796		n+224.8	n+224.9
				1797		n+224.10	n+224.11
				1798		n+224.12	n+224.13
				1799		n+224.14	n+224.15
			PDO 2	1800		n+225.0	n+225.1
				1801		n+225.2	n+225.3
				1802		n+225.4	n+225.5
				1803		n+225.6	n+225.7
			PDO 3	1804		n+225.8	n+225.9
				1805		n+225.10	n+225.11
				1806		n+225.12	n+225.13
				1807		n+225.14	n+225.15
114	7	2	PDO 0	1808	F363.1	n+226.0	n+226.1
				1809		n+226.2	n+226.3
				1810		n+226.4	n+226.5
				1811		n+226.6	n+226.7
			PDO 1	1812		n+226.8	n+226.9
				1813		n+226.10	n+226.11
				1814		n+226.12	n+226.13
				1815		n+226.14	n+226.15
			PDO 2	1816		n+227.0	n+227.1
				1817		n+227.2	n+227.3
				1818		n+227.4	n+227.5
				1819		n+227.6	n+227.7
			PDO 3	1820		n+227.8	n+227.9
				1821		n+227.10	n+227.11
				1822		n+227.12	n+227.13
				1823		n+227.14	n+227.15
115	7	3	PDO 0	1824	F363.2	n+228.0	n+228.1
				1825		n+228.2	n+228.3
				1826		n+228.4	n+228.5
				1827		n+228.6	n+228.7
			PDO 1	1828		n+228.8	n+228.9
				1829		n+228.10	n+228.11
				1830		n+228.12	n+228.13
				1831		n+228.14	n+228.15
			PDO 2	1832		n+229.0	n+229.1
				1833		n+229.2	n+229.3
				1834		n+229.4	n+229.5
				1835		n+229.6	n+229.7
			PDO 3	1836		n+229.8	n+229.9
				1837		n+229.10	n+229.11
				1838		n+229.12	n+229.13
				1839		n+229.14	n+229.15
116	7	4	PDO 0	1840	F363.3	n+230.0	n+230.1
				1841		n+230.2	n+230.3
				1842		n+230.4	n+230.5
				1843		n+230.6	n+230.7
			PDO 1	1844		n+230.8	n+230.9
				1845		n+230.10	n+230.11
				1846		n+230.12	n+230.13

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1847		n+230.14	n+230.15
			PDO 2	1848		n+231.0	n+231.1
				1849		n+231.2	n+231.3
				1850		n+231.4	n+231.5
				1851		n+231.6	n+231.7
			PDO 3	1852		n+231.8	n+231.9
				1853		n+231.10	n+231.11
				1854		n+231.12	n+231.13
				1855		n+231.14	n+231.15
117	7	5	PDO 0	1856	F363.4	n+232.0	n+232.1
				1857		n+232.2	n+232.3
				1858		n+232.4	n+232.5
				1859		n+232.6	n+232.7
			PDO 1	1860		n+232.8	n+232.9
				1861		n+232.10	n+232.11
				1862		n+232.12	n+232.13
				1863		n+232.14	n+232.15
			PDO 2	1864		n+233.0	n+233.1
				1865		n+233.2	n+233.3
				1866		n+233.4	n+233.5
				1867		n+233.6	n+233.7
			PDO 3	1868		n+233.8	n+233.9
				1869		n+233.10	n+233.11
				1870		n+233.12	n+233.13
				1871		n+233.14	n+233.15
118	7	6	PDO 0	1872	F363.5	n+234.0	n+234.1
				1873		n+234.2	n+234.3
				1874		n+234.4	n+234.5
				1875		n+234.6	n+234.7
			PDO 1	1876		n+234.8	n+234.9
				1877		n+234.10	n+234.11
				1878		n+234.12	n+234.13
				1879		n+234.14	n+234.15
			PDO 2	1880		n+235.0	n+235.1
				1881		n+235.2	n+235.3
				1882		n+235.4	n+235.5
				1883		n+235.6	n+235.7
			PDO 3	1884		n+235.8	n+235.9
				1885		n+235.10	n+235.11
				1886		n+235.12	n+235.13
				1887		n+235.14	n+235.15
119	7	7	PDO 0	1888	F363.6	n+236.0	n+236.1
				1889		n+236.2	n+236.3
				1890		n+236.4	n+236.5
				1891		n+236.6	n+236.7
			PDO 1	1892		n+236.8	n+236.9
				1893		n+236.10	n+236.11
				1894		n+236.12	n+236.13
				1895		n+236.14	n+236.15
			PDO 2	1896		n+237.0	n+237.1
				1897		n+237.2	n+237.3
				1898		n+237.4	n+237.5
				1899		n+237.6	n+237.7
			PDO 3	1900		n+237.8	n+237.9
				1901		n+237.10	n+237.11
				1902		n+237.12	n+237.13
				1903		n+237.14	n+237.15
120	7	8	PDO 0	1904	F363.7	n+238.0	n+238.1
				1905		n+238.2	n+238.3
				1906		n+238.4	n+238.5
				1907		n+238.6	n+238.7
			PDO 1	1908		n+238.8	n+238.9
				1909		n+238.10	n+238.11
				1910		n+238.12	n+238.13
				1911		n+238.14	n+238.15
			PDO 2	1912		n+239.0	n+239.1

Node ID	SW3 SW4		PDO	C/D Table	Presence	PDO Fault Data	
						A	B
				1913		n+239.2	n+239.3
				1914		n+239.4	n+239.5
				1915		n+239.6	n+239.7
			PDO 3	1916		n+239.8	n+239.9
				1917		n+239.10	n+239.11
				1918		n+239.12	n+239.13
				1919		n+239.14	n+239.15
121	7	9	PDO 0	1920	F363.8	n+240.0	n+240.1
				1921		n+240.2	n+240.3
				1922		n+240.4	n+240.5
				1923		n+240.6	n+240.7
			PDO 1	1924		n+240.8	n+240.9
				1925		n+240.10	n+240.11
				1926		n+240.12	n+240.13
				1927		n+240.14	n+240.15
			PDO 2	1928		n+241.0	n+241.1
				1929		n+241.2	n+241.3
				1930		n+241.4	n+241.5
				1931		n+241.6	n+241.7
			PDO 3	1932		n+241.8	n+241.9
				1933		n+241.10	n+241.11
				1934		n+241.12	n+241.13
				1935		n+241.14	n+241.15
122	7	A	PDO 0	1936	F363.9	n+242.0	n+242.1
				1937		n+242.2	n+242.3
				1938		n+242.4	n+242.5
				1939		n+242.6	n+242.7
			PDO 1	1940		n+242.8	n+242.9
				1941		n+242.10	n+242.11
				1942		n+242.12	n+242.13
				1943		n+242.14	n+242.15
			PDO 2	1944		n+243.0	n+243.1
				1945		n+243.2	n+243.3
				1946		n+243.4	n+243.5
				1947		n+243.6	n+243.7
			PDO 3	1948		n+243.8	n+243.9
				1949		n+243.10	n+243.11
				1950		n+243.12	n+243.13
				1951		n+243.14	n+243.15
123	7	B	PDO 0	1952	F363.10	n+244.0	n+244.1
				1953		n+244.2	n+244.3
				1954		n+244.4	n+244.5
				1955		n+244.6	n+244.7
			PDO 1	1956		n+244.8	n+244.9
				1957		n+244.10	n+244.11
				1958		n+244.12	n+244.13
				1959		n+244.14	n+244.15
			PDO 2	1960		n+245.0	n+245.1
				1961		n+245.2	n+245.3
				1962		n+245.4	n+245.5
				1963		n+245.6	n+245.7
			PDO 3	1964		n+245.8	n+245.9
				1965		n+245.10	n+245.11
				1966		n+245.12	n+245.13
				1967		n+245.14	n+245.15
124	7	C	PDO 0	1968	F363.11	n+246.0	n+246.1
				1969		n+246.2	n+246.3
				1970		n+246.4	n+246.5
				1971		n+246.6	n+246.7
			PDO 1	1972		n+246.8	n+246.9
				1973		n+246.10	n+246.11
				1974		n+246.12	n+246.13
				1975		n+246.14	n+246.15
			PDO 2	1976		n+247.0	n+247.1
				1977		n+247.2	n+247.3
				1978		n+247.4	n+247.5

Node ID			PDO	C/D Table	Presence	PDO Fault Data	
	SW3	SW4				A	B
			PDO 3	1979		n+247.6	n+247.7
				1980		n+247.8	n+247.9
				1981		n+247.10	n+247.11
				1982		n+247.12	n+247.13
				1983		n+247.14	n+247.15
125	7	D	PDO 0	1984	F363.12	n+248.0	n+248.1
				1985		n+248.2	n+248.3
				1986		n+248.4	n+248.5
				1987		n+248.6	n+248.7
			PDO 1	1988		n+248.8	n+248.9
				1989		n+248.10	n+248.11
				1990		n+248.12	n+248.13
				1991		n+248.14	n+248.15
			PDO 2	1992		n+249.0	n+249.1
				1993		n+249.2	n+249.3
				1994		n+249.4	n+249.5
				1995		n+249.6	n+249.7
			PDO 3	1996		n+249.8	n+249.9
				1997		n+249.10	n+249.11
				1998		n+249.12	n+249.13
				1999		n+249.14	N+249.15

APPENDIX B GEMTEQ I/O MODULE INSTRUCTION SHEETS

Instruction Sheet	Title
T1981En	24V d.c., 16-way Input Module
T1982En	24V d.c., 0.5A, 16-way Output Module
T1983En	110V a.c., 16-way Input Module
T1984En	110V a.c., 0.5A, 16-way Output Module
T1985En	8 Input / 8 Output Combination Analogue Module
T1986En	Relay, 3A, 16-way Output Module
T2113En	16 Input / 8 Output Combination Analogue Module

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APPENDIX C NODE GUARD PERIOD AND MASTER CHANGEOVER TIME

Master Change-over time

In a change over system it is good practice to set the change-over time to at least twice the selected Node Guard Period Time (NGPT).

Consider the following:-

At 250K Baud the default NGPT is 80mS, setting the change-over time in each controller to 100mS may cause the system to momentarily swap to the "off-line" controller should any changes be made to it's operational state e.g. Power Cycle or recompile.

To prevent the above, reduce the Node Guard Period or increase the change-over time as required.

Freeze Fallback

A slave GEMTEQ output module has a default Freeze / Fallback delay time of 500ms.

At the selected Node Guard Period Time (NGPT), the GEMTEQ master sends a node guard message to the first node and the second master (if fitted). The next Node Guard Period Time (NGPT), a node guard message is sent to the second node + the second master (if fitted).

This continues for each node configured (C/D Reference in ladder) before it starts again.

Assume a Node Guard Period Time of 80mS and eight nodes have been configured in the ladder.

Note: The node ID's do not have to be sequential, the system only sends a node guard to nodes referred to in the ladder program.

Each node is sent a unique Node Guard Message and as such it will take 640mS to service each node.

Number of Nodes (8) x Node Guard Period (80mS) = 640mS

It can be seen that with a default Fallback delay (500mS) the modules will go to the fallback state

To prevent the above, reduce the Node Guard Period or increase the Fallback delay as required.

France

Converteam SAS
1, Square John H. Patterson
91345 Massy Cedex - France
Tel : +33 (0)1 77 31 20 00
Fax : +33 (0)1 60 19 64 95

Germany

Converteam GmbH
Culemeyerstraße 1,
12277 Berlin - Germany
Tel : +49 (0) 30 7622 – 0
Fax : +49 (0) 30 7622 2109

UK

Converteam UK Ltd
West Avenue, Kidsgrove
Stoke-on-Trent, ST7 1TW – UK
Tel : +44 (0) 1782 781000
Fax : +44 (0) 1782 781001

USA

Converteam Inc.
610 Epsilon Drive
Pittsburgh, PA 15238 - USA
Tel : +1 412 967 0765
Fax : +1 412 967 7660

