Alspa DI100

World FIP to Serial Link Gateway

Technical Manual

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SAFETY/HAZARDS WARNINGS

Health and Safety

COMPLIANCE WITH INSTRUCTIONS IN THIS MANUAL

This technical manual should be regarded as part of the DI100 product. It should be retained for the life of the product and passed on to any subsequent owner or user of the product.

For the safety of all personnel permitted to work on or in the vicinity of this equipment, the user should comply with the instructions and information contained in this manual.

In order to preserve the safety of the equipment during installation and operation the user must ensure that personnel are qualified and trained in the operation of the equipment.

The hazards associated with this equipment are predominantly electrical. Voltages up to and exceeding 250VAC may be present while the equipment is operating and for a period after the sources of energy are removed. These voltages will give severe electrical shock which may kill.

Only trained, qualified personnel should install and maintain the equipment.

The installation and maintenance of the equipment must be carried out in the manner described in this manual. These instructions are designed to provide a safe installation which complies with the international standards listed within this manual.

Any question or doubt concerning the equipment should be referred to CEGELEC Industrial Controls Ltd.

In addition to these instructions, the user should take note of any local or national safety requirements particular to their installation.

The equipment has been designed to operate in an industrial environment. Care must be observed that these conditions are maintained at all times. Your attention is particularly drawn to the electromagnetic emission and susceptibility screening, and the personnel safety protection, provided by the enclosure. Both may be compromised when covers are removed or enclosure doors are open.

CAUTION
ELECTROSTATIC DAMAGE
This equipment contains solid state devices which may be affected by electrostatic discharge.

When this equipment is handled, static handling precautions in accordance with Protection of Electrostatic Sensitive Devices, Part 1, General Requirements , BS EN 100015 Pt.1 (1990) must be used.

CAUTION
Writing to data tables must be performed with caution, to prevent the accidental transfer of erroneous data to FIP subscribers or serial link tributaries.

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Glossary

The following terms and acronyms are used within the text of this manual:

BA	FIP Bus Arbiter.
CLASS	A group of application data processed in a way specific to the class type.
CLASS Type	A number that indicates how the application data within a CLASS should be Coded/Decoded.
Consumed variable	A variable which is read from the FIP network into the unit's FIP database.
ESP	Extended Simple Protocol - a standard GEM80 serial communications protocol.
@	Used in this manual to indicate a number is hexadecimal.
F8000	A specification produced by CEGELEC Common Centre for Development, to provide interoperability of drives and PLCs over a WorldFIP network.
FIP	Factory Instrumentation Protocol.
JK Table Exchange	A data transfer messaging system, using ESP as a transport mechanism.
Modulo	The remainder from an integer division operation.
PC	Personal Computer
PDU	Protocol Data Unit - specifically the data unit used by FIP
Produced variable	A variable which is written to the FIP network from the unit's FIP database.
VCOM	FIP Variable of Communication.
RSVP	A low overhead serial communications protocol, supported by the GD3000 drive (Software version 3.20 onwards).

References

(1) Companion Standard for Variable Speed Drives MCI-P-080-8 Rev 3a (REF. VSDCS)

(2) F8000 Systems Step 1 Communication Profile for Variable Speed Drives Y3-99 A414217 Index B

(3) GEMESYS 3 User Manual T1601

(4) GEM80 System Programmer T298

(5) GEM80 Serial Communications Technical Manual T457.

(6) Alspa GD2000 Technical Manual 78277

(7) Alspa GD3000 Technical Manual T1619

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1. Introduction

The WorldFIP to Serial Link Gateway is an IP20 conformant free standing unit, providing a cost effective interface between the FIP network and various serial devices. The unit is a subscriber on a dual redundant 1Mbit/s FIP network, compliant with WorldFIP A, FIP and SlowFIP standards. The serial communication interface performs as an ESP or RSVP control port, supporting both point-to-point RS232 and multi-dropped RS485 signalling standards. Various line speeds are supported from 110 baud to 38,400 baud. The unit manages sixteen information routes, permitting the exchange of data with various tributaries. The number of tributaries is limited only by the ESP/RSVP addressing range.

The flexibility of the unit is achieved using extensive configuration parameters retained in non-volatile memory, removing the need for battery support. Several switch selectable configuration templates are provided to simplify the configuration process.

A specific feature of the unit is the F8000 compliant support for GD2000 and GD3000 variable speed drives. This permits the transfer of setpoints, process orders, etc. from a networked controller to the drive and the return of process measurements, faults, etc. Support for data scaling is provided together with a freeze/fallback strategy controlled by an internal state machine.

The serial programming interface accepts a sub-set of the ESP programming protocol and operates using point-to-point RS232 signalling standards at either 9600 baud or 19,200 baud. It is used to configure, control and monitor the operation of the unit.

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2. Technical Specification

2.1 Electrical

Power consumption:	15-30V DC at 1A maximum. Connections for 1.5mm^2 wire via screw terminals on a removable terminal block		
Safety Earth connection:	Stud M4 x 8mm		
LED Indication:	Module healthy:		1 green LED
	FIP "Cd"," Te" Medium A:		2 yellow LEDs
	FIP "Cd"," Te" Medium B:		2 yellow LEDs
	Programming port "Tx", "Rx":		2 yellow LEDs
	Communication port "Tx", "Rx":		2 yellow LEDs
Connections:	FIP Medium A & B:		Male 9 way D-type pin 6 = D+ pin 7 = D-
	Programming port:		Female 9 way D-type RS232 pin 2 = TxD pin 3 = RxD pin 5 = 0V pin 7 = CTS pin 8 = RTS
	Communication port:		Female 15 way D-type RS485/RS232
		RS485:	pin 1 = Rx+ pin 2 = Rx- pin 3 = Tx+ pin 4 = Tx- (4 Wire operation only)
		RS232:	pin 9 = RxD pin 10 = TxD pin 11 = CTS pin 12 = RTS pin 14 = 0V

2.2 Physical

Module dimensions:	243 x 160 x 52 mm	See section 3.1 for Mounting Details
Weight:	1.0 kg approx.	

2.3 Environmental

Operating temperature:	0° to 60°C	
Storage temperature:	-25° to 70°C	
Humidity:	5% to 95% RH non-condensing	
Enclosure:	IP20	Finger proof No water protection

2.4 FIP Compliance Standards

The unit may be configured for compatibility with the following standards:

- SlowFIP
  TXrate = 1Mbit/s, Silence time = 224µs, Return time = 61µs.

- WorldFIP Profile A (IEC 1158-2)
  TXrate = 1Mbit/s, Silence time = 110µs, Return time = 10µs.

- FIP (NFC 46-603/4)
  TXrate = 1Mbit/s, Silence time = 110µs, Return time = 10µs.

2.5 Performance

The following performance figures are specific to routes configured for F8000 operation. Data exchange uses ESP protocol at 19200 baud. The minimum figures assume 0% 'byte stuffing' is required and the best case drive turn-around time. The maximum figures assume 100% 'byte stuffing' and the worst case drive turn-around time.

1 × GD2000 (compliance = 2000) min. 39ms max. 69ms.
2 × GD2000 (compliance = 2000) min. 71ms max. 131ms.
1 × GD3000 (compliance = 3000) min. 42ms max. 75ms.
2 × GD3000 (compliance = 3000) min. 77ms max. 143ms.

The following performance figures are specific to routes configured for F8000 operation. Data exchange uses RSVP protocol at 38400 baud. The minimum figures assume the best case drive turn-around time. The maximum figures assume the worst case drive turn-around time.

1 × GD3000 (compliance = 3000) min. 28ms max. 39ms.
2 × GD3000 (compliance = 3000) min. 52ms max. 74ms.

3. Installation

3.1 Physical Installation

The WorldFIP to Serial Link Gateway has a very simple mounting procedure which utilises mounting holes in the four flanges on the base of the box. The centres of the four fixing holes are detailed below in Figure 3-1

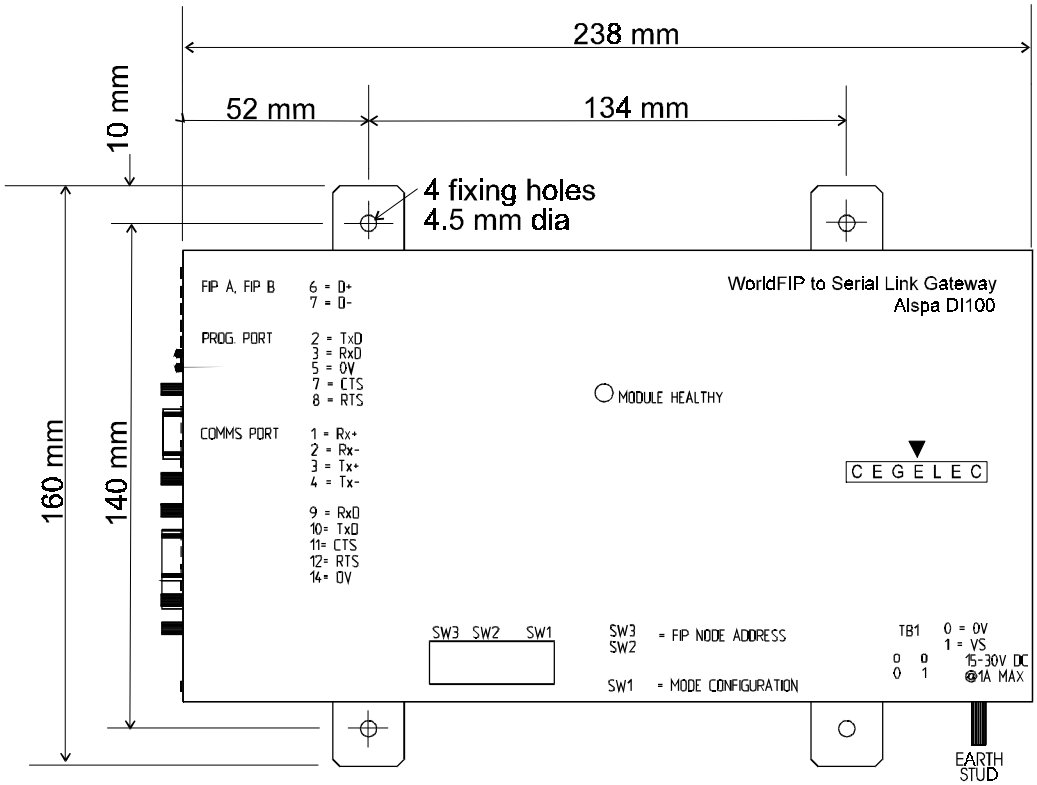

Figure 3-1 Unit Fixing Dimensions

Note: Ensure sufficient clearance at the front and bottom of the unit for system connections, and operation/checking of the configuration switches.

3.2 Connections to the WorldFIP to Serial Link Gateway

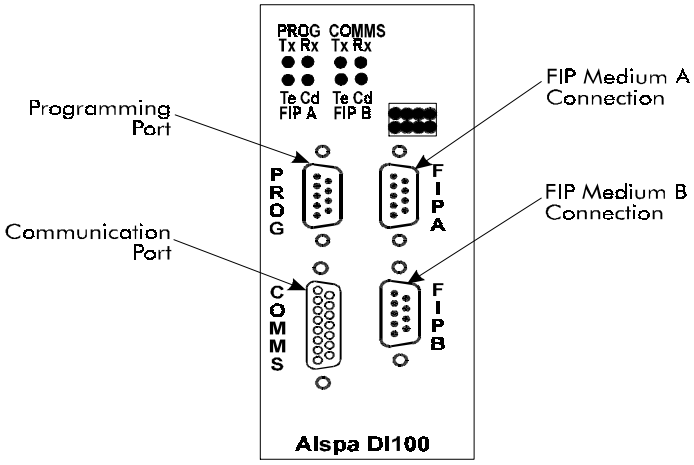

Figure 3-2 Front Panel Connections

Electrical noise and electromagnetic interference can be introduced into a micro-electronics system via the cables and wires connected to it. To avoid this, wiring which could carry noise (i.e. 'dirty' cables) should be kept away from cables which are sensitive to noise, these cables are then kept 'clean' (i.e. free from electrical noise). Wiring that falls into the same group can be run together, while wiring from the different groups should be kept apart, though paths may cross at right angles. All connections to the WorldFIP to Serial Link Gateway are considered to be 'clean' except for the Safety Earth connection which is considered to be 'dirty'.

3.2.1 Power Supply

The WorldFIP to Serial Link Gateway requires an external power source to be attached to the two-way terminal block. The unit will accept a DC voltage from 15 to 30 Volts at a maximum of 1 Amp. The input is fused and protected against reverse connection.

CAUTION
The reverse polarity protection of the unit is compromised if the serial link signal grounds are earthed.

3.2.2 FIP Connections

The unit provides connection to a dual redundant FIP network via two 9 way male D-type plugs. The two links are transformer isolated from each other and from the units 0V. The data transmission rate is fixed at 1 Mbit/second.
FIP network cabling arrangement and cables should comply with the relevant FIP standards.

Note The DI100 can be supplied fitted with one of two different types of FIP network cable connector retention screwlocks: shrouded or un-shrouded. The un-shrouded screwlocks are hexagonal and have a bright metallic finish. The shrouded screwlocks are circular and shrouded by a black moulding.

If the unit is fitted with un-shrouded screwlocks, the user must ensure that the screwlocks are isolated from the screen of the FIP network cable and provide an alternative "AC earth" for the FIP cable screen as close as possible to the unit.

Units fitted with shrouded screwlocks provide an "AC earth" facility via the screwlocks. In this case, the screen of the FIP network cable should be electrically connected to the screwlocks. Some screened D type connectors automatically provide this facility.

3.2.3 Serial Links

The WorldFIP to Serial Link Gateway has two serial ports. The first referred to as the “programming port” and labelled PROG on the front of the unit, is used to configure and monitor the unit. The second referred to as the “communication port” and labelled COMMS , is used to exchange data with non-FIP clients.

The programming port provides an RS232 level interface via a 9 way female D-type socket. It accepts baud rates of 9600 or 19200 and will automatically adjust to the baud rate of the programming device.

The communication port provides RS232 and RS485 level interfaces on separate pins of a single 15 way female D-type socket. This permits the simultaneous use of RS232 and RS485. The port can be configured to operate at 110, 300, 600, 1200, 2400, 4800, 9600, 19200 and 38400 baud.

Note: Both serial links are not isolated from the unit's logic supply.

The serial link cable should be multicore, with an overall screen and meet the following requirements:-

- Zo = 100-150Ω
- Capacitance < 41 pF/m
- Resistance < 78.7Ω/km

3.2.4 Earthing Requirements

It is essential that the WorldFIP to Serial Link Gateway is properly earthed as detailed below:

- The unit should have a safety earth connection to the earth stud on the side of the box. A minimum of 2.5mm² insulated cabling (Green/Yellow) must be used.
- The 0 Volts of the supply should be connected to the system clean earth (signal ground).
- The screens of the serial link cables should be taken to signal ground. It is recommended that only one end of the screen is grounded, this being the end remote from this unit.
- Screens from the FIP network should be earthed in accordance with the relevant FIP standards. Refer to Note in section 3.2.2 FIP Connections.

3.3 Programming Tools

The programming tool recommended for the WorldFIP to Serial Link Gateway is Gemesys 3. Other GEM 80/Drives programming tools may be used as long as they support the ESP messages given in section 4.11.

3.4 Switch Settings

The unit has 3 rotary switches, 2 to set the FIP Node Address, and one to control the configuration. Figure 3-3 shows the location of these switches.

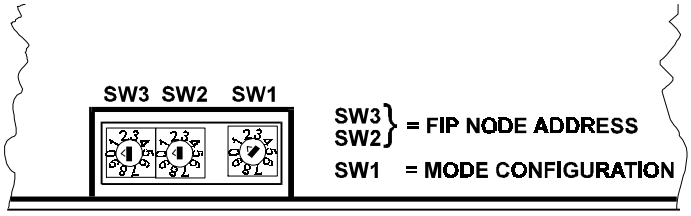

Figure 3-3 Location of Mode and FIP Node Switches.

3.4.1 FIP Node Address

These two switches are set to define the FIP node Address of the unit. FIP node Addresses in the range 00 to 99 may be selected. The FIP node Address is read from left to right. i.e. 10×SW3 position + SW2 position.

These switches must be set to comply with the system level FIP network configuration. Please refer to section 4.6 for an explanation of how the FIP node Address is used by the unit.

N.B. These switches are read once when power is applied to the unit, a power cycle is therefore necessary in order to activate changes made to the switch settings.

3.4.2 Configuration Mode

SW1 controls the action of the unit at power up and is also used to select one of the in-built (template) configurations. See section 5.1 and 5.2.1 for further details.

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4. Operation

4.1 Introduction

The function of the unit is to permit the exchange of information between FIP compatible controllers and none FIP compatible devices connected to the serial communications port. The context in which the unit may be employed is illustrated in Figure 4-1.

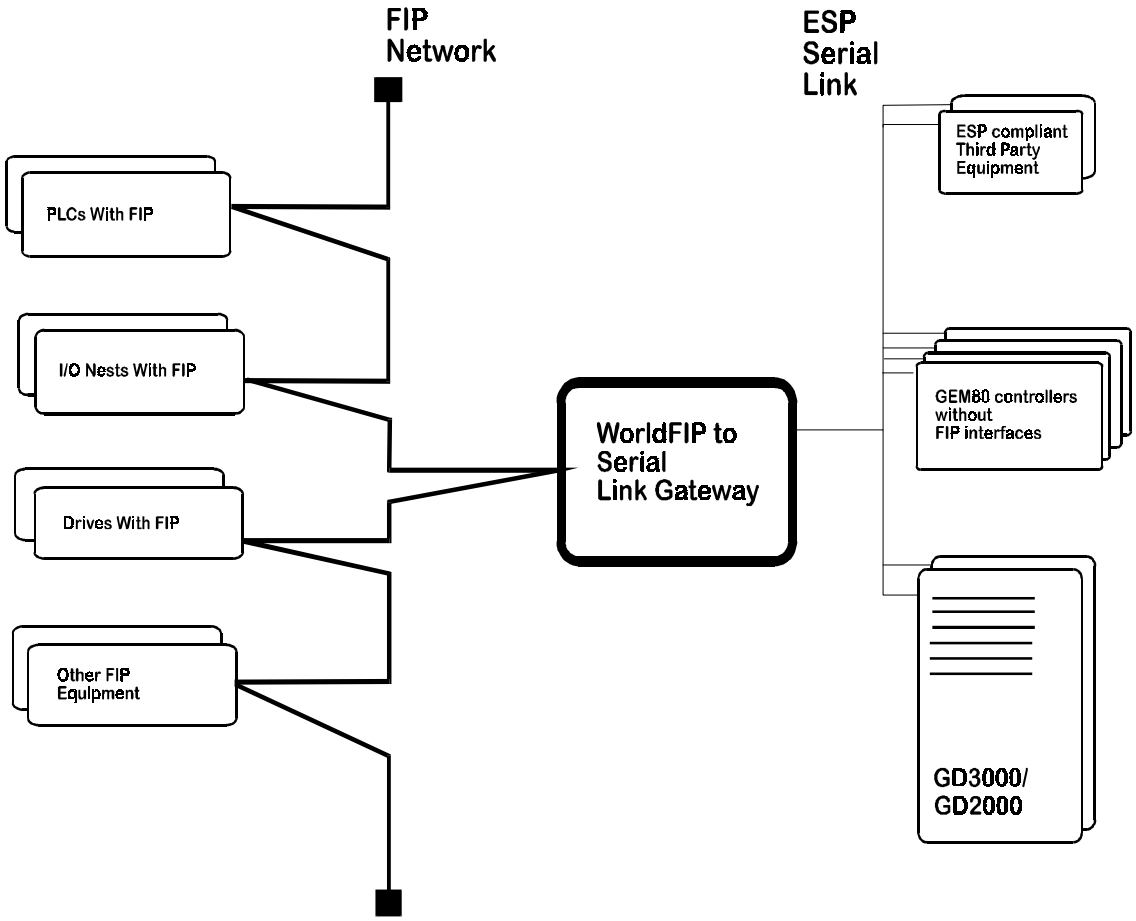


Figure 4-1 WorldFIP to Serial Link Gateway Context Diagram

4.2 Description of Operation

4.2.1 Overview

To achieve this functionality data flows along the paths (shown in Figure 4-2) as follows:

- Data contained in the VCOMs is exchanged between the FIP network and the units FIP database, at a time controlled by the bus arbiter, via the network interface.
- Each consumed VCOM is transferred from the FIP database to VCOM storage in G-Tables, at a time determined by the time scheduler.
- For each configured route, class data is transferred from the consumed VCOMs stored in G-Tables to the route's K-Tables, according to the function of the class types.

- Each configured route's K-tables are transmitted on the serial link at the configured serial link trigger phase and period. Response data from the serial link is placed in the route's J-Tables
- For each configured route, class data is transferred from the J-Tables to the produced VCOMs stored in G-Tables, according to the function of the class types.
- Each produced VCOM stored in G-Tables is transferred to the FIP database at a time determined by the time scheduler.

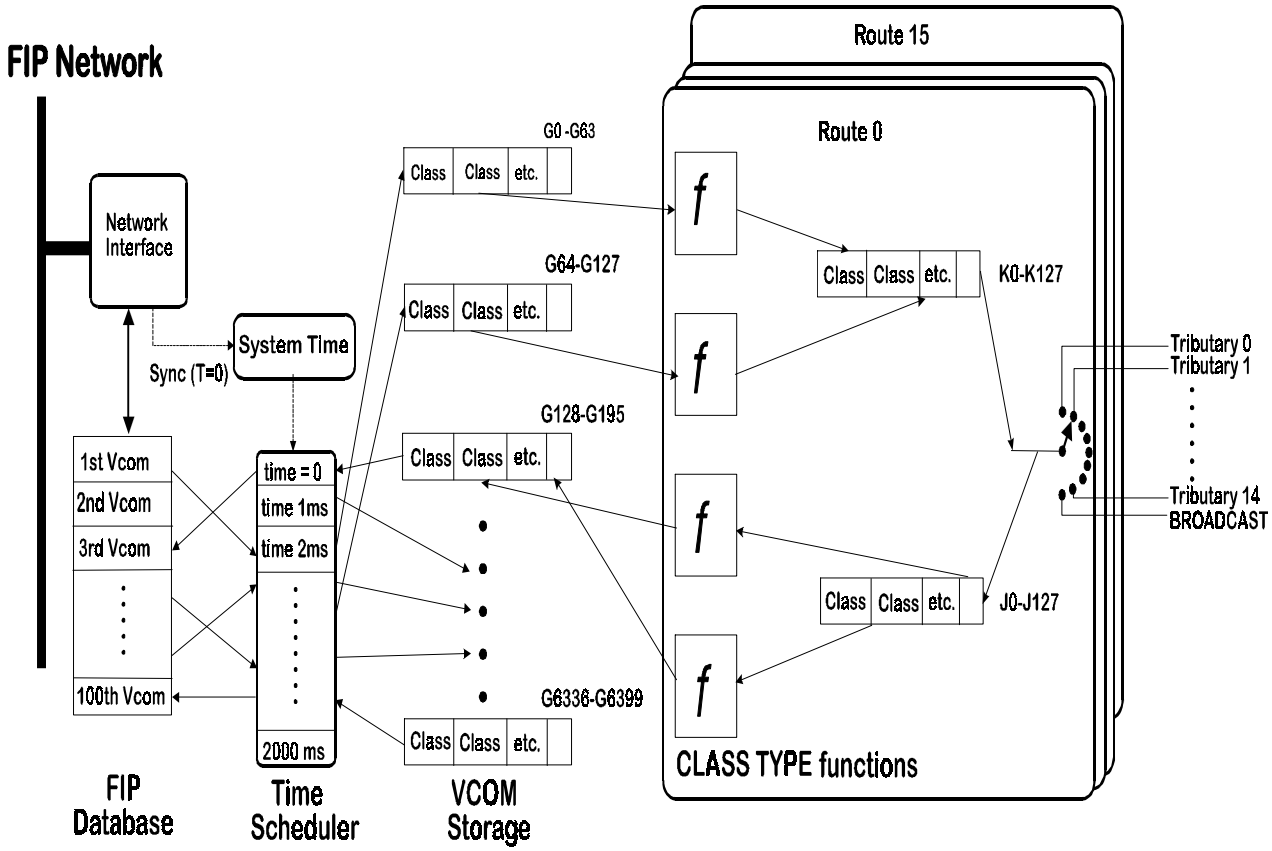


Figure 4-2 Internal Data Exchange

4.3 Time Scheduler Operation

The configuration parameters VCOM phase and VCOM period, provide the user with a method of controlling the point at which the unit exchanges G-Table data with the FIP Database. The time scheduler uses a list containing 2000 time slots, each representing an interval of one millisecond. The time scheduler allocates time slots to VCOMs based on the configuration parameters, such that a consumed VCOM can be read just after being received over the network, and a produced VCOM can be written just prior to the transmission over the network. Only one VCOM may be produced/consumed per time slot.

Each consumed VCOM is allocated to slot positions equating to multiples of its period plus phase plus one. Each produced VCOM is allocated to slot positions equating to multiples of its period plus phase minus one. If the calculated slot position is already allocated, then the VCOM is repositioned to the next available empty slot. Consumed VCOMs are repositioned to later slots, produced VCOMs are repositioned to earlier slots.

All VCOMs with a period configured to zero are considered to be asynchronous, these are allocated to any remaining empty slots. If any of the VCOMs cannot be allocated to time slots, then an error message is displayed on the programming device and the condition is reflected in the F-Table entries F130 to F132 inclusive.

Data is transferred between the FIP network and the FIP database under the control of the bus arbiter program, rather than the time scheduler. A mechanism is therefore provided to synchronise the two. The reception of a special synchronising VCOM causes the time scheduler to restart at the first time slot. After a period of one millisecond, the time slot is advanced and if occupied a VCOM is transferred. This continues until the reception of another synchronising VCOM. In the absence of successive synchronising VCOMs, the time scheduler will eventually reach the last time slot, and will wrap-around to time slot 0.

The period of the synchronising VCOM is used in the detection of synchronisation. Each synchronising VCOM is timed with respect to its predecessor, and is considered to be valid if delivered at this period +/- one millisecond. The unit is 'synchronised' following the reception of two successive valid synchronising VCOMs. Subsequently consumed VCOMs have the 'SY' bit in the combined status word set. The unit continues to be 'synchronised' until the detection of two missing or invalid synchronising VCOMs, when the 'SY' bit of subsequently consumed VCOMs is cleared. This synchronisation period defaults to 2000 milliseconds, to permit asynchronous operation without a synchronising VCOM being configured.

4.4 Route Operation.

A route is a data channel which can be allocated to an ESP/RSVP tributary address. Up to 16 routes may be configured, each having any one of the possible tributary addresses. Several routes may be configured with the same tributary address if required.

Each route can have up to 12 data classes configured. Each data class defines the source, destination and transfer function required. The data class configurations are described in section 5.4.5. The unit processes the routes cyclically.

4.5 Modes of Operation

4.5.1 Run Mode

In the run mode, data transfers occur between the FIP network and the FIP database, and between the FIP database and the unit's G-Tables. Class data is transfer from the G-Tables to the K-Tables and from J-Tables to G-Tables according to the function of the class types. Data is transferred over the serial link. The user may observe the operation of the unit, by monitoring the contents of the data tables. Writing to data tables is permitted, but the configuration data in the P-Table cannot be modified.

CAUTION
Writing to data tables must be performed with caution, to prevent the accidental transfer of erroneous data to FIP subscribers or serial link tributaries.

4.5.2 Halt Mode

In the halt mode the unit continues to supply data to the FIP network, which will eventually lose asynchronous refreshment and will therefore be received as stale data by other FIP subscribers. Data transfers between the FIP database and the unit's G-Tables are suspended. The class type functions no longer transfer class data from the G-Tables to the K-Tables and from J-Tables to G-Tables. The serial link continues to process any backlog of transfers and then suspends. The contents of tables may be monitored. Writing to tables is permitted, including the configuration data in the P-Table.

4.6 Presence and Identification VCOMs

VCOM IDs @10XX and @14XX are used by FIP in the detection of subscriber identification and presence on the network. Where XX represents the FIP node address. As a result VCOM IDs in the ranges @1000 to @10FF and @1400 to @14FF are reserved and must not be specified in the configuration parameters of the unit.
In common with other FIP subscribers, the unit automatically creates the identification and presence VCOMs which correspond to the setting of the FIP node address switches (SW2 and SW3).
Additional identification and presence VCOMs are created for each route, (other than route 0), configured with F8000 compliance. In these cases the IDs used correspond to the node address plus the route number. These additional VCOMs are deleted on a halt to run transition, and replaced with VCOMs corresponding to the new configuration.

As a result the unit will occupy at least one FIP node address on the network, and at most sixteen depending on the configuration.

Example 1.

Configuration:
SW3 set to position 1, SW2 set to position 6.

Route 5	-compliance 100	(none F8000)
Route 6	-compliance 100	(none F8000)
Routes 0 to 4 and 7 to15	-compliance 0	(not in use)

Resultant network set-up:

The FIP node address base:	@10	(16 decimal)
Identification variables created:	@1010	(automatic)
Presence variables created:	@1410	(automatic)

Example 2.

Configuration:
SW3 set to position 3, SW2 set to position 2.
Routes 11 and 12 -compliance 2000 and 3000 respectively (F8000)
Routes 0 to 10 and 13 to 15 -compliance 0 (not in use)

Resultant network set-up:

The FIP node address base:	@20	(32 decimal)
Identification variables created:	@1020	(automatic)
	@102B	(for route11)
	@102C	(for route12)
Presence variables created:	@1420	(automatic)
	@142B	(for route11)
	@142C	(for route12)

4.6.1 Identification Variable Content

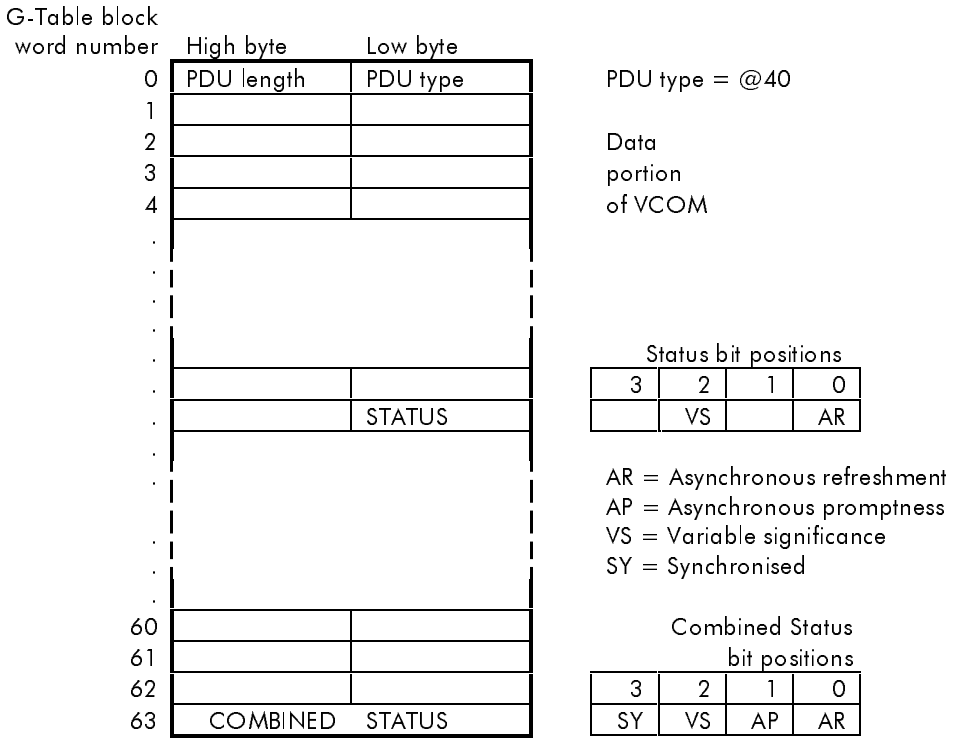
The following NULL terminated strings are included in the identification VCOM and are accessible over the network.

Vendor Name	"CEGELEC INDUSTRIAL CONTROLS"
Model Name	"Alspa DI100"
Revision	The current revision number
Tag Name	"FIP2ESP"

4.7 Table Allocation

4.7.1 G-Table Usage

Each block of 64 G-Tables is formatted as follows:



PDU type, **PDU length**, **STATUS** and **COMBINED STATUS** are only present if the associated VCOM is configured for consumption, otherwise these fields are cleared.

PDU length
The size of the VCOM in bytes if refreshment/promptness not configured. This value increases by one in order to include the status if refreshment/promptness is configured.

STATUS
This byte is present only if refreshment/promptness is configured and is positioned following the received data at position PDU length.

The **STATUS** and **COMBINED STATUS** bits have the following meaning:

SY - SYNCHRONISED.

The bit is RESET when:
- No synchronisation VCOM is currently configured.
- Two synchronising VCOMs have not been received within +/- 1ms of their specified synchronisation period.

The bit is SET when:
- The synchronising VCOM is configured and being correctly received i.e. consecutive synchronising VCOMs are received within +/- 1ms of their specified synchronisation period.

VS - VARIABLE SIGNIFICANCE.

The bit is RESET when:
- The unit is powered or reconfigured, to indicate that any data read from the associated VCOM is not significant.

The bit is SET when:
- A read of the associated VCOM is performed following a write by another FIP subscriber. The bit remains set until the unit is reconfigured.

AP- ASYNCHRONOUS PROMPTNESS.

The bit is RESET when:
- The unit is powered or reconfigured.
- A read is not performed within the specified consumption period, when status elaboration is configured for the associated VCOM.

The bit is SET when:
- A read of significant data is performed when, status elaboration is not configured for the associated VCOM.
- A read of significant data is performed within the specified consumption period, when status elaboration is requested for the associated VCOM.

AR - ASYNCHRONOUS REFRESHMENT.

The bit is RESET when:
- The unit is powered or reconfigured.
- A read signifies that data was not written to the FIP network within the specified production period, when status elaboration is requested for the associated VCOM.

The bit is SET when:
- A read of significant data is performed, when status elaboration is not configured for the associated VCOM.
- A read signifies that data was written to the FIP network within the specified production period, when status elaboration is requested for the associated VCOM.

4.7.2 G-Table Allocation

The unit permits up to 100 VCOMs to be configured. Each VCOM position has an allocated block of 64 G-Tables, whether in use or not. These G-Table blocks are either the data source for produced VCOMs or the data destination for consumed VCOMs. VCOM position is described in section 5.4.2.
N.B. synchronising VCOMs are allocated a G-Table block although by definition they carry no data. G-Table locations are permanently allocated as shown in Table 4-1.

Table 4-1 G-Table Allocation

VCOM Position	G-Table Allocation
0	0-63
1	64-127
2	128-191
3	192-255
4	256-319
5	320-383
6	384-447
7	448-511
8	512-575
9	576-639
10	640-703
11	704-767
12	768-831
13	832-895
14	896-959
15	960-1023
16	1024-1087
17	1088-1151
18	1152-1215
19	1216-1279
20	1280-1343
21	1344-1407
22	1408-1471
23	1472-1535
24	1536-1599
25	1600-1663
26	1664-1727
27	1728-1791
28	1792-1855
29	1856-1919
30	1920-1983
31	1984-2047
32	2048-2111
33	2112-2175
34	2176-2239
35	2240-2303
36	2304-2367
37	2368-2431
38	2432-2495
39	2496-2559
40	2560-2623
41	2624-2687
42	2688-2751
43	2752-2815
44	2816-2879
45	2880-2943
46	2944-3007
47	3008-3071
48	3072-3135
49	3136-3199

VCOM Position	G-Table Allocation
50	3200-3263
51	3264-3327
52	3328-3391
53	3392-3455
54	3456-3519
55	3520-3583
56	3584-3647
57	3648-3711
58	3712-3775
59	3776-3839
60	3840-3903
61	3904-3967
62	3968-4031
63	4032-4095
64	4096-4159
65	4160-4223
66	4224-4287
67	4288-4351
68	4352-4415
69	4416-4479
70	4480-4543
71	4544-4607
72	4608-4671
73	4672-4735
74	4736-4799
75	4800-4863
76	4864-4927
77	4928-4991
78	4992-5055
79	5056-5119
80	5120-5183
81	5184-5247
82	5248-5311
83	5312-5375
84	5376-5439
85	5440-5503
86	5504-5567
87	5568-5631
88	5632-5695
89	5696-5759
90	5760-5823
91	5824-5887
92	5888-5951
93	5952-6015
94	6016-6079
95	6080-6143
96	6144-6207
97	6208-6271
98	6272-6335
99	6336-6399

4.7.3 J/K Table Allocation

The unit permits up to 16 routes to be configured. Each route has an allocated block of 128 J and K-Tables, whether in use or not. K-Table blocks are the data destination for classes referencing consumed VCOMs. J-Table blocks are the data source for classes referencing produced VCOMs. The J and K-Tables are permanently allocated to routes as shown in Table 4-2.

Table 4-2 J and K-Table Allocation.

Route	Table Allocation
0	J0 - J127 K0 - K127
1	J128 - J255 K128 - K255
2	J256 - J383 K256 - K383
3	J384 - J511 K384 - K511
4	J512 - J639 K512 - K639
5	J640 - J767 K640 - K767
6	J768 - J895 K768 - K895
7	J896 - J1023 K896 - K1023
8	J1024 - J1151 K1024 - K1151
9	J1152 - J1279 K1152 - K1279
10	J1280 - J1409 K1280 - K1409
11	J1408 - J1535 K1408 - K1535
12	J1536 - J1663 K1536 - K1663
13	J1664 - J1791 K1664 - K1791
14	J1792 - J1919 K1792 - K1919
15	J1920 - J2047 K1920 - K2047

4.7.4 I-Table Allocation.

The I-Tables are reserved for internal control requirements. The content may be monitored when the unit is running or halted. To facilitate commissioning, the user may activate a data transfer by writing to the relevant I-Table location. This feature must be used with extreme caution as it may cause network wide effects. The I-Table allocation is shown in Table 4-3.

Table 4-3 I-Table Allocation

I Table	Function
I0 to I15	Bits 15 to 8 Number of Tables received from route X. Bits 7 to 0 Number of Tables to send to route X. X = 0 to 15 for I-Tables I0 to I15 respectively.
I16	ESP/RSVP Transmit Flags. One bit per route, I16.0 for route 0 etc. Bit = 1 to start transmission. Bit = 0 when transmission complete.
I17	ESP/RSVP Receive Flags. One bit per route, bit 0 for route 0 etc. Bit = 1 on receipt of response message.
I18.0 to I24.3	100 FIP Rx/Tx bits. 1 bit per VCOM. I18.0 =VCOM position 0, I24.3= VCOM position 99. Consumed VCOMs. The bit is set on receipt of new data for the associated VCOM from the FIP database. Produced VCOMs. Setting the bit causes a write of data for the associated VCOM to the FIP database. The bit is reset when the data has been copied.

4.7.5 F-Table Allocation

The F tables provide FIP and serial link statistical and diagnostic information. The content may be monitored and modified when the unit is running or halted. The F-Table allocation is shown in Table 4-4, Table 4-5, Table 4-7 and Table 4-7.

Table 4-4 Serial Link Diagnostics (COMMS PORT)

F-Table	Function
F10	Route failure flags - one bit per route (bit 0 set = route 0 failed etc.)
F11	Route truncated flags - one bit per route (bit 0 set = route 0 truncated etc.)
F12	Route 0 Diagnostics
F13	Route 1 Diagnostics
F14	Route 2 Diagnostics
F15	Route 3 Diagnostics
F16	Route 4 Diagnostics
F17	Route 5 Diagnostics
F18	Route 6 Diagnostics
F19	Route 7 Diagnostics
F20	Route 8 Diagnostics
F21	Route 9 Diagnostics
F22	Route 10 Diagnostics
F23	Route 11 Diagnostics
F24	Route 12 Diagnostics
F25	Route 13 Diagnostics
F26	Route 14 Diagnostics
F27	Route 15 Diagnostics

Route diagnostic tables are defined as follows:

Bits 0 to 7 Address of the last responding tributary.

Bits 8 to 11 Fault codes - (Unspecified values reserved).
0 - Successful transfer.
3 - Transmission failure.
4 - Hardware error.
5 - NAK received .
6 - Response with CRC error.
7 - Response with wrong terminator.
8 - Response too long.
9 - Data error (incorrect format).

Bits 12 and 13 Reserved.
Bit 14 Set when transfer failure detected.
Bit 15 Set when transfer successful.

Table 4-5 Serial link statistics (COMMS PORT)

F-Table	Function
F70 & F71	Number of transmitted messages (excluding retries)
F72 & F73	Number of transmitted messages (including retries)
F74	Number of hardware errors (framing/parity errors)
F75	Number of receive message time-outs
F76	Number of CRC errors
F77	Number of NAK replies
F78	Number of terminator errors
F79	Number of data errors
F80	Number of transmit message time-outs
F81	Number of overrun errors
F82	Number of break errors

Number of transmitted messages (excluding retries) = (F71 × 65536) + F70
Number of transmitted messages (including retries) = (F73 × 65536) + F72

Table 4-6 Serial link statistics (PROG PORT)

F-Table	Function
F110 & F111	Number of transmitted messages (excluding retries)
F112 & F113	Number of transmitted messages (including retries)
F114	Number of hardware errors (framing/parity errors)
F115	Number of receive message time-outs
F116	Number of CRC errors
F117	Number of NAK replies
F118	Number of terminator errors
F119	Number of data errors
F120	Number of transmit message time-outs
F121	Number of overrun errors
F122	Number of break errors

Number of transmitted messages (excluding retries) = (F111 × 65536) + F110
Number of transmitted messages (including retries) = (F113 × 65536) + F112

The F-Tables specific to FIP start at F130. The tables have the following format. Tables F134 to 154 refer to consumed VCOMs only.

Table 4-7 FIP Specific F-Tables

F-Table	Function
F130	FIP Interface Status 1= Configured
F131	Configuration Error Flags
F132	Extra Error information
F133	Hardware Fault
F134	AR Status of VCOM (1-16) in positions 0 -15
F135	AR Status of VCOM (17-32) in positions 16 - 31
F136	AR Status of VCOM (33-48) in positions 32 - 47
F137	AR Status of VCOM (49-64) in positions 48 - 63
F138	AR Status of VCOM (65-80) in positions 64 - 79
F139	AR Status of VCOM (81-96) in positions 80 - 95
F140	AR Status of VCOM (97-100) in positions 96 - 99
F141	AP Status of VCOM (1-16) in positions 0 - 15
F142	AP Status of VCOM (17-32) in positions 16 - 31
F143	AP Status of VCOM (33-48) in positions 32 - 47
F144	AP Status of VCOM (49-64) in positions 48 - 63
F145	AP Status of VCOM (65-80) in positions 64 - 79
F146	AP Status of VCOM (81-96) in positions 80 - 95
F147	AP Status of VCOM (97-100) in positions 96 - 99
F148	VS Status of VCOM (1-16) in positions 0 - 15
F149	VS Status of VCOM (17-32) in positions 16 - 31
F150	VS Status of VCOM (33-48) in positions 32 - 47
F151	VS Status of VCOM (49-64) in positions 48 - 63
F152	VS Status of VCOM (65-80) in positions 64 - 79
F153	VS Status of VCOM (81-96) in positions 80 - 95
F154	VS Status of VCOM (97-100) in positions 96 - 99
F155	FIP Interface Watchdog Status 1= healthy 0 = tripped
F156	Non echoing FIP transmission error rate
F157	Number of successful FIP transactions per second on medium 1
F158	Number of successful FIP transactions per second on medium 2
F159	Number of FIP frames received with error per second on medium 1
F160	Number of FIP frames received with error per second on medium 2

F131 Configuration error flags - have the following format:-
Flag set if the condition is true.

Bit 0 FIP Not Configured.
Bit 1 Invalid serial link configuration.
Bit 2 Bad Class length.
Bit 3 More than 100 VCOMs.
Bit 4 Class data outside VCOM.
Bit 5 Duplicated VCOM ID.
Bit 6 Invalid tributary address.
Bit 7 Class references a non-existent VCOM.
Bit 8 More than 12 classes/route.
Bit 9 FIP database configuration error. Refer to F132 for detailed report.
Bit 10 Bad VCOM Length.
Bit 11 Incorrect Route Compliance.
Bit 12 Incorrect Class for the Route Compliance.
Bit 13 Class references J or K data outside allocation.
Bit 14 Invalid F8000 scaling/conversion parameter.
Bit 15 Invalid change to network compliance.

F132 Extra Error Information - This provides additional information about the error indicated in F131. It has the following format:

If F131.9 is set, then time slots could not be allocated to suit the requested configuration, and F132 will be set as follows:

@0020	Unable to allocate consumed VCOM
@0040	Unable to allocate produced VCOM
@0060	Unable to allocate asynchronous VCOM

If any of Bits 1,2,3,4,5,6,7,8,10,11,12,13, 14 and 15 in F131 are set then F132 represents the offset of the P-Table that caused the error.

If F131=0 and Bit 2 in F133 =1 then F132 bits 0-15 contain a FIP interface error number. These values should be reported to Customer Service.

F133 Hardware Fault - has the following format:

Bit 0	FIP interface Module Fault.
Bit 1	Reserved
Bit 2	FIP interface internal error.
Bit 3 to Bit 15	Reserved

F134 to F140 Asynchronous Refreshment
The bit sense and meaning is as defined in section 4.7.1

F141 to F147 Asynchronous Promptitude
The bit sense and meaning is as defined in section 4.7.1

F147 to F154 Variable Significance
The bit sense and meaning is as defined in section 4.7.1

4.8 Direct Data Transfer Operation

When direct data transfer is required, without F8000 compliance, the route compliance is set to 100. The following data class types can then be employed.

Class Type 256 (@0100)

Performs a transfer of data from the associated VCOM (stored in G-tables), to K-Table locations, while simultaneously exchanging the byte order of complete words transferred. The source information in the G-Tables is unaltered. This data class may be used to convert from Motorola to Intel byte ordering. The combined status information is used to determine whether the transfer should occur as illustrated in Table 4-8.

Class Type 257 (@0101)

Performs a transfer of data from J-Table locations to the associated VCOM (in G-tables), while simultaneously exchanging the byte order of complete words transferred. The source information in the J-Tables is unaltered. This data class may be used to convert from Motorola to Intel byte ordering.

Class Type 258 (@0102)

Performs a transfer of data from the associated VCOM (stored in G-tables), to K-Table locations, without exchanging the byte order. The source information in the G-Tables is unaltered. The combined status information is used to determine whether the transfer should occur as illustrated in Table 4-8.

Class Type 259 (@0103)

Performs a transfer of data from J-Table locations to the associated VCOM (in G-tables), without exchanging the byte order. The source information in the J-Tables is unaltered.

Class Type 260 (@0104)

Performs a transfer of data from the associated VCOM (stored in G-tables), to K-Table locations, while simultaneously exchanging the byte order of complete words transferred. The source information in the G-Tables is unaltered. This data class may be used to convert from Motorola to Intel byte ordering. The combined status information of all contributory VCOMs is used to produce a composite status in the final K-Table transferred. The transfer occurs regardless of the combined status content.

Class Type 262 (@0106)

Performs a transfer of data from the associated VCOM (stored in G-tables), to K-Table locations, without exchanging the byte order. The source information in the G-Tables is unaltered. The combined status information of all contributory VCOMs is used to produce a composite status in the final K-Table transferred. The transfer occurs regardless of the combined status content.

Table 4-8 Combined Status Bit Operation

VCOM Type	Status Elaboration	SY	VS	AP	AR
Synch.	YES	✓	✓	✓	✓
Synch.	NO	✓	✓	1	1
Asynch.	YES	×	✓	✓	✓
Asynch.	NO	×	✓	1	1

Synch. The consumed VCOM is configured for synchronous network transfer.

Asynch. The consumed VCOM is configured for asynchronous network transfer.

Status Elaboration

YES The VCOM is produced with asynchronous refreshment and consumed with asynchronous promptness configured.

NO The VCOM is configured without asynchronous refreshment or asynchronous promptness.

× The bit is not used in transfer determination, can be set or clear.

✓ The bit is used in transfer determination, set to transfer, clear to inhibit transfer.

1 This bit is used in transfer determination, and is set whenever VS is set.

4.9 F8000 Compliant Operation

The WorldFIP to Serial Link Gateway can be configured to be compliant with the F8000 standard [Ref. 2].

4.9.1 F8000 VCOM Descriptions

In the F8000 implementation, predetermined VCOMs and data classes are specified. The VCOMs are: SYNC, SETPOINTS, ORDERS, CTRL-VSD and STAT-VSD. Table 4-9 shows the allocated VCOM ID numbers for F8000.

Table 4-9 VCOM ID Numbers for F8000

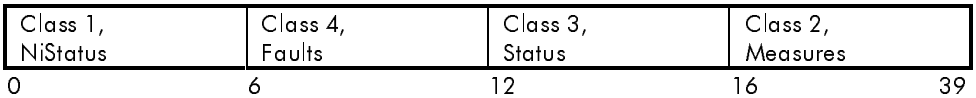
VCOM	VCOM length (bytes)	VCOM ID
SYNC	0 (consumed)	@9801
SETPOINTS	120 (consumed)	@8000 + Drive ID/6
ORDERS	96 (consumed)	@8030 + Drive ID/24
CTRL-VSD	112 (consumed)	@8040 + Drive ID/56
STAT-VSD	40 (produced)	Drive ID

The data classes specified for F8000 implementation are: Setpoints, Orders, NiControl, Measures, Status, Faults and NiStatus.

In the case of VCOMs consumed by the drive, to optimise VCOM utilisation, a single VCOM can hold data classes for more than one drive. As Table 4-9 shows, the ID of the VCOM which contains a specific data class for a particular drive, is based upon the drive ID and the data class size.

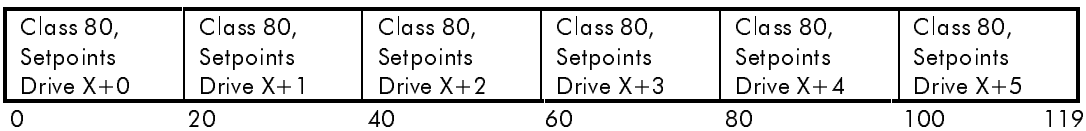
Figure 4-3 shows how six Setpoints data classes can be fitted into a single VCOM and that the first SETPOINTS VCOM has an ID of @8000.
Twenty four Orders data classes can be fitted into a single VCOM and that the first ORDERS VCOM has an ID of @8030.
Fifty six NiControl data classes can be fitted into a single VCOM and the first CTRL-VSD VCOM has an ID of @8040.

VCOM STAT-VSD: Produced by Drive, VCOM ID=Drive ID



Byte offset from Start of VCOM

VCOM SETPOINTS: Consumed by Drive, VCOM ID=@8000+X; X=Drive ID/6



Byte offset from Start of VCOM

VCOM ORDERS: Consumed by Drive, VCOM ID=@8030+X; X=Drive ID/24

Class 81, Orders Drive X+0	Class 81, Orders Drive X+1	Class 81, Orders Drive X+2	Class 81, Orders Drive X+3	Class 81, Orders Drive X+4	. . . .	Class 81, Orders Drive X+23

0 4 8 12 16 20 92 95
Byte offset from Start of VCOM

VCOM CTRL-VSD: Consumed by Drive, VCOM ID=@8040+X; X=Drive ID/56

Class 0, NiControl Drive X+0	Class 0, NiControl Drive X+1	Class 0, NiControl Drive X+2	Class 0, NiControl Drive X+3	Class 0, NiControl Drive X+4	. . . .	Class 0, NiControl Drive X+55

0 2 4 6 8 10 110 111
Byte offset from Start of VCOM

Figure 4-3 VCOM Layout

The offset within a VCOM where a particular drive's class data is located is shown in Table 4-10. The class type numbers are also shown.

Table 4-10 Class Data Offsets

Class	Class Type No.	Associated VCOM	Offset in VCOM (bytes)	Class size (bytes)
Setpoints	80	SETPOINTS	(Drive ID modulo 6) × 20	20
Orders	81	ORDERS	(Drive ID modulo 24) × 4	4
NiControl	0	CTRL-VSD	(Drive ID modulo 56) × 2	2
Measures	2	STAT-VSD	16	24
Status	3	STAT-VSD	12	4
Faults	4	STAT-VSD	6	6
NiStatus	1	STAT-VSD	0	6

Each drive produces one STAT-VSD VCOM. This is the amalgamation of the data classes Measures, Status, Faults, and NiStatus. Since each drive has its own STAT-VSD VCOM, and does not share it with other drives, the data class offsets are fixed.

Each VCOM appears in G tables. The G-Table where a class data starts is determined using the formula:

Gn = (position of VCOM in list × 64)+1+(offset for class /2)

where position of VCOM in list starts at zero. The 1 is added because internal FIP data occupies the first G table location in each 64 table block.

Table 4-11 Orders Class Layout

G Table	FIP-CS Ref.	FUNCTION	VALUE	GD2000 Reference	GD3000 Reference
n.0	D_BO1	Brake Command	1=Release	N/S	CF62=1
n.1	D_GO2	Jog/Auto Mode	1=Jog	N/S	CF8=1
n.2	D_GO3	Forward/Reverse	1=Forward 0=Reverse	P207×1 [a] P231×1 [b] P207×–1 [a] P231×–1 [b]	CF3=0 CF3=1
n.3	D_GO4	Reset Faults	0 to1=Reset	N/S	CF9=1
n.4	D_GO5	Main Contactor	1=On	N/S	N/S
n.5	D_GO6	Rapid Stop	1=Rapid	N/S	CF2=0
n.6	D_GO7	DC Loop Power	1= Closed	N/S	N/S
n.7	D_GO8	Run/Stop	1=Run	P208.0=1 [a] P232.0=1 [b]	CF0=1
n.8	D_GO12	External Fault Trip Input	1=Fault	N/S	CF10=1
n.9	D_MO1	Select additional speed ref.	1=Select	N/S	N/S
n.10	D_PO2	Set Datum	0 to1=Set	N/S	CF83=1 [c]
n.11	D_PO3	Position Control select	1=Select	N/S	CF7=1 [c]
n.12	D_PO6	Unidirectional approach select	1=Select	N/S	CF90=1 [c]
n.13	D_VO1	Select speed/torque mode	1=Torque	N/S	CF72=1
n.14	D_VO2	Apply speed control droop	1=Apply	N/S	N/S
n.15	D_DO2	Apply Full field reference	1=Economy	N/S	N/S
n+1.0	D_VO4	Enable Magnetising Control	1=Enable	N/S	CF25=1
n+1.1 to n+1.7		RESERVED			
n+1.8 to n+1.15		RESERVED			

(a) Reference applicable to RS232 operation.
(b) Reference applicable to RS485 operation.
(c) Reference applicable to routes with a compliance of 3001 when connected to a GD3000 using position control. Otherwise N/S.
N/S Reference not supported.

Table 4-12 Setpoints Class Layout

G Table	FIP-CS Ref.	FUNCTION	UNITS	GD2000 Reference	GD3000 Reference
n	D_GC1	Upper Current Limit	CURRENT	P9	N/S
n + 1	D_GC4	Speed Reference	SPEED	N/S	P216[(a)(d)] P256[(b)(d)]
n + 1	D_GC4	Speed Reference	FREQUENCY	P207 [(a)] P231 [(b)]	N/S
n + 2	D_PC1	Linear Position reference (High word)	LENGTH	N/S	P217[(a)(c)] P257[(b)(c)]
n + 3	D_PC1	Linear Position reference (Low word)	LENGTH	N/S	P216[(a)(c)] P256[(b)(c)]
n + 4	D_PC4	Datum set position ref. - (linear) (High Word)	LENGTH	N/S	P751[(c)]
n + 5	D_PC4	Datum set position ref. - (linear) (Low word)	LENGTH	N/S	P750[(c)]
n + 6	D_SC2	Radius	LENGTH	N/S	N/S
n + 7	D_VC1	Main Electromagnetic torque ref.	FLUX	N/S	P217[(a)(d)] P257[(b)(d)]
n + 8	D_VC4	Additional Electromagnetic torque ref.	CURRENT	N/S	N/S
n + 9	D_VC7	Additional speed/Freq. ref.	SPEED	N/S	N/S

(a) Reference applicable to RS232 operation.
(b) Reference applicable to RS485 operation.
(c) Reference applicable to routes with a compliance of 3001 when connected to a GD3000 using position control. Otherwise N/S.
(d) Reference applicable to routes with a compliance of 3000 when connected to a GD3000 not using position control. Otherwise N/S.
N/S Reference not supported.

Table 4-13 NiControl Class Layout

G Table	FUNCTION	
n	Bits 7 to 0	Control Protocol Sequence Number Increments from 1 to 2 etc. to 255, but overflows from 255 to 1.
	Bits 15 to 8	Transition Number 0 = Network valid config 1 = Network discard config 2 = Run Locked 3 = Stop 4 = Run Unlocked

Table 4-14 NiStatus Class Layout

G Table	FUNCTION	
n	Bits 7 to 0 Bits 15 to 8	Device type Conformance level
n + 1		Configuration Version
n + 2	Bits 7 to 0 Bits 15 to 8	Operating Mode: 00 = Fault 01 = Idle 02 = Ready 03 = Running Locked 04 = Running Unlocked 05 = Locked local Current Control Protocol Sequence Number

Table 4-15 Measures Class Layout

G Table	FIP-CS Ref.	FUNCTION	UNITS	Supported in GD2000	Supported in GD3000
n	D_GM1	Current	CURRENT	P4	P4
n + 1	D_GM3	Speed	SPEED	P3	P13
n + 2	D_GM6	Overload Timer	TIMER#3	P17	P12
n + 3	D_GM7	Motor voltage	VOLTAGE	P5	P6
n + 4	D_GM8	Power	POWER	P6	P7
n + 5	D_PM1	Position - absolute, linear (High word)	LENGTH	N/S	P703[(c)]
n + 6	D_PM1	Position - absolute, linear (Low word)	LENGTH	N/S	P702[(c)]
n + 7	D_VM1	Electromagnetic Torque	CURRENT	N/S	P10
n + 8	D_VM2	Magnetising current	FLUX	N/S	P20
n + 9	D_VM3	Electromagnetic Torque ref.	CURRENT	N/S	P9
n + 10	D_VM4	DC Link volts	VOLTAGE	N/S	P95
n + 11	For GD2000 D_AM2 For GD3000 D_VM5	Frequency (motor)	FREQUENCY	P2	P14

(c) Reference applicable to routes with a compliance of 3001 when connected to a GD3000 using position control. Otherwise N/S.
N/S Reference not supported.

The Overload Timer represents the time remaining until the drive would trip through timed overcurrent. This is based on the percentage overrating capacity and actual operating conditions. The value is limited to the range of an unsigned 16-bit integer. A value of 60000 represents 600 seconds, 6000 represents 60 seconds etc. When no overrcurrent condition exists, the value reported is 65535.

Example.
A 10 amp. drive with an overcurrent capability of 1.5 × Full load current for 60 seconds, delivering 15 amps. initially reports :
Overload Timer = 6000 (60 seconds remaining).
If the overload remains constant, then 40 seconds later the report is:
Overload Timer = 2000 (20 seconds remaining).

Table 4-16 Status Class Layout

G Table	FIP-CS Ref.	FUNCTION	VALUE	GD2000 Reference	GD3000 Reference
n .0	D_BS1	Brake Released	1=Released	N/S	Digital I/P 14=1
n .1	D_GS1	Drive ready	1=Ready	N/S	SF4=1
n .2	D_GS3	Drive running forward	1=Forward	N/S	SF9=0
n .3	D_GS4	Drive running reverse	1=Reverse	P464.1=1	SF9=1
n .4	D_GS5	Drive motoring	1=Motoring	P464.13=0	P7.15=0
n .5	D_GS6	Drive regenerating	1=Regen	P464.13=1	P7.15=1
n .6	D_GS7	Drive at zero speed	1=Zero Speed	N/S	SF11=1
n .7	D_GS8	In local control	1=Local	N/S	N/S
n .8	D_GS9	In speed/freq. limit	1=In limit	N/S	SF10=1
n .9	D_GS10	Control on drive	1=Control on	N/S	N/S
n .10	D_GS11	Drive stopped	1=Stopped	P464.9=1	SF1=1
n .11	D_GS12	Alarm Fault	1=No alarm	P464.12=0	SF4=1
n .12	D_GS13	Normal Stop fault	1=No fault	N/S	N/S
n .13	D_GS14	Instantaneous Stop Fault.	1=No Fault	P60=0	SF5=0
n .14	D_GS15	Drive at current limits	1=In limit	P464.4=0	SF28=1
n .15	D_GS16	At speed	1= at speed	P464.5=1	SF12=1
n + 1.0	D_PS2	Position Datum Set	1=Datum set	N/S	SF64=1[(c)]
n + 1.1	D_PS4	At position	1=At position	N/S	SF67=1[(c)]
n + 1.2	D_TS1	Saturation in tension limits	1=Saturated	N/S	N/S
n + 1.3	D_VS1	Pre-alarm overload timer	1=Pre-alarm	N/S	N/S
n + 1.4 to n + 1.7		RESERVED	0		
n + 1.8 to n + 1.15		RESERVED	0		

(c) Reference applicable to routes with a compliance of 3001 when connected to a GD3000 using position control. Otherwise N/S.
N/S Reference not supported.

Table 4-17 Faults Class Layout

G Table	FIP-CS Ref.	FUNCTION	VALUE	GD2000 Reference	GD3000 Reference
n		Number of first fault	non-zero = fault	P60	P60
n + 1.0	D_BF1	Brake power supply failure	1=fault	N/S	Digital I/P 15=1
n + 1.1	D_GF1	Main power failure	1=fault	N/S	N/S
n + 1.2	D_GF2	Auxiliary power failure	1=fault	P60=15	P60=15
n + 1.3	D_GF4	Earth fault Detected	1=fault	N/S	N/S
n + 1.4	D_GF5	Microprocessor Fault	1=fault	N/S	N/S
n + 1.5	D_GF6	Drive Over-Temperature fault	1=fault	P60=6	P60=6
n + 1.6	D_GF7	Motor Over-Temperature fault	1=fault	P60=21	P60=21
n + 1.7	D_GF9	Drive ventilation fault	1=fault	P60=6	P60=6
n + 1.8	D_GF10	Motor overspeed	1=fault	P60=57	P60=57
n + 1.9	D_GF11	Motor stalled	1=fault	N/S	SF18=1
n + 1.10	D_GF12	Drive instantaneous current overload	1=fault	P60=7	P60=7
n + 1.11	D_GF13	Drive timed current overload	1=fault	P60=5	P60=5
n + 1.12	D_GF16	Power Components Protection tripped.	1=fault	N/S	N/S
n + 1.13	D_GF17	External interlock fault	1=fault	P60=1	P60=1
n + 1.14	D_GF20	Motor timed current overload	1=fault	P60=22	P60=22
n + 1.15	D_GF22	Mains sync loss	1=fault	N/S	N/S
n + 2.0	D_GF23	Overcurrent Supply Bridge	1=fault	N/S	N/S
n + 2.1	For GD2000 D_AF2 For GD3000 D_VF2	DC Link undervoltage	1=fault	P60=4	P60=4
n + 2.2	For GD2000 D_AF1 For GD3000 D_VF1	DC Link overvoltage	1=fault	P60=3	P60=3
n + 2.3	For GD2000 D_AF6 For GD3000 D_VF3	DC Link precharge fault	1=fault	N/S	N/S
n + 2.4		Motor Field loss	1=fault	N/S	N/S
n + 2.5		Motor Field overcurrent	1=fault	N/S	N/S
n + 2.6	D_AF3	Current imbalance	1=fault	P60=14	P60=58
n + 2.7		Armature overvoltage	1=fault	N/S	N/S
n + 2.8		Low Motor Voltage	1=fault	P60=28	N/S
n + 2.9	D_VF5	Speed feedback fault	1=fault	N/S	P60=61
n + 2.10 to n + 2.15		Reserved			

N/S Reference not supported.

Faults detected by the unit during the scaling or unscaling of Setpoints and Measures classes, are also reported in G Table n. These values reported are listed in Table 4-18.

Table 4-18 Scaling/unscaling faults.

Value Reported	Reason	Result
-1	A 32-bit signed integer contained the value @80000000 prior to scaling or unscaling.	The value 0 is substituted for the result.
-2	Scaling or unscaling produced a result, which it too large to be expressed in a 32-bit signed integer. The produced value is greater than +99999999. The produced value is less than -99999999. The produced value would be @80000000.	The value +99999999 is substituted, if the sign of the result is positive. The value -99999999 is substituted, if the sign of the result is negative.
-3	A 16-bit signed integer contained the value @8000 prior to scaling or unscaling.	The value 0 is substituted for the result.
-4	Scaling or unscaling produced a result, which is too large to be expressed in a 16-bit signed integer.	The value +32767 is substituted, if the sign of the result is positive. The value -32767 is substituted, if the sign of the result is negative.

4.9.2 F8000 Scaling.

The values in the Measures and Setpoints classes represent a proportion of their respective configured Scaling Parameters. Each Setpoint value is divided by its respective scaling parameter to give the required proportion of the maximum. This proportion is multiplied by the respective conversion parameter to give actual physical units.

There is one network wide scaling value for each physical unit and one conversion parameter per unit per drive. The conversion parameter has a specified local unit e.g. Amps, RPM etc. The formula below shows the method of calculating scaled values.

$$\text{scaled\_value} = \frac{(\text{network\_value} \times \text{conversion\_parameter})}{\text{scaling\_parameter}}$$

e.g. for an angular speed Setpoint network value of 5,000, with angular speed scaling parameter of 10,000 and the drive's angular speed conversion parameter of 4,000 r.p.m.;

$$\text{scaled\_value} = \frac{(5000 \times 4000)}{10000} = 2000 \text{r.p.m}$$

When Measures values are being passed to the FIP network, a reverse operation is carried out to 'unscale' values into network values. The formula below shows this method of calculation.

$$\text{network\_value} = \frac{(\text{scaled\_value} \times \text{scaling\_parameter})}{\text{conversion\_parameter}}$$

CAUTION

Care should be taken to ensure that scaling and unscaling produce results, which can be contained in a 16 bit signed integer, or a 32 bit signed integer as applicable. Value substitution will occur as listed in Table 4-18 under fault conditions.

4.9.3 F8000 State Descriptions

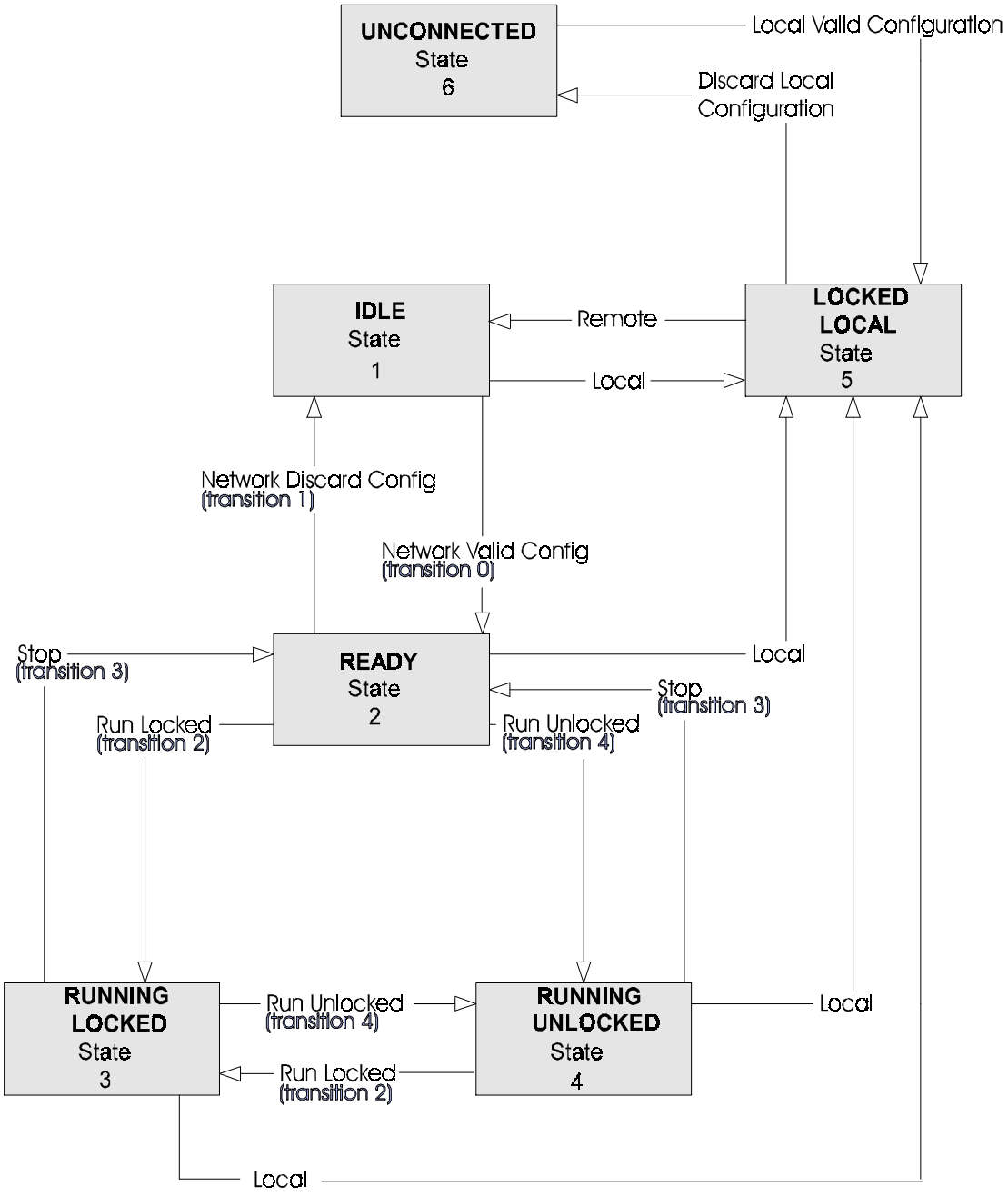


Figure 4-4 F8000 State Chart

Figure 4-4 shows the F8000 state chart. Transitions issued from the FIP network have their F8000 transition number shown. LOCAL/REMOTE is treated as a transition and is derived from the state of a bit in the data table R0. Each bit in R0 relates to the corresponding route e.g. if bit 0 is set then route 0 is in REMOTE and if cleared then it is in LOCAL. The value of R0 can be changed while the unit is running to permit transitions between REMOTE and LOCAL.

FREEZE/FALLBACK

A fallback value is a constant derived from P-Table contents. Values should be chosen which represent a safe operating condition for the drive.

A frozen value is the last prompt and fresh value received from the network while in RUNNING LOCKED or RUNNING UNLOCKED states. Initially frozen values are made equal to fallback values until overwritten.

When setting up the freeze/fallback configuration, suitable fallback values must be entered even if freeze has been selected, so that the frozen values are valid even if the route has not entered the RUNNING LOCKED or RUNNING UNLOCKED states.

UNCONNECTED

When the unit is halted, all routes are in the UNCONNECTED state. In this state, no FIP transfers or serial link activity occur.

LOCKED LOCAL

In this state, NiControl, Setpoints and Orders data from the G-Tables are not interpreted nor transferred to the drive. The NiStatus data is returned in the route's STAT-VSD VCOM, but the Measures, Status and Faults classes are not significant and should be ignored. The serial link is inactive but can be manually triggered.

IDLE

In this state, the Setpoints and Orders data from the G-Tables are not interpreted nor transferred to the drive. The NiStatus data is returned in the route's STAT-VSD VCOM, but the Measures, Status, and Faults classes are not significant and should be ignored. NiControl data from the G-Tables is interpreted and state changes actioned if prompt, fresh and the sequence number is correct.

READY

In this state, frozen or fallback values are used for Setpoints and Orders as selected in the configuration. NiControl data from the G-Tables is interpreted and state changes are actioned if prompt, fresh and the sequence number is correct.
The serial link is active in this state and values are sent to and received from the drive. NiStatus, Measures, Status and Faults are presented in the route's STAT-VSD VCOM.

RUNNING UNLOCKED

In this state, Setpoints and Orders data from the G-Tables are interpreted and transferred to the drive, if both are prompt and fresh. NiControl data from the G-Tables is interpreted and state changes are actioned if prompt, fresh and the sequence number is correct. If freshness for either Setpoints or Orders is lost, then the latest frozen values are transferred to the drive, irrespective of the freeze/fallback configuration and the route remains in the RUNNING UNLOCKED state. If promptness for either Setpoints or Orders is lost, then the state is changed to READY by the internal issuing of a STOP transition. A promptness or freshness fault associated with NiControl does not cause a state change.
NiStatus, Measures, Status and Faults are presented in the route's STAT-VSD VCOM.

RUNNING LOCKED

On entering this state, the refreshment tolerance time for the route is loaded from the configuration data and the timer is started. If this timer expires, then the route is returned to the READY state by the internal issuing of a STOP transition. When freshness is detected for both Setpoints and Orders and the route is synchronised, the timer is halted.

While the timer is running, either frozen or fallback values are transferred to the drive, as directed by the configuration data and the route remains in the RUNNING LOCKED state. The loss of promptness for either Setpoints or Orders causes an immediate return to the READY state. NiControl data from the G-Tables is interpreted and state changes are actioned if prompt, fresh and the sequence number is correct. A promptness or freshness fault associated with NiControl does not cause a state change. NiStatus, Measures, Status and Faults are presented in the route's STAT-VSD VCOM.

While the timer is halted, Setpoints and Orders data from the G-Tables are interpreted and transferred to the drive. The loss of promptness or freshness for either Setpoints or Orders, or the loss of synchronisation for the route, causes an immediate return to the READY state. NiControl data from the G-Tables is interpreted and state changes are actioned if prompt, fresh and the sequence number is correct. A promptness or freshness fault associated with NiControl does not cause a state change. NiStatus, Measures, Status and Faults are presented in the route's STAT-VSD VCOM.

4.10 Timings

4.10.1 Introduction

Ideal unit operation is achieved with data transferred in the following order:

- consume (from the FIP network)
- transmit (over the serial link)
- receive (from the serial link)
- produce (to the FIP network)

This is shown diagramatically in Figure 4-5. The unit's performance can be measured as the time taken for one complete iteration of this cycle.

The transfer time (T_{TRANS}), is defined as the time taken to consume data from the FIP network, transmit it across the serial link, receive data back from the serial link and for the module to produce data back to the FIP network.

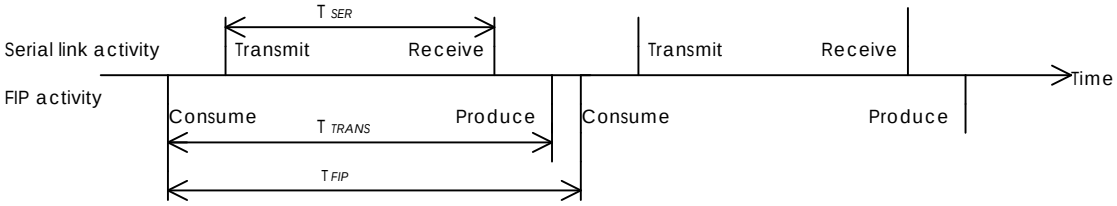


Figure 4-5 VCOM Transfer Timing Scheme

The main influencing factors on the transfer time are:

- The period of the unit's associated VCOMs (T_{FIP}) as requested by the BA.
- The serial link transfer time (T_{SER}).
- The phase of the unit's VCOMs.

The relationship between T_{FIP} and T_{SER} controls whether the serial link can operate synchronously or asynchronously with the FIP network:-

If $T_{FIP} < T_{SER}$ then the serial link runs asynchronously to the FIP network. This is because each time the serial link completes a transfer cycle, the unit has already consumed new data from the FIP network.

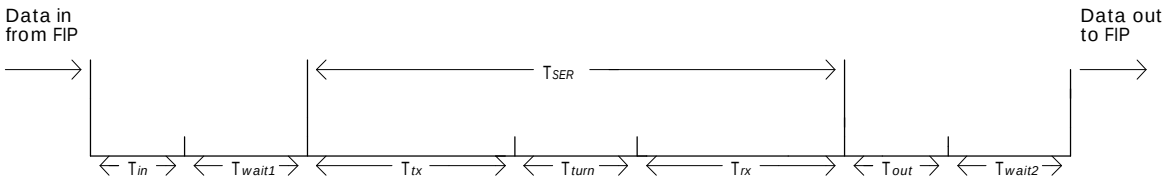
If $T_{FIP} > T_{SER}$ then the serial link can be configured to run synchronously with the FIP network. This is achieved using the serial link period & phase set-up tables P22 & P23. (Note if these are left at 0 then the serial link will revert to asynchronous operation).

4.10.1.1 Synchronous operation

When operating in the synchronous mode, the period and phase of the VCOMs can be matched to the serial link transfer time, to give the optimum unit performance. The unit's transfer time then equals the difference between the phases of the consumed and produced VCOMs.

The phase of the VCOMs only becomes influential when $T_{FIP} > T_{SER}$. It is important to have the consumed VCOMs phased early and the produced VCOMs phased late in the transfer cycle. This gives the longest time for data to be received from the serial link, which is to be produced in the current FIP period. Poor configuration will result in unnecessary degradation of the unit's performance.

The time taken for the transfer cycle is shown diagramatically in Figure 4-6.



Where:-

Tin	The time to take data in from the FIP network
Twait1	The waiting time before beginning transmission over the serial link
Ttx	The time to transmit the data over the serial link
Tturn	The turnaround time of the serial link tributary
Trx	The time to transmit the reply over the serial link
Tout	The time to take data from the serial link and present it to the FIP chipset, ready for transmission over FIP
Twait2	The waiting time before data is output on the FIP network
TSER	The total time spent transferring data over the serial link (*Ttx* + *Tturn* + *Trx*)

Figure 4-6 Transfer Cycle Scheme

If the unit is communicating with more than 1 tributary T_{SER} must be increased, to include the time taken to communicate to all configured tributaries.

Note If tributaries are configured but left unconnected, the T_{wait1} time is increased (due to retries), to such an extent that it may cause loss of freshness on the healthy routes.

The times for each stage can be calculated from Equation 4-1.

$$T_{TRANS} = T_{in} + T_{wait1} + T_{tx} + T_{turn} + T_{rx} + T_{out} + T_{wait2}.$$

Where :

T_{in}	= 1ms typ
T_{wait1}	= 0 to T_{SER} (async.) or 1 to 2ms (sync.)
T_{tx}	= ((bytes of data to transmit + 7) × 10) / baud rate
T_{turn}	= 6ms typ, 17ms max. (GD2000 or GD3000)
T_{rx}	= ((bytes of data to receive + 5) × 10) / baud rate
T_{out}	= 1ms typ
T_{wait2}	= 0 to T_{FIP} (async.) or configurable (sync.)

Equation 4-1

The transmission times T_{tx} and T_{rx} will be increased if the data bytes contain any control characters (STX, ETX, ETB, EOT, DLE or ENQ) as these require 'stuffing', which adds a further byte to the length of the message per control character. For further information on byte 'stuffing' see the GEM80 Serial Communications Technical Manual [Ref. 5].

4.10.1.2 Asynchronous operation

When operating in the asynchronous mode, it is only possible to define the range of transfer times. Discounting the 2ms due to T_{in} and T_{out} the throughput then becomes dependant upon T_{SER} and T_{FIP} and can be simplified into the 3 following categories:-

(1) $T_{SER} > T_{FIP}$
i.e. the FIP cycle time is shorter than the time taken to transfer data over the serial link.

The FIP subscriber is effectively waiting for data to be returned from the serial link.

The minimum transfer time occurs, when the serial link transfer runs having just received data from FIP, and when FIP requests the response just after it is received from the serial link. This gives a min transfer time of T_{SER}.

The maximum transfer time occurs, when the serial link transfer runs just prior to the receipt of data from FIP, and FIP requests the response just prior to it being received from the serial link. This gives the longest waiting times (T_{SER} and T_{FIP}) and the maximum transfer time is $2 \times T_{SER} + T_{FIP}$.

(2) $2 \times T_{SER} > T_{FIP} > T_{SER}$
i.e. the FIP cycle time is 1 to 2 times the time taken to transfer data over the serial link.

The minimum transfer time occurs, when the serial link transfer runs having just received data from FIP. As $T_{FIP} > T_{SER}$, the response is available before the end of the current FIP cycle, giving a minimum transfer time of T_{FIP}.

The maximum transfer time occurs, when the serial link transfer runs just prior to the receipt of data from FIP. A delay of T_{SER} occurs while data is transmitted over the serial link. A further delay of T_{SER} occurs while data is received from the serial link. By this time the current FIP cycle will have finished and the data will not be transferred until the next FIP cycle, giving a maximum transfer of $2 \times T_{FIP}$.

(3) $T_{FIP} > 2 \times T_{SER}$

i.e. the FIP cycle time is at least twice that of the serial link.

In this case, the serial link will have sufficient time to complete its current transfer and a further transfer before the end of the FIP cycle. The minimum and maximum transfer time is T_{FIP}.

4.10.2 Summary

It is intended that the VCOM configuration will be aligned with the BA.

Best unit performance is achieved when the serial link is running synchronously with the FIP network, when T_{TRANS} becomes the difference between the phase of the unit's first consumed VCOM and last produced VCOM.

If the unit cannot be run synchronously then the unit's performance becomes dependant upon the ratio of T_{SER} and T_{FIP} and will fall into one of the three categories in Figure 4-7.

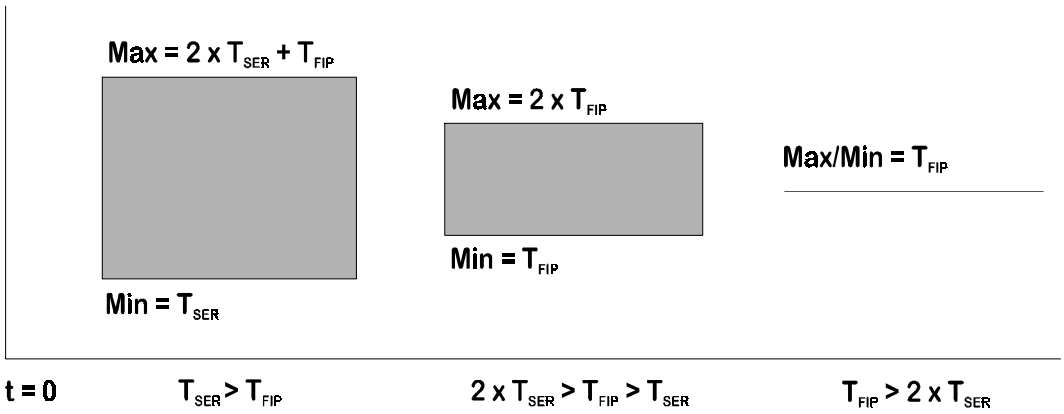


Figure 4-7 Asynchronous Timing Categories

The unit's performance has been defined as the time taken to exchange data with the serial link tributary as viewed from the FIP network.

4.10.3 Example 1

What configuration is required for optimum performance when communicating to 1 GD2000 drive in F8000 mode?

Assumptions:

- The unit transmits 10 bytes of data to the drive and receives 26 bytes.
- Worse case data content requiring 100% byte 'stuffing'.
- Baud rate = 19200
- The unit's Node ID = 0 i.e. it consumes VCOMs, @8000, @8030 & @8040 and produces VCOM 0.
- T_{in} = 1ms
- T_{wait1} = 2ms max.
- T_{out} = 1ms

Note: T_{wait2} effectively absorbs the difference between the best and worst case timings for the previous stages. This may also be used to add a delay so that the unit can fit in with the FIP networks synchronisation period.

Calculations

- Set Consumed VCOM Phases as follows:
  set the phase of VCOM @8000H to X
  set the phase of VCOM @8030H to X+1
  set the phase of VCOM @8040h to X+2

- Set the serial link transfer phase to X+4 to allow 1ms (T_{in}) to process the data.

- Calculate T_{SER} *as follows:*

  $T_{SER} = (T_{tx} + T_{turn} + T_{rx}) :$

		Percentage byte stuffing		
Time		0%	20%	100%
T_{tx}	(10 + 7)×10/19200	9ms	10ms	14ms
T_{turn}	6 to 17ms	17ms	17ms	17ms
T_{rx}	(26 +5) ×10/19200	16ms	19ms	30ms
T_{SER}	=	42ms	46ms	61ms

  The serial link transfer may not be initiated for a maximum of 2ms (T_{wait1}) after the serial link transfer phase, giving a worst case delay of 63ms before data can be returned at X+67.

- The phase for VCOM 0 should therefore be set to a minimum of X+69 to allow 1ms (T_{out}) to process the data.

The transfer time is therefore 69ms; the difference between the phase of the first consumed VCOM and the last produced VCOM.

To ensure synchronous operation the period of all the VCOMs should be greater than the transfer time. The lowest value for the period is therefore 70ms. X in the calculations above can thus take any value between 1 & 70ms.

If the phase of any VCOM exceeds its period, replace the phase with the phase minus the period. This eliminates jitter during resynchronisation. For optimum performance the BA and the SYNC VCOM must have a period that is exactly divisible by the period of the unit's VCOMs.

In this example setting X to 25ms and the period of the VCOMs to 70ms will give the following phases:-

VCOM @8000	= 25ms
VCOM @8030	= 26ms
VCOM @8040	= 27ms
Serial link phase	= 29ms
VCOM @0	= 94ms

The phase of VCOM 0 should therefore be changed to 94ms-70ms i.e. 24ms.
A suitable value for the period of the SYNC VCOM would be 700ms as this is an exact multiple of 70.

Note: In this example, if P22 & P23 are 0, requesting asynchronous operation, the unit's transfer time will vary between 70ms and 140ms.

4.10.4 Example 2

How could the above unit be added to a FIP network where the period of the SYNC VCOM had already been fixed to 500ms?

We have calculated the transfer time, achieved with VCOM periods of 70ms. However 500 is not an exact multiple of 70. As 500/70 =7.14, the unit would be successfully updated 7 times, but the SYNC VCOM would arrive during the 8th update. This would cause jitter and may force the unit into asynchronous operation. This can be avoided, at the expense of performance, by increasing the VCOM periods.

If the update rate is not critical, a VCOM period of 100ms can be used, as this is exactly divisible into 500.

4.10.5 Example 3

How can a second F8000 compliant tributary be added to the unit configuration in Example 1?

This will consume the same VCOMs but will in addition produce VCOM 1.

The main effect of adding a second tributary is to double T_{SER} (assuming the same number of bytes are to be exchanged).

This increases T_{SER} from 61ms to 122ms. The phases of the consumed VCOMs, VCOM 0 and the initiation of the serial link may be left the same. The phase of produced VCOM 1 will have to be set to 61ms later than VCOM 0 i.e. x+130.
The periods of all the unit's associated VCOMs must be set to greater than 130ms.

4.10.6 Drive specific timing information.

The following summary is provided as a guide and applies only to drives configured to support F8000 functionality. The user should refer to the current drive documentation for the latest information and application specific timing details. The drive operates asynchronously to the FIP network.

Table 4-19 Drive Specific Timing Information

Direction	Parameter	GD2000	GD3000
DI100 to Drive	Measures, Status, and Fault data, collated and transmission of reply started. (Drive serial Link turnaround time).	6 to 17	6 to 17
DI100 to Drive	Delivered Setpoints and Orders start to affect drive's control algorithm after:	6 to 18	6 to 22
Drive to DI100	Measures and status data in the reply are out of date at the start of transmission by:	0 to 6	0 to 6
Drive to DI100	Fault Data in the reply are out of date at the start of transmission by:	0 to 120	0 to120

Times are in milliseconds and are relative to the end of T_{fx} .

4.11 Programming Messages

The programming port supports a subset of programming commands as produced by the System Programmer or Gemesys programming package, as detailed in [Ref. 5]. The commands are used to control the unit, to supply configuration parameters and to monitor the operation of the unit. In most cases the action performed by the unit on receipt of a command is as described in [Ref. 5], but some commands perform different functions depending on the switch setting of the unit. The supported commands are divided into two categories, control and data transfer.

4.11.1 Control Commands

Type CC - Clear Store (permitted only when halted).
Clear the current configuration, or load a switch selected default configuration into the P-Tables. On successful completion the unit responds with an 'ACK' character.

Type CE - Query extent of User Program and P-Table.
The response contains the number of the last program instruction (always -1 signifying program instructions are not supported) and the number of the last P-Table entry.

Type CF - Query facilities.
The response indicates the following:
On-line program changes not supported.
Block messages supported.
General edit mode not supported.
Master I/O Processor.
Off-line data storage not supported.
EPROM memory not supported.
Floating point not supported.

Type CH - Halt. (permitted only when running).
Table exchange over the communication port is halted, no new data transfers with the FIP interface are performed. Modification to the P-Table configuration is permitted.
The unit responds with 2 characters.
1st 'H' to indicate halted or 'R' to indicate running.
2nd 'N' to indicate normal.
This is followed by a string containing a diagnostic message.

Type CM - Query Identity.
The unit responds with a string containing a space character and the identifier 'Alspa DI100'. Following a successful halt to run transition the string is modified to include the compliance of the FIP network.

Type CQ - Query Status.
The unit responds with 2 characters.
1st 'H' to indicate halted or 'R' to indicate running.
2nd 'N' to indicate normal.
This is followed by a string containing a diagnostic message.

Type CR - Run (permitted only when halted).
The unit validates the P-Table configuration parameters, if successful then data transfers with the FIP interface commence and table exchange is started over the communication port.
The unit responds with 2 characters.

1st 'H' to indicate halted or 'R' to indicate running.
2nd 'N' to indicate normal.

This is followed by a string containing a diagnostic message.

4.11.2 Data transfer commands.

Type R - Read a single data table location.
The request is valid for the following tables only: F,G,I,J,K,P,R,V. The unit responds with four ASCII characters each representing one HEX digit of the data table content. If the table does not exist, the unit responds with a '?' character.

Type S - Read a block of data table locations.
The request is valid for the following tables only: F,G,I,J,K,P,R,V. The unit responds with the requested data, but will truncate if the end of the table is reached. If the start table does not exist, the unit responds with a '?' character.

Type W - Write to a single data table location.
The request is valid for the following data tables: F,G,I,J,K,P,R. The request is valid for P-Tables when the unit is halted. On successful completion the unit responds with an 'ACK' character. If the table does not exist or the write is disallowed, the unit responds with a '?' character.

Type X - Write to a block of data table locations.
The request is valid for the following data tables: F,G,I,J,K,P,R. The request is valid for P-Tables when the unit is halted. On successful completion the unit responds with an 'ACK' character. If all of the tables do not exist or the write is disallowed, the unit responds with a '?' character.

5. Configuration

5.1 Introduction

The unit's configuration data is located in P-Tables. These are not retained when the unit is powered down, however they are copied to EEPROM during a halt to run transition. At power up, the configuration data stored in EEPROM is validated using a CRC algorithm. If the validation is successful, the data is loaded into the P-Tables. If the data is corrupt, a warning message is issued and the P-Tables are cleared. The previous operating state of the unit is also stored in EEPROM. If the mode configuration switch is in position 1 at power up, and the EEPROM content is valid, the unit enters this previous state. Under any other condition the unit will power up in the HALTED state. This is summarised in Table 5-1.

Table 5-1 Power Up Mode.

Configuration Switch Setting	Function on power cycling the unit	Operating State
0	Copy configuration from EEPROM	HALTED
1	Copy configuration from EEPROM	State prior to power cycle
2-9	Copy configuration from EEPROM	HALTED

The first time the unit is powered up, no configuration data will be present in the EEPROM, resulting in the P-Tables being cleared and the operating state being HALTED. The user must use a suitable programming tool to establish a valid configuration. (See section 3.3 Programming Tools and section 5.2 Configuration Method)

Once the required valid configuration has been established, the unit can be set to the RUN state with the programming tool. The halt to run transition also stores the configuration in EEPROM. The mode configuration switch can then be set to position 1 so that if power failure occurs the unit will power up in the RUN state, with the stored configuration. If the user requires the unit to always power up in the HALTED state, the mode configuration switch should be set to position 0.

5.2 Configuration Methods

Using the programming tool described in section 3.3, the user may configure the unit using one of following methods:

- Load an in-built configuration supplied with the unit. (If suitable for the application.)
- Load an in-built configuration as a template, then modifying it to suit the application.
- Create a completely new configuration.

In the latter case, users may find it useful to photocopy the tables of in-built configurations shown in section 7. A blank column is provided for user entries. See section 5.4 in order to determine appropriate values.

5.2.1 Loading an In-built Configuration

In order to load one of the in-built configurations into the units P-Tables, the unit must first be halted using the programming tool. Select the desired configuration from Table 5-2 and set the Configuration switch accordingly. A 'CLEAR STORE' command from the programming tool loads the selected in-built configuration into the P-Tables.

Receipt of a 'CLEAR STORE' command with the switch set to position 0 clears all P-Tables, deleting the previous configuration data. Currently positions 2,3 and 4 provide in-built configurations, positions 5 to 9 inclusive are reserved for future expansion, but currently provide the same functionality as position 0.

The loaded P-Tables may now be modified, if tailoring to the specific application is required. At this point the P-Tables have not been saved and loss of power will lose the current values. Issuing a 'RUN/RECOMPILE' command from the programming tool copies the P-Tables into EEPROM. This occurs even if compilation is unsuccessful due to configuration errors introduced by modification of the defaults.

Table 5-2 Configuration Switch settings.

Configuration Switch Setting	In-built configuration loaded on receipt of CLEAR STORE
0	Clear Store i.e. zero all P-Tables
1	No Action
2	1 off GD2000 (F8000 compliant)
3	6 off GD2000 (F8000 compliant)
4	1 off JK exchange (32 table)

5.2.2 Configuration save/restore

Using a compatible programming tool, the unit's configuration may be saved to disk or tape and subsequently restored. It is possible to save and restore the configuration as a program using the COPY/COMPARE PROGRAM menu option or as a data tables using the LOAD/DUMP menu option

5.3 Configuration Overview

The operation of the unit is controlled by configuration data held in P-Tables, the content being reinstated from a copy stored in EEPROM when power is applied . The unit must be halted in order to modify the P-Table content. The configuration is divided into five main sections:

- Serial communication port.
- Network Compliance.
- FIP communication variables (VCOM).
- Route and data classes.
- F8000 specific configuration.

The configuration parameters are detailed in section 5.4

5.3.1 Serial communication port

The unit supports either ESP or RSVP protocols, but the choice is common to all routes. Examine the configuration of all tributaries which are to be connected to the unit. Ensure that they are capable of supporting a common protocol. If mixed protocols must be supported, then it will be necessary to use additional units.

Choose a baudrate which can be supported by all tributaries, again the baudrate is common to all routes. Examine the turn-around time of the slowest tributary. If this turn-around time requires the use of extended time-out periods, enter the baudrate as a negative value

Decide whether to synchronise the serial link transfer to the internal time scheduler, or to let it free-run. In many cases the free-run option will be adequate. Synchronisation is useful in eliminating delays, but requires an in-depth knowledge of serial link transmission and turn-around times. The trigger phase permits synchronisation with the receipt of VCOMs. The trigger period chosen should be sufficient to give all configured routes time to transfer data. If this period is greater than 2 seconds then synchronous operation is not possible, unless the number of tributaries is reduced. Synchronisation also requires that the configuration includes a synchronising VCOM, with a period either equal to or a multiple of the trigger period. A FIP subscriber must also include a synchronising VCOM in the Bus Arbiter program in order to re-synchronise the internal time scheduler to the network.

5.3.2 Network compliance

It is essential for correct operation to select a network compliance in common with all other subscribers on the network. Not all products may support the same options. When the unit is to be added to an existing network, select the compliance as directed by the network administrator.

5.3.3 FIP communication variables VCOMs

The quantity of VCOMs to configure is entered into P69. Examine the specification of other FIP subscribers, some devices support a fixed sub-set of the possible VCOM identifiers. For maximum flexibility of use, the DI100 places no restriction on VCOM identifiers. FIP itself uses certain identifiers in the detection of subscriber presence and subscriber identification etc. These identifiers should not be entered in the unit's configuration data. Often a standard such as F8000 dictates which VCOM identifiers to consume, produce or to use as a synchronising VCOM.

5.3.4 VCOM period and phase.

The VCOM period is used to determine whether the associated VCOM is to be accessed in an asynchronous or synchronous manner, with respect to network transfer. It is permitted to specify both types in the same configuration. If no synchronising VCOM is included in the configuration or Bus Arbiter program then specify only asynchronous access.
When configuring synchronous VCOMs, the values to specify are dictated by the Bus Arbiter program. The period relates to the Bus Arbiter cycle time. The phase relates to the time elapsed since the previous synchronising VCOM.

5.3.5 Refreshment/Promptness time-out

This parameter provides a mechanism for the consumer of a VCOM to detect stale data. Data becomes stale if the producer fails to refresh the VCOM, or if a consumer accesses the VCOM late with respect to delivery by the network. The parameter is used to initialise a production period timer in the subscriber producing the VCOM, or a consumption period timer in the subscriber consuming the VCOM. This mechanism is particularly useful when delivery times are known, as is the case with synchronous VCOMs. The use of this mechanism with asynchronous VCOMs will require more relaxed timings. Data produced by the DI100 will become stale following a run to halt transition, when the production period has elapsed.

5.3.6 VCOM Length

This parameter is used to configure the quantity of data carried by a produced or consumed VCOM, or to configure a synchronising VCOM. It is necessary that the producer and consumer of a VCOM specify the same value for successful data transfer.

5.3.7 Route Configuration

These parameters are used to configure up to 16 information routes to ESP or RSVP tributaries connected to the serial communication port. Each route has a compliance parameter, which indicates whether the route is in use and which data classes are supported.
Routes with a compliance of 100 are general purpose routes, permitting communication with Drives, PLCs etc. with little or no data formatting.
Routes with a compliance of 2000, 3000 and 3001 invoke specific features of the DI100, permitting F8000 compliant communication with GD2000 and GD3000 variable speed drives.

5.3.8 Data Class Configuration

Each route can be associated with up to 12 data classes. Each data class type defines the method of data transfer within the unit. In general data from one or more VCOMs consumed by the unit, may be combined into K-Tables for subsequent transmission to the connected tributary. Response data received into J-Tables, may be distributed to one or more VCOMs produced by the unit.

5.4 Configuration Parameters

A listing of all the P-Tables provided in section 7.3 -Configuration Parameter Tables.

5.4.1 Serial communication port configuration - P10 to P11

The serial communications port baudrate, operating mode and transfer synchronisation are user configurable. The following characteristics are fixed for both RS232 and RS485 operation using ESP or RSVP protocols:

1 Start bit.
1 Stop bit.
8 Data bits.
Parity disabled.

Serial port Baudrate P10

The communication port baudrate and time-out period are selected using this parameter. Permitted values are listed in Table 5-3. The time-out period is the maximum time that the ESP/RSVP control port is prepared to wait for a response from a tributary. This time varies with the baudrate and the quantity of tables transmitted on the route. An extended time-out period may be selected by supplying a negative value.

Table 5-3 Baudrate/time-out selection

P10 Value	Baudrate	Time-out (seconds)		
		TX length 0 to 32 (words)	TX length 33 to 64 (words)	TX length 65 to 128 (words)
3840	38400	0.50	1.00	2.00
-3840	38400	1.00	2.00	4.00
19200	19200	0.50	1.00	2.00
-19200	19200	1.00	2.00	4.00
9600	9600	0.75	1.50	3.00
-9600	9600	1.50	3.00	6.00
4800	4800	1.00	2.00	4.00
-4800	4800	2.00	4.00	8.00
2400	2400	1.25	2.50	5.00
-2400	2400	2.50	5.00	10.00
1200	1200	1.75	3.50	7.00
-1200	1200	3.50	7.00	14.00
600	600	2.75	5.50	11.00
-600	600	5.50	11.00	22.00
300	300	5.00	10.00	20.00
-300	300	10.00	20.00	40.00
110	110	13.75	27.50	55.00
-110	110	27.50	55.00	110.00

Serial port operating mode P11

This parameter selects the communication port operating protocol. Permitted values are:

- 0 or 3 to configure an ESP control port.
- 10 to configure an RSVP control port.

The selected mode applies to all routes.

Serial port transfer synchronisation - P22 to P23

Transfer trigger period P22
Transfer trigger phase P23

These parameters are 16 bit integer values in millisecond units. If required, data transfers over the serial link may be synchronised to the internal time scheduler using a transfer trigger phase and period. Time slots equating to the supplied phase plus multiples of the supplied period are marked as trigger points on a halt to run transition of the unit. Data transfers on all routes are held, pending the detection of the next trigger point. This technique eliminates the delay caused by a currently active transfer which could occur if running asynchronously. If the resultant trigger repetition rate is faster than the time to complete the transfers, then the serial link will again be running asynchronously. A transfer period of zero causes data transfers over the serial link to be triggered asynchronously to the receipt of VCOMs over the network, in this case the transfer phase parameter is ignored.

Note: If the transfer phase parameter is greater than the network repetition rate of the synchronising VCOM, then all serial link traffic will be suspended. If no synchronising VCOM is present then a value greater than 2000 will also suspend the serial link traffic.

5.4.2 FIP communication variable (VCOM) configuration - P69 to P569

VCOM Quantity P69
The unit supports up to 100 VCOMs, the quantity configured is entered into P69. On a halt to run transition, the unit will attempt to create the quantity requested.

VCOM configuration P70 to P569
P-Table locations P70 to P569 are permanently allocated in groups of 5 tables to VCOM configuration. The position of the VCOM within the list dictates which group of G-Table locations are associated with the VCOM for the transfer of data.
e.g. G0 to G63 are allocated to the VCOM in position 0, G64 to G127 are allocated to the VCOM in position 1.

VCOM position 0.

P70	VCOM ID
P71	VCOM Period (ms)
P72	Refreshment/Promptness Time-out
P73	VCOM Phase (ms)
P74	VCOM length in bytes.

VCOM position N where ($N \leq 99$).

P70 + (N×5)	VCOM ID
P71 + (N×5)	VCOM Period (ms)
P72 + (N×5)	Refreshment/Promptness Time-out
P73 + (N×5)	VCOM Phase (ms)
P74 + (N×5)	VCOM length in bytes.

VCOM ID
Any 16 bit value identifying the VCOM. A value may be used once only in a particular subscriber. A VCOM may be consumed by multiple subscribers, but must only be produced by one. It is not possible both to produce and consume the same VCOM within a single subscriber.

VCOM Period
A 16 bit integer specifying the transport repetition rate of the VCOM. This parameter takes a value in the range 0 to 2000, in millisecond units. A non-zero value signifies that data is to be transferred to or from the FIP network synchronously.

Note: If any synchronous VCOMs are configured, then a synchronising VCOM must be configured. Failure to configure a synchronising VCOM results in a loss of synchronisation indication in the combined status of any consumed synchronous VCOMs (SY bit cleared). Only one synchronising VCOM should be configured for predictable synchronous operation. If multiples are present, then the period of the last in the VCOM list is used in the detection of loss of synchronisation.

A VCOM period of zero signifies that data is to be transferred asynchronously. In the special case where the VCOM length is zero, this parameter specifies the transport repetition rate of a synchronising VCOM. The value is then used to detect the loss of synchronising events. If a synchronising VCOM is specified with a period of 0 or greater than 2000, the default value of 2000 milliseconds is assumed.

Refreshment/Promptness time-out
This parameter specifies the refreshment time-out for a produced VCOM or the promptness time-out for a consumed VCOM. This 16 bit integer takes a value in the range 0 to 2000 in millisecond units. A value of zero signifies that refreshment/promptness status elaboration is not required. A value greater than 2000 results in the default value of 2000 milliseconds being used.

Status elaboration must be used consistently. If refreshment is configured in the production of a VCOM, then promptness must be configured at each unit consuming the VCOM. The time-out periods are application specific, different values are permitted at each subscriber. This parameter is not used by the synchronising VCOM where zero should be supplied.

VCOM Phase
A parameter specifies the transport phase of the VCOM relative to the synchronising VCOM. This 16 bit integer takes a value in the range 0 to 2000 in millisecond units. This parameter is not used by the synchronising VCOM nor by asynchronous VCOMs, in these cases zero should be supplied.

VCOM Length
This parameter specifies the size of the VCOM in bytes. A positive value in the range 1 to 120 signifies a consumed variable, a negative value in the range -1 to -120 signifies a produced variable. A value of zero signifies a synchronising variable. If any synchronous VCOMs are specified, then one synchronising VCOM must also be specified.

5.4.3 Network Compliance - P571

P571 selects the method used by the FIP interface when accessing the network:

- 0 = SlowFIP compliant.
- 1 = WorldFIP-A compliant.
- 2 = FIP compliant.

In all cases network traffic is transmitted at 1Mbit/s.

> N.B.
> **A change to this parameter requires that the unit is power cycled in order to activate the change.**

5.4.4 Route configuration - P600 to P1623

Each route has a 4 table header of the following format:-

Route 0.

P600	Route Compliance
P601	Tributary address
P602	Number of tables to transmit (TX quantity)
P603	Number of data classes.

Route N where ($N \leq 15$)

P600+(N×64)	Route Compliance
P601+(N×64)	ESP Tributary address
P602+(N×64)	Number of tables to transmit (TX Quantity)
P603+(N×64)	Number of classes.

Route Compliance
This parameter is used to ensure that compatible data classes are specified.
A value of zero indicates that the route is inactive, in which case all data classes are ignored.

A value of 100 (decimal) specifies that direct JK table exchange is to be performed. Data class types 256, 257, 258, 259, 260 and 262 are permitted.

A value of 2000 (decimal) specifies an F8000 compliant route, used to communicate with a GD2000 drive. Data class types 0, 1, 2, 3, 4, 80 and 81 are permitted.

A value of 3000 (decimal) specifies an F8000 compliant route, used to communicate with a GD3000 drive. Data class types 0, 1, 2, 3, 4, 80 and 81 are permitted.

A value of 3001 (decimal) specifies an F8000 compliant route, used to communicate with a GD3000 drive with position control. Data class types 0, 1, 2, 3, 4, 80 and 81 are permitted.

If a route is configured to be active but no ESP/RSVP tributary with the corresponding address is present, the time-out/retry mechanism of the protocol may cause excessive delays. Ensure that all unused routes are disabled by setting the route compliance to 0.

Tributary address
A value in the range 0 to 15 , specifying the ESP/RSVP tributary address associated with the route. It is not a requirement that the tributary address is the same as the route number, nor that the address is unique across all routes. An address of 15 indicates that a broadcast to all connected ESP tributaries is to be performed. The RSVP protocol does not support broadcast operation, an address of 15 operates as an ordinary address.

Number of tables to transmit (TX Quantity)
A value in the range 0 to 128 specifying the number of tables to transmit to the specified tributary from the K -Tables allocated to the route. This parameter is ignored if the route is F8000 compliant, since the value is internally generated.

Writing zero to the TX Quantity parameter of a configured route, may be used to poll an ESP/RSVP tributary without causing a data transfer to the tributary. A transfer results which contains no K-Table data, but prompts the return of J-Table data from the tributary. This technique may be used to source data to classes when a monitoring only operation is required.

Number of Classes
A value between 0 and 12 specifying the number of classes in the route.

5.4.5 Data class configuration

Each data class is defined by a block of 5 P-Tables of the following format:

Route 0, Data class 0.

P604	Data class type
P605	Associated VCOM ID
P606	Offset into VCOM (in bytes)
P607	Data class length (in bytes)
P608	Data table offset (in words)

Route M, Data class N where ($M \leq 15$ and $N \leq 11$)

P604+(M×64)+(N×5)	Data class type
P605+(M×64)+(N×5)	Associated VCOM ID
P606+(M×64)+(N×5)	Offset into VCOM (in bytes)
P607+(M×64)+(N×5)	Data class length (in bytes)
P608+(M×64)+(N×5)	Data table offset (in words)

Data class type

A value of 256 (@100) specifies a data transfer from G-Table to K-Table locations while exchanging the order of the high and low byte in each complete word.

A value of 257 (@101) specifies a data transfer from J-Table to G-Table locations while exchanging the order of the high and low byte in each complete word.

A value of 258 (@102) specifies a data transfer from G-Table to K-Table locations without exchanging the byte ordering.

A value of 259 (@103) specifies a data transfer from J-Table to G-Table locations without exchanging the byte ordering.

A value of 260 (@104) specifies a data transfer from G-Table to K-Table locations while exchanging the order of the high and low byte in each complete word. The content of the final K-Table is replaced with a word containing the composite status of all contributory VCOMs.

A value of 262 (@106) specifies a data transfer from G-Table to K-Table locations without exchanging the byte ordering. The content of the final K-Table is replaced with a word containing the composite status of all contributory VCOMs.

The operation of these data class types is explained in section 4.8.

Associated VCOM ID

The VCOM ID whose associated block of G-Table locations are the source or destination of data to be transferred by the data class.

Offset into VCOM

The byte offset within the associated block of G-Table locations at which the data transfer is to commence.

Class length

The number of bytes of data to transfer to or from G-Table locations. This parameter is ignored if the route is F8000 compliant, since the value is internally generated.

Data Table offset

The word offset within the associated block of K or J-Tables at which the data transfer is to commence. This parameter is ignored if the route is F8000 compliant, since the value is implicit in the data class type.

5.5 F8000 Specific Configuration

5.5.1 Data Class Configuration

With a route compliance of 2000, 3000 or 3001, seven data classes must be present to configure the route as F8000 compliant. These are data class types : 0, 1, 2, 3, 4, 80 and 81.

Class type 0 (NiControl)
This class supplies the state change information and sequence numbers.

Class type 1 (NiStatus)
This class interprets internal information, producing F8000 compliant state, version number and sequence number in the associated VCOM.

Class type 2 (Measures)
This class interprets the route's J-Tables, producing unscaled Measures values in the associated VCOM.

Class type 3 (Status)
This class interprets the route's J-Tables, producing F8000 compliant status information in the associated VCOM.

Class type 4 (Faults)
This class interprets the route's J-Tables, producing F8000 compliant fault values in the associated VCOM.

Class type 80 (Setpoints)
This class interprets data from the associated VCOM or freeze/fallback values, producing scaled Setpoint values in the K-Tables for transmission to the drive.

Class type 81 (Orders)
This class interprets data from the associated VCOM or freeze/fallback values, producing Orders values in the K-Tables for transmission to the drive.

The offset into the VCOM and the associated VCOM ID can be derived from Figure 4-3.

5.5.2 Scaling Parameters

The network wide scaling parameters are held in the P-Tables starting at P1640. These are required if any route is F8000 compliant. The scaling parameters are non-zero values in the 16-bit signed integer range.

Table 5-4 Scaling Parameter P-Tables

P Table	Function	FIP Companion Standard Ref.
P1640	Current Scaling	P_CSP
P1641	Frequency Scaling	P_FSP
P1642	(Reserved)	-
P1643	Angular Speed Scaling	P_NSP
P1644	Power Scaling	P_PSP
P1645	Torque Scaling	P_TSP
P1646	Voltage Scaling	P_VSP
P1647	Flux Scaling	P_XSP

If GD3000 position control is required, i.e. any route has compliance of 3001 specified, then the following network wide scaling parameters are also required. The scaling parameters are non-zero values in the 32-bit signed integer range. To achieve this the high word is signed and the low word is unsigned.

Table 5-5 Position Control Scaling Parameter P-Tables

P Table	Function	FIP Companion Standard Ref.
P1936	Length Scaling (low word)	P_LSP
P1937	Length Scaling (high word)	P_LSP

5.5.3 Conversion Parameters

The conversion parameters are held in the P-Tables starting at P1648. These are allocated in blocks of ten tables, one block per route. The block is required if the associated route is F8000 compliant. The conversion parameters are non-zero values in the 16-bit signed integer range. Full load current and percentage overrating are non-negative values in the 16-bit signed integer range.

Table 5-6 Conversion Parameter P-Tables

P Table	Function	FIP Companion Standard Ref.
P1648 +N×10	Current Conversion drive N	P_CCP
P1649 +N×10	Frequency Conversion drive N	P_FCP
P1650 +N×10	(Reserved)	-
P1651 +N×10	Angular Speed Conversion drive N	P_NCP
P1652 +N×10	Power Conversion drive N	P_PCP
P1653 +N×10	Torque Conversion drive N	P_TCP
P1654 +N×10	Voltage Conversion drive N	P_VCP
P1655 +N×10	Flux Conversion drive N	P_XCP
P1656 +N×10	Full Load Current drive N	N/A
P1657 +N×10	Percentage Overrating drive N	N/A

(N has the range 0 to 15 and corresponds to the route number)
The full load current and percentage overrating parameters are used to convert the overload timer parameter from a percentage into a timed value (TIMER#3 units).

The full load current parameter is also used to convert magnetising current into the correct value in the case of a GD3000.

The full load current parameter should be the full load current of the drive multiplied by 10 e.g. a 5 Amp drive would have 50 entered.

The percentage overrating is the overload capability of the drive expressed as a percentage of full load current e.g. 50 for 1.5 times Full Load Current and 10 for 1.1 times Full Load Current.

The position control conversion and fallback parameters are held in the P-Tables starting at P1938. These are allocated in blocks of six tables, one block per route. The block is required if the associated route has a compliance of 3001 specified. The fallback parameters are values in the 32-bit signed integer range. The conversion parameters are non-zero values in the 32-bit integer range. To achieve this the high word is signed and the low word is unsigned.

Table 5-7 Position Control Conversion and Fallback Parameter P-Tables

P Table	Function	FIP Companion Standard Ref.
P1938 +N×6	Length Conversion (low word) drive N	P_LCP
P1939 +N×6	Length Conversion (high word) drive N	P_LCP
P1940 +N×6	Position Fallback (low word) drive N	-
P1941 +N×6	Position Fallback (high word) drive N	-
P1942 +N×6	Datum Fallback (low word) drive N	-
P1943 +N×6	Datum Fallback (high word) drive N	-

(N has the range 0 to 15 and corresponds to the route number)

5.5.4 Freeze/Fallback Configuration

The per route freeze/fallback parameters are held in the P-Tables starting at P1808. These are allocated in blocks of 8 tables. These are required if the associated route is F8000 compliant. (N has the range 0 to 15 and corresponds to the route number).

Table 5-8 Freeze/Fallback parameter P-Tables

P Table	Function	FIP-CS REF
P1808 +N×8	Orders Freeze/Fallback select word 1 drive N	-
P1809 +N×8	Orders Freeze/Fallback select word 2 drive N	-
P1810 +N×8	Setpoint Freeze/Fallback select drive N	-
P1811 +N×8	Orders Fallback value word 1 drive N	-
P1812 +N×8	Orders Fallback value word 2 drive N	-
P1813 +N×8	Upper Current Limit Fallback drive N (not used with GD3000)	D_GC1
P1814 +N×8	Speed Reference Fallback drive N	D_GC4
P1815 +N×8	Main Electromagnetic Torque Ref. Fallback drive N (not used with GD2000)	D_VC1

The Freeze/Fallback select words determine whether freeze or fallback is to be carried out. One bit is allocated per reference. If the bit is set then fallback is to be carried out.

The Orders Freeze/Fallback select word 1 has the following format:

Table 5-9 Orders Freeze/Fallback select word 1

Bit Position	FIP-CS Ref.	FUNCTION
0	D_BO1	Brake Command
1	D_GO2	Jog/Auto Mode
2	D_GO3	Forward/Reverse
3	D_GO4	Reset Faults
4	D_GO5	Main Contactor
5	D_GO6	Rapid Stop
6	D_GO7	DC Loop Power
7	D_GO8	Run/Stop
8	D_GO12	External Fault Trip Input
9	D_MO1	Select additional speed ref.
10	D_PO2	Set Datum
11	D_PO3	Position Control select
12	D_PO6	Unidirectional approach select
13	D_VO1	Select speed/torque mode
14	D_VO2	Apply speed control droop
15	D_D02	Apply Full field reference

The Orders Freeze/Fallback select word 2 has the following format:

Table 5-10 Orders Freeze/Fallback select word 2

Bit Position	FIP-CS Ref.	FUNCTION
Bit 0	D_VO4	Enable Magnetising Control
Bit 1 to 7	-	Reserved
Bit 8 to 15	-	Reserved

The Orders Fallback value word 1 has the following format:

Table 5-11 Orders Fallback value word 1

Bit Position	FIP-CS Ref.	FUNCTION	VALUE
0	D_BO1	Brake Command	1=Release
1	D_GO2	Jog/Auto Mode	1=Jog
2	D_GO3	Forward/Reverse	1=Forward
3	D_GO4	Reset Faults	0 to1=Reset
4	D_GO5	Main Contactor	1=On
5	D_GO6	Rapid Stop	1=Rapid
6	D_GO7	DC Loop Power	1= Closed
7	D_GO8	Run/Stop	1=Run
8	D_GO12	External Fault Trip Input	1=Fault
9	D_MO1	Select additional speed ref.	1=Select
10	D_PO2	Set Datum	0 to1=Set
11	D_PO3	Position Control select	1=Select
12	D_PO6	Unidirectional approach select	1=Select
13	D_VO1	Select speed/torque mode	1=Torque
14	D_VO2	Apply speed control droop	1=Apply
15	D_D02	Apply Full field reference	1=Economy

The Orders Fallback value word 2 has the following format.

Table 5-12 Orders Fallback word 2

Bit Position	FIP-CS Ref.	FUNCTION	VALUE
Bit 0	D_VO4	Enable Magnetising Control	1=Enable
Bits 1 to 7		Reserved	
Bits 8 to 15		Reserved	

The Setpoint Freeze/Fallback select word has the following format:

Table 5-13 Setpoint Freeze/Fallback select word

Bit position	FIP-CS REF	Select
Bit 0	D_GC1	Current Limit (Not used with GD3000)
Bit 1	D_GC4	Frequency
Bit 2	D_VC1	Torque (Not used with GD2000)
Bit 3	D_PC1	Position (Not used with GD2000)
Bit 4	D_PC4	Datum (Not used with GD2000)
Bits 5 -15	-	Reserved

Setpoint Fallback are values in the 16-bit signed integer range.

5.5.5 Refreshment Tolerance Time Configuration

The per route refreshment tolerance time is held in P-Tables starting at P1624. Each entry specifies a time during which the associated route is tolerant to refreshment faults, when entering the RUNNING LOCKED state. This time is specified in millisecond units.

Table 5-14 Refreshment Tolerance Time P-Tables.

P Table	Function
P1624	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 0
P1625	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 1
P1626	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 2
P1627	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 3
P1628	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 4
P1629	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 5
P1630	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 6
P1631	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 7
P1632	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 8
P1633	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 9
P1634	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 10
P1635	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 11
P1636	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 12
P1637	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 13
P1638	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 14
P1639	Tolerance for refreshment when entering RUNNING LOCKED mode (ms) route 15

5.5.6 Configuration Version

P572 contains the configuration version of the current F8000 configuration. This should be entered into this table by the user. The parameter is sent over FIP in the NiControl class. This is an integer value.

5.6 F8000 GD2000 Configuration (Route Compliance = 2000)

In order to comply with the requirements of F8000, it is a prerequisite that the GD2000 is configured for J/K Table exchange with parameter page 10, the user defined page. This configuration must be performed manually prior to connection to the WorldFIP to Serial Link Gateway. Table 5-15 specifies the values to place in page 9 in order to configure page 10 for RS232 or RS485 operation. For further details of configuration of the GD2000, refer to the Alspa GD2000 Technical Manual [Ref.6].

Table 5-15 GD2000 Configuration

Parameter number RS232	Parameter number RS485	Value
210	234	11
211	235	9
212	236	231 For RS485 207 For RS232
213	237	232 For RS485 208 For RS232
214	238	2
215	239	3
216	240	4
217	241	5
218	242	6
219	243	17
220	244	60
221	245	464
222	246	N/A
223	247	N/A
224	248	N/A

The WorldFIP to Serial Link Gateway produces a K-Table transfer requesting a write to parameters 9, 231 and 232 via page 10 for RS485 and a write to parameters 9,207 and 208 for RS232. It expects a response containing parameters 9, 231, 232, 2, 3, 4, 5, 6, 17, 60 and 464 for RS485 and 9,207, 208, 2, 3, 4, 5, 6, 17, 60 and 464 for RS232. These parameters will be returned in J-Tables. Table 5-16 and Table 5-17 show the K-Table and J-Table layouts respectively.

Table 5-16 K-Table layout for GD2000.

K Table address	Table Parameter
Base Address	Page to Write to (10)
Base Address + 1	Page to Read from (10)
Base Address + 2	Current Limit (P9)
Base Address + 3	Frequency Ref. (P231 For RS485) (P 207 For RS232)
Base Address + 4	Run/Stop (P232 For RS485) (P208 For RS232)

Table 5-17 J-Table layout for GD2000.

J-Table Address	Table Parameter
Base Address	Error Word
Base Address + 1	Page Number Read from (10)
Base Address + 2	Current Limit (P9)
Base Address + 3	Frequency Ref. (P231 For RS485) (P207 For RS232)
Base Address + 4	Run/Stop (P232 For RS485) (P208 For RS232)
Base Address + 5	Frequency Feedback (P2)
Base Address + 6	Speed Feedback (P3)
Base Address + 7	Current Feedback (P4)
Base Address + 8	Motor Volts (P5)
Base Address + 9	Motor Power (P6)
Base Address + 10	Overcurrent (P17)
Base Address + 11	Fault Codes (P60)
Base Address + 12	Status Codes (P464)

K-Tables and J-Tables may be monitored whilst the unit is operating in READY, RUNNING UNLOCKED and RUNNING LOCKED states, or the tables can be manually set-up in LOCKED LOCAL and IDLE states.

5.7 F8000 GD3000 Configuration (Route Compliance = 3000)

Please note that the configuration described below will only function with GD3000 Firmware version 3.14 onwards, where two user pages are permitted.

In order to comply with the requirements of F8000, it is a prerequisite that the GD3000 is configured for J/K exchange with user page 1 and user page 32. Page 1 is used for K-Tables and page 32 is used for J-Tables. Table 5-18 shows the layout of Page 1 and Table 5-19 shows the layout of Page 32

Table 5-18 Page 1 parameter set-up

Parameter No	Value for RS485 operation	Value for RS232 operation
221	3	3
222	256	216
223	257	217
224	258	218
225	N/A	N/A
226	N/A	N/A
227	N/A	N/A
228	N/A	N/A
229	N/A	N/A
230	N/A	N/A
231	N/A	N/A
232	N/A	N/A
233	N/A	N/A
234	N/A	N/A
235	N/A	N/A
236	N/A	N/A
237	N/A	N/A

Table 5-19 Page 32 Parameter Set-up

Parameter No	Value for RS485 and RS232 Operation
261	14
262	4
263	13
264	12
265	6
266	7
267	10
268	20
269	9
270	95
271	14
272	550
273	551
274	572
275	60
276	N/A
277	N/A

Table 5-20 shows the layout of the K-Tables for a GD3000.

Table 5-20 K-Table layout for GD3000

K Table address	Table Parameter
Base Address	Page to Write to (1)
Base Address + 1	Page to Read from (32)
Base Address + 2	Freq. /Speed Ref. (P256 for RS485 P216 for RS232)
Base Address + 3	Torque Ref. (P257 for RS485 P217 for RS232)
Base Address + 4	Control Flags (P258 for RS485 P218 for RS232)

The Control Flags which are driven by the Orders Class are presented to the drive in the RS485 Control Word (Low) for RS485 operation and RS232 Control Word (Low) for RS232. The user must then make the drive Control Flags be internally derived from the bits in this word. Table 5-21 shows the bit position of each Control Flag within the word.

Table 5-21 Control Flag Bit Positions

Bit Position	Function	Suggested Control Flag	FIP CS Ref.
0	Brake Command	CF62	D_B01
1	Jog/Auto Mode	CF8	D_G02
2	Forward/Reverse	CF3	D_G03
3	Reset Faults	CF9	D_G04
4	Rapid Stop	CF2	D_G06
5	Run/Stop	CF0	D_G08
6	External Fault Trip	CF10	D_G012
7	Select Speed/Torque	CF72	D_V01
8	Enable Mag. Control	CF25	D_V04
9-15	Not Used	N/A	N/A

It is suggested that the Brake Command (D_B01) should be connected to CF62 (Logic Block G input) and the output of Logic Block G connected to a suitable Digital Output.

In order for the Speed and Torque References to be taken from the Serial link, drive parameters P390 and P396 must be set as follows.
P390 = 4 P396 = 5 for RS485 operation.
P390 = 6 P396 = 7 for RS232 operation.

It is suggested that CF1 should be permanently set, to enable CF0 to perform the Run/Stop function. This is achieved by setting P301 to 1.

Table 5-22 shows the layout of the J-Tables for a GD3000.

Table 5-22 J-Table layout for GD3000

J Table Address	Table Parameter
Base Address	Error Word
Base Address + 1	Page Number Read from (32)
Base Address + 2	Current Feedback (P4)
Base Address + 3	Speed Feedback(P13)
Base Address + 4	Overcurrent(P12)
Base Address + 5	Motor Volts (P6)
Base Address + 6	Motor Power (P7)
Base Address + 7	Torque (P10)
Base Address + 8	Mag. Current (P20)
Base Address + 9	Torque Ref. (P9)
Base Address + 10	DC Link Volts (P95)
Base Address + 11	Frequency Feedback (P14)
Base Address + 12	Status Flags (0-15) (P550)
Base Address + 13	Status Flags (16-31) (P551)
Base Address + 14	Dig Input Word (P572)
Base Address + 15	Fault Codes (P60)

In order to make Brake Released (D_BS1) and Brake Power Supply Failure (D_BF1) operate correctly (when a brake is being operated), the external Brake Released signal should be connected to drive Digital Input 14 and the external Brake Power Supply Failure signal should be connected to drive Digital Input 15.

The Motor Stalled bit (D_GF11) is not automatically supported by the drive. The bit is automatically linked to SF18 (Logic Block A delay output) and it is the user's responsibility to configure Logic Block A so that the delay output will be set when the motor is stalled.
An example of how to set up Logic Block A to detect motor stalled is as follows:

- P500 (Comparator A Input) should be set to 19 (Active current)
- P501 (Comparator A Threshold) should be set to 2 (Speed Feedback)
- P502 (Comparator A Hysteresis) should be set to a suitable hysteresis value.
- P503 (Comparator A mode) should be set to 9 (Input >Threshold)
- P504 (Delay A Time) should be set to 1
- P505 should be set to 10 (delay time 1 second)

K-Tables and J-Tables may be monitored whilst the unit is operating in READY, RUNNING UNLOCKED and RUNNING LOCKED or the tables can be manually set-up in LOCKED LOCAL and IDLE states.

5.8 F8000 GD3000 Configuration (Route Compliance = 3001)

Please note that the configuration described below will only function with GD3000 Firmware version 3.18 onwards, where two extended user pages are permitted.

In order to comply with the requirements of F8000, it is a prerequisite that the GD3000 is configured for J/K exchange with user page 1 and user page 32. Page 1 is used for K-Tables and page 32 is used for J-Tables. Table 5-23 shows the layout of Page 1 and shows the layout of Page 32

Table 5-23 Page 1 parameter set-up

Parameter No	Value for RS485 operation	Value for RS232 operation
221	5	5
222	256	216
223	257	217
224	258	218
225	750	750
226	751	751
227	N/A	N/A
228	N/A	N/A
229	N/A	N/A
230	N/A	N/A
231	N/A	N/A
232	N/A	N/A
233	N/A	N/A
234	N/A	N/A
235	N/A	N/A
236	N/A	N/A
237	N/A	N/A
245	N/A	N/A
246	N/A	N/A
247	N/A	N/A
248	N/A	N/A

Table 5-24 Page 32 Parameter Set-up

Parameter No	Value for RS485 and RS232 Operation
261	17
262	4
263	13
264	12
265	6
266	7
267	10
268	20
269	9
270	95
271	14
272	550
273	551
274	572
275	60
276	702
277	703
295	715
296	N/A
297	N/A
298	N/A

Table 5-25 shows the layout of the K-Tables for a GD3000 configured for F8000 operation with position control. The values in the K-Tables representing position, are converted to the format required by the drive following scaling. Position ref. (high) represents multiples of 10000, position ref. (low) represents units.

Table 5-25 K-Table layout for GD3000

K Table address	Table Parameter
Base Address	Page to Write to (1)
Base Address + 1	Page to Read from (32)
Base Address + 2	Position Ref. (low) (P256 for RS485 P216 for RS232)
Base Address + 3	Position Ref. (high) (P257 for RS485 P217 for RS232)
Base Address + 4	Control Flags (P258 for RS485 P218 for RS232)
Base Address + 5	Datum (low word) (P750)
Base Address + 6	Datum (high word) (P751)

The Control Flags which are driven by the Orders Class are presented to the drive in the RS485 Control Word (Low) for RS485 operation and RS232 Control Word (Low) for RS232. The user must arrange for the drive Control Flags to be internally derived from the bits in this word. Table 5-26 shows the bit position of each Control Flag within the word.

Table 5-26 Control Flag Bit Positions

Bit Position	Function	Suggested Control Flag	FIP CS Ref.
0	Brake Command	CF62	D_B01
1	Jog/Auto Mode	CF8	D_G02
2	Forward/Reverse	CF3	D_G03
3	Reset Faults	CF9	D_G04
4	Rapid Stop	CF2	D_G06
5	Run/Stop	CF0	D_G08
6	External Fault Trip	CF10	D_G012
7	Select Speed/Torque	CF72	D_V01
8	Enable Mag. Control	CF25	D_V04
9	Set Datum	CF83	D_P02
10	Position Control Select	CF7	D_P03
11	Unidirectional Approach Select	CF90	D_P06
12-15	Not Used	N/A	N/A

It is suggested that the drive Brake Command (D_B01) should be connected to CF62 (Logic Block G input) and the output of Logic Block G connected to a suitable Digital Output.

In order for the Position Reference to be taken from the Serial Link, drive parameter P727 must be set to 6 for RS485 operation and 7 for RS232 operation. In both cases CF88 = 0.

It is suggested that CF1 (Start) should be permanently set, to enable CF0 to perform the Run/Stop function. This is achieved by setting drive parameter P301 to 1.

CF25 (Enable Mag. Control) must be set during position control operation.

It is suggested that CF82 (Datum Permit) should be permanently set, to enable CF83 to perform the set datum function. This is achieved by setting drive parameter P716 bit 2.

Table 5-27 shows the layout of the J-Tables for a GD3000 configured for F8000 operation with position control. The values in the J-Tables representing position feedback, are converted from the format supplied by the drive prior to unscaling. Position feedback (high) represents multiples of 10000, position feedback (low) represents units.

Table 5-27 J-Table layout for GD3000

J Table Address	Table Parameter
Base Address	Error Word
Base Address + 1	Page Number Read from (32)
Base Address + 2	Current Feedback (P4)
Base Address + 3	Speed Feedback (P13)
Base Address + 4	Overcurrent (P12)
Base Address + 5	Motor Volts (P6)
Base Address + 6	Motor Power (P7)
Base Address + 7	Torque (P10)
Base Address + 8	Mag. Current (P20)
Base Address + 9	Torque Ref. (P9)
Base Address + 10	DC Link Volts (P95)
Base Address + 11	Frequency Feedback (P14)
Base Address + 12	Status Flags (0-15) (P550)
Base Address + 13	Status Flags (16-31) (P551)
Base Address + 14	Dig Input Word (P572)
Base Address + 15	Fault Codes (P60)
Base Address + 16	Position Feedback (low) (P702)
Base Address + 17	Position Feedback (high) (P703)
Base Address + 18	Status Flags (64-79) (P715)

D_PS2 - Position Datum Set, is derived from SF64. D_PS4 - At Position, is derived from SF67.
In order to make Brake Released (D_BS1) and Brake Power Supply Failure (D_BF1) operate correctly (when a brake is being operated), the external Brake Released signal should be connected to Digital Input 14 and the external Brake Power Supply Failure signal should be connected to Digital Input 15.

The Motor Stalled bit (D_GF11) is not automatically supported by the drive. The bit is automatically linked to SF18 (Logic Block A delay output) and it is the user's responsibility to configure Logic Block A so that the delay output will be set when the motor is stalled.
An example of how to set up Logic Block A to detect motor stalled is as follows:

- P500 (Comparator A Input) should be set to 19 (Active current)
- P501 (Comparator A Threshold) should be set to 2 (Speed Feedback)
- P502 (Comparator A Hysteresis) should be set to a suitable hysteresis value.
- P503 (Comparator A mode) should be set to 9 (Input >Threshold)
- P504 (Delay A Time) should be set to 1
- P505 should be set to 10 (delay time 1 second)

K-Tables and J-Tables may be monitored whilst the unit is operating in READY, RUNNING UNLOCKED and RUNNING LOCKED or the tables can be manually set-up in LOCKED LOCAL and IDLE states.

6. Maintenance and Fault Finding

6.1 Self-test System

The self-test system performs one full cycle of tests at power up and then executes 'on-line' tests at regular intervals.

Faults which immediately trip the watchdog

- DC supply break longer than the minimum ride-through period.
- Power supply circuit failure.
- Failure of processor circuitry.

Faults which trip the watchdog when detected by running tests

- Alteration detected in the contents of the read only memory.
- Failure of any part of the read/write memory to store and recall data.
- Failure of user configuration data checksum.
- Failure of software integrity test

6.2 Faults

Faults detected by the system are represented as a three digit error code and an English language text message. This information is displayed when a suitable programming tool is connected. For example:

#146 FIP Configuration error at P69

Error messages fall into four groups as shown in Table 6-1.

Table 6-1 Error Message Types.

Error Message Number	Type of Error Message
#100 to #199	Compilation Errors
#500 to #699	System Status Errors
#700 to #799	Self Test Errors
#900 to #999	System Errors

6.2.1 Compilation Error Messages (#100 to #199)

Compilation errors are listed in Table 6-2, these errors are detected on a halt to run transition and prevent the system from entering the run state. After correcting the configuration, the fault message is cleared by performing a halt to run transition.

Table 6-2 Compilation Error Messages

Code	Fault Message	Possible Causes	Recommended Recovery
#146	FIP configuration error at P%i	Invalid VCOM, class, address or length parameter at or near the indicated P-Table location	Correct the configuration with reference to the reason provided in F131 and recompile
#147	FIP database creation error no. %x	FIP internal error	If recompilation does not clear the error, report the error number to Customer Support
#148	Serial link configuration error at P%i	Invalid serial link mode or baudrate parameter at or near the indicated P-Table location	Correct the configuration with reference to the reason provided in F131 and recompile

6.2.2 System Status at Power Up (#500 to #699)

If, during the power-up self-test cycle, one of these fault conditions is detected, the unit will remain in the HALT condition and return the fault message until the fault is cleared. Unless otherwise stated in Table 6-3, if one of these errors occurs, power cycle the unit. If the problem persists it should be reported to Customer Support.

Table 6-3 System Status Error Messages

Code	Fault Message	Possible Causes	Recommended Recovery
#501	Monitor Firmware CRC Test Fail.	Flash memory corrupted or damaged (possibly by static).	Power cycle. If the problem persists, the unit is suspect.
#502	System Firmware CRC Test Fail.	Flash memory corrupted, damaged (possibly by static) or a fault has occurred during firmware update.	Power cycle. If firmware update has just occurred, try again or re-install the firmware backup. If the problem persists, the unit is suspect.
#503	No Valid System Code Found.	As above.	As above
#504	Invalid Monitor Mode Selected.	Pins on TP1 shorted or link still fitted.	Remove short or link.
#505	Workspace Ram Test Failed.		Power cycle. If the problem persists, the unit is suspect.
#518	EEPROM CRC Fail	First power up; configuration has never been stored. EEPROM device failure.	Build/re-build configuration and store using a halt to run transition. If the problem persists, the unit is suspect.
#519	EEPROM Header CRC fail	EEPROM device failure.	Build/re-build configuration and store using a halt to run transition. If the problem persists, the unit is suspect.
#520	EEPROM programming time-out	EEPROM device failure.	Retry storing, using a halt to run transition. If the problem persists, the unit is suspect.
#521	EEPROM version incompatible	The system firmware has been updated and the new EEPROM layout does not match that in the EEPROM.	Build/re-build configuration and store using a halt to run transition.
#627	FLASH EPROM not present or faulty.	Faulty unit.	Power cycle. If the problem persists, the unit is suspect.
#628	FLASH EPROM could not be written to successfully.	Firmware Update link making intermittent contact power up. Faulty unit.	Check firmware update link (see section 6.3). Power cycle. If the problem persists, the unit is suspect.
#629	FLASH EPROM programming failed.	Firmware Update link making intermittent contact power up. Faulty Unit.	Check firmware update link (see section 6.3). Power cycle. If the problem persists, the unit is suspect.
#642	FIP presence ID create/delete failure %x	Internal error.	Power cycle and report failure value to Customer Support
#643	FIP generated warning no.%x	Internal error.	Power cycle and report warning value to Customer Support
#644	FIP compliance error.	Incorrect value entered	Correct the value and recompile, Power cycle if required.

6.2.3 Self-test Error Messages (#700 to #799)

On the occurrence of a self-test failure, the unit enters the HALTED state and produces one of the messages detailed in Table 6-4. The unit cannot enter the RUN state unless the fault is cleared and the unit is power cycled.

Unless otherwise stated, power cycle the unit to clear the fault. If the problem persists contact Customer Support.

Table 6-4 Self-test Error Messages

Code	Fault Message	Possible Causes	Recommended Recovery
#704	V-Table checksum test failure.	RAM failure. Faulty unit.	Power cycle, then reload configuration if necessary and RUN. If the problem persists, contact Customer Support.
#705	Processor local RAM failure.	Faulty unit.	As above.
#708	Watchdog test failure.	Suspect failed unit.	As above.
#719	Watchdog self trip.	Watchdog detected error. Possible faulty processor.	As above.
#732	Object RAM test failure.	Unit has faulty RAM .	As above.
#733	Firmware checksum failure.	Flash EPROMs have failed.	As above.
#737	P-Table checksum failure.	RAM failure. Faulty unit.	As above.

6.2.4 System Errors (Error Messages #900 to #999)

These errors relate to internal maloperation of the executive software. They cannot be cleared with a halt to run transition. It may be possible to clear the fault by power cycling the unit, but if the fault persists is should be reported to Customer Support. Table 6-5 details the System Errors.

Table 6-5 System Errors Error Messages

Code	Fault Message
#900	Unknown error data.
#901	%i task. Illegal task number used.
#902	%i task. Too many messages sent.
#903	%i task. No messages available.
#904	%i task. No messages to return.
#905	%i task. Message not received.
#906	%i task. Illegal interrupt number used.
#907	No room in region queue.
#908	Not in region when executing EXIT_PLC_REGION.
#909	Insufficient memory for organiser tables.
#910	Interrupt already defined.
#911	Insufficient memory for organiser tables.
#912	Insufficient memory for organiser tables.
#913	%i task performed return.
#914	Pascal error.
#915	Divide overflow.
#916	Range check overflow.
#917	Trap interrupt.
#919	%i task stack overflow.
#921	Transmit time-out on serial link data.

Code	Fault Message
#922	Software watchdog trip.
#923	Too many interrupt levels defined.
#924	Organiser interrupt time-out (inter processor).
#925	Floating Point Unit error.
#928	Unused interrupt @cs:ip = %x:%x
#929	Unused Opcode. @cs:ip = %x:%x
#931	Error message data is too long.
#932	Error message data has insufficient number of parameters.
#934	Error message data ended prematurely.
#935	Error message data has invalid character.
#936	Error message data has invalid format specifier.
#937	Error message data generated invalid hex character.
#938	Error message data invalid task number.
#939	Error message data included string too long.
#940	Could not switch state in Error Handler.
#941	Invalid state transition. State data, transition data.
#942	Invalid state data.
#943	Source pointer not in region.
#944	Source pointer beyond region.
#948	Invalid call.
#949	Invalid return.
#950	Invalid switch.
#957	Power failure.
#958	DMA 1 interrupt.
#960	Single step error.
#961	INT0 interrupt.
#962	Escape opcode error.
#963	Array bounds error.
#964	Invalid timer interrupt.
#966	Invalid key switch position.
#967	Invalid serial link interrupt.
#968	Unexpected Watchdog Interrupt.
#971	CHICS memory RAM test failure.
#974	FIP generated fatal error no.%x
#975	FIP network initialisation failure
#976	FIP medium invalid, error %x
#977	FIP ram test failure, error %x

6.3 Firmware Update.

CAUTION
ELECTROSTATIC DAMAGE

This equipment contains solid state devices which may be affected by electrostatic discharge.

When this equipment is handled, static handling precautions in accordance with Protection of Electrostatic Sensitive Devices, Part 1,General Requirements , BS EN 100015 Pt.1 (1990) must be used.

The executive code or 'Firmware' that provides the unit with its characteristic functionality is stored in Flash EPROM. This may be updated on site using a user friendly, DOS based, PC compatible, firmware update utility. The firmware update utility communicates with the programming port of the unit in the same way as a PC based programming tool and will normally be able to use the same serial link connection lead.

The instructions given in the README.TXT file, supplied with the firmware update program, should be followed in order to complete successful firmware update.

Note: The user configuration should be saved using the normal programming tool before firmware update is attempted
The unit must be disconnected from the FIP network before it can be updated.
The unit must be powered during the actual update of the firmware.
The unit must not be disassembled, have any internal links modified, or be reassembled with power applied.

To obtain access to the link that forces the module into the firmware update mode, the module must be separated from its mounting base by extracting the four retaining screws situated on the sides of the unit.

The link to put the module into firmware update mode is located next to the healthy LED, as shown in Figure 6-1. This link should be set to position 'A' for firmware update mode.

When the firmware has been successfully updated, return the link to position 'B', (the normal position) before refitting the module to its mounting base.

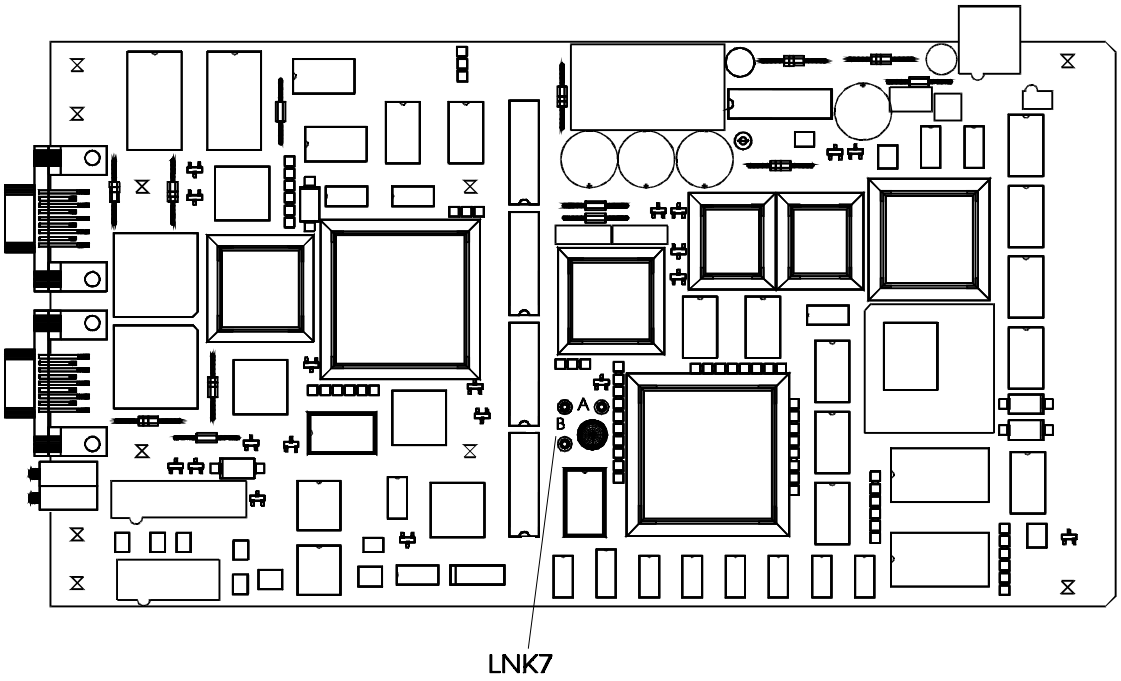


Figure 6-1 Link For Firmware Update Mode.

7. In-Built Configurations

7.1 General

The WorldFIP to Serial Link Gateway has several in-built configurations, which may be loaded by setting the mode switch to the required position and issuing a 'clear store' command. This operation is described in detail in the section 5.2.1.
Due to the flexibility of the WorldFIP to Serial Link Gateway, it may be configured in many different ways. The in-built configurations are intended as a starting point for users to develop their own configuration. Users may photocopy the tables in this chapter to aid generation of their own configuration, using the empty right-hand column to record their selected values. Currently three in-built configurations are supplied:

- Configured for one GD2000 drive operating with F8000 compliance. It is assumed that FIP node address 0 is used.
- Configured for six GD2000 drives operating with F8000 compliance. It is assumed that the FIP node addresses 0 to 5 inclusive are used.
- Configured for the exchange of 32 J-Tables and 32 K-Tables, without byte swapping.

7.2 Description of In-built Configurations

All reserved/unused P-Tables not described in this section are by default zero.

Each drive connected to the unit has an ID equal to the FIP node address plus the route number. In the user's application it may be necessary to change the FIP node address and thus the drive IDs. The user is reminded that this may affect the VCOM IDs and offset of the data within each VCOM.

In the following in-built configurations, it has been assumed that the decimal rotary node address switches, SW2 and SW3, which make up the FIP node address, are both set to position 0.

7.2.1 In-built Configuration 1 - one F8000 compliant Alspa GD2000.

To obtain the fastest response from the WorldFIP to Serial Link Gateway, the data rate controlled by P10 is set to 19200 baud. The configuration for one GD2000 drive with F8000 compliance requires five VCOMs to be configured. This quantity is entered in P69. The VCOM timing for this configuration is shown in Figure 7-1

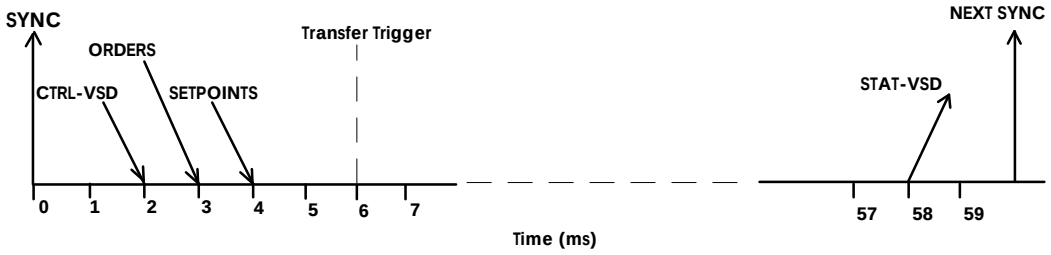


Figure 7-1 VCOM Timing for In-built Configuration 1

The serial link transfer trigger period is set to 60ms and the transfer trigger phase set to 6ms, in P22 and P23 respectively. The time period between the Transfer Trigger and the produced STAT-VSD VCOM, (58 - 6 = 52ms), allows for the transmission and reception of serial link data as follows:

Gateway data transmit time (with all bytes stuffed, at 19200 baud):	13ms
Drive data transmit time (with all bytes stuffed, at 19200 baud):	29ms
	---
	42ms

This leaves 10ms for the Drive and Gateway serial link overhead.

VCOM position 0, the SYNC VCOM, and has an ID of @9801. The period is set to 60ms. Since the BA controls the period at which the SYNC VCOM is produced on the network, the period given here is only used to calculate when loss of SYNC has occurred. The refreshment/ promptness time-out and phase do not apply to sync VCOMs and are therefore zero. The length is set to zero distinguishing this as a SYNC VCOM.

VCOM position 1 is the CTRL-VSD VCOM and has an ID of @8040. The period is set to 60ms. The refreshment/ promptness time-out is set to 2000ms to give a high tolerance to detection of stale data. It is consumed at a phase of 2ms after SYNC, providing the maximum time for the exchange of data with the drive. The CTRL-VSD VCOM has a length of 112 bytes.

VCOM position 2 is the ORDERS VCOM and has an ID of @8030. The period is set to 60ms. The refreshment/ promptness time-out is set to 2000ms, to give a high tolerance to detection of stale data. It is consumed at a phase of 3ms after SYNC, providing the maximum time for the exchange of data with the drive. The ORDERS VCOM has a length of 96 bytes.

VCOM position 3 is the SETPOINTS VCOM and has an ID of @8000. The period is set to 60ms. The refreshment/ promptness time-out is also set to 2000ms to give a high tolerance to detection of stale data. It is consumed at a phase of 4ms after SYNC, providing the maximum time for the exchange of data with the drive. The SETPOINTS VCOM has a length of 120 bytes.

VCOM position 4 is the STAT-VSD VCOM and has an ID of @0000. The period is set to 60ms. The refreshment/ promptness time-out is set to 2000ms to give a high tolerance to detection of stale data. A phase of 58ms after SYNC is specified. This is near the end of the cycle allowing the maximum time for VCOM data to arrive from the drive. The STAT-VSD VCOM has a length of -40 bytes (negative for produced).

This configuration is set for SlowFIP compliance, with P571 equal to zero. The Config. version in P572 is set nominally to one. Users may change this whenever a new F8000 configuration is generated.

Only route 0 is used in this configuration. P600 reflects a single GD2000 drive with F8000 compliance. The tributary address is set to 0. Five J-Tables are needed to transmit the required data. A route connected to a GD2000 under F8000 compliance requires seven data classes.

Route 0 class record 0 is the NiControl class having type 0, length 2 bytes and associated VCOM @8040. Since only a single drive is used the data is located at the start of the VCOM (offset 0). The data table pointer is not used with F8000 compliance.

Route 0 class record 1 is the Orders class having type 81, length 4 bytes and associated VCOM @8030. Since only a single drive is used the data is located at the start of the VCOM (offset 0). The data table pointer is not used with F8000 compliance.

Route 0 class record 2 is the Setpoints class having type 80, length 20 bytes and associated VCOM @8000. Since only a single drive is used the class is located at the start of the VCOM (offset 0). The data table pointer is not used under F8000 compliance.

Route 0 class record 3 is the Measures class having type 2 and length 24 bytes. It shares the STAT-VSD VCOM (ID. @0000) with Status, Faults and NiStatus classes. It is located at an offset of 16 bytes. The data table pointer is not used with F8000 compliance.

Route 0 class record 4 is the Status class having type 3 and length 4 bytes. It shares the STAT-VSD VCOM (ID. @0000) with Measures, Faults and NiStatus classes. It is located at an offset of 12 bytes. The data table pointer is not used with F8000 compliance.

Route 0 class record 5 is the Faults class having type 4 and length 6 bytes. It shares the STAT-VSD VCOM (ID. @0000) with Measures, Status and NiStatus classes. It is located at an offset of 6 bytes. The data table pointer is not used with F8000 compliance.

Route 0 class record 6 is the NiStatus class having type 1 and length 6 bytes. It shares the STAT-VSD VCOM (ID. @0000) with Measures, Status and Faults classes. It is located at the VCOM start (offset 0). The data table pointer is not used with F8000 compliance.

The Fault Tolerance when entering the RUNNING LOCKED state, for this single drive, is set to 3600 in P1624. This is a high value to provide large tolerance to stale data before returning to the READY state.

The Network Scaling value for all parameters is set to 10000 in P1640-1647. This means each parameter will be at 100% if 10000 is read from the network.

All drive 0 Conversion parameters are set to 5000 in P1648-1655. This means that each parameter will contain 5000 if running at 100%. The Full Load Current is set to 100 (10 Amps) and the Percentage Overrating is set to 50.

The fallback option for Orders and Setpoints is not selected (P1808-1810 zero). Fallback values are still entered as these form the freeze values until data is significant. The Orders fallback value is 4 which selects a safe condition (forward, stop). The fallback Setpoints, Upper Current Limit, Speed Reference and Main Electromagnetic Torque Reference Feedback are set to 5000, which is the same as the Conversion value, and thus 100%.

7.2.2 In-built Configuration 2 - six F8000 compliant Alspa GD2000s.

To obtain the fastest response from the WorldFIP to Serial Link Gateway, the data rate controlled by P10 is set to 19200 baud. The configuration for six GD2000 drives with F8000 compliance requires ten VCOMs to be configured. This quantity is entered in P69. The VCOM timing for this configuration is shown in Figure 7-2

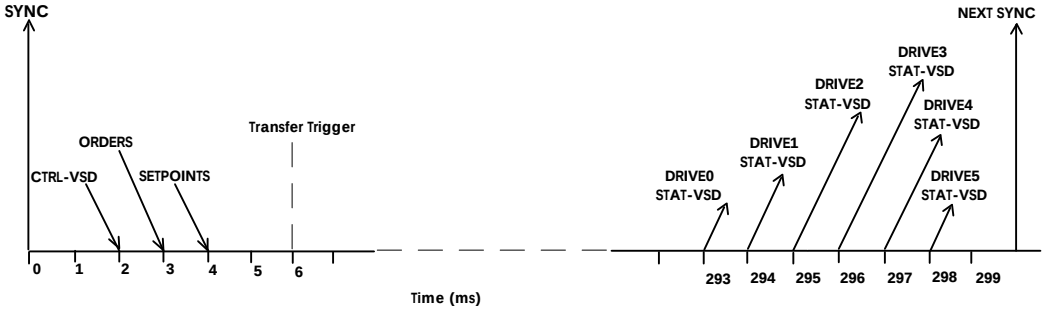


Figure 7-2 VCOM Timing for In-built Configuration 2

The serial link transfer trigger period is set to 300ms and the transfer trigger phase to 6ms, in P22 and P23 respectively. The time period between the Transfer Trigger and the first produced VCOM, drive 0 STAT-VSD, (293 - 6 = 287ms), allows for the transmission and reception of serial link data for all six drives as follows:

Gateway data transmit time (with all bytes stuffed, at 19200 baud):	13ms x 6 =	78ms
Drive data transmit time	29ms x 6 =	174ms
		252ms

This leaves 35ms for the Gateway and six Drives' serial link overhead.

VCOM position 0 contains the SYNC VCOM and is the same as Config.1 except that the period is 300ms.

VCOM positions 1 to 3 (CTRL-VSD, ORDERS and SETPOINTS) are also the same as Config.1 except that the period is set to 300ms. Each contains data for all six drives.

VCOM positions 4 to 9 are STAT-VSD VCOMs for drives 0 to 5 respectively. The VCOM IDs are the same as the drive number. The STAT-VSD VCOMs for drives 0 to 5 have a period of 300ms and refreshment/ promptness time-out of 2000ms, to give a high tolerance to detection of stale data. They are produced at phases 293ms, 294ms, 295ms, 296ms, 297ms and 298ms respectively. This is near the end of the cycle allowing the maximum time for data to arrive from the drive. The STAT-VSD VCOMs have length -40 bytes (negative for produced).

This network is set for SlowFIP compliance, with P571 equal to zero. The Config. version in P572 is set nominally to one. Users may change this whenever a new F8000 configuration is generated.

Routes 0 to 5 are used in this configuration for drives 0 to 5 respectively. Route 0 is the same as Route 0 in configuration 1. NiControl, Orders and Setpoints classes for routes 1 to 5 are the same as Route 0 except that the offsets increment by the class size, in order to point to the data for the next route. Measures, Status, Faults and NiStatus classes for routes 1 to 5 are the same as Route 0 except that the associated VCOM is the same as the drive ID.

The Network Scaling parameters and each routes Fault Tolerance when entering RUNNING LOCKED, Conversion parameters and Freeze/Fallback values are the same as for Configuration 1.

7.2.3 In-built Configuration 3 - 32 word J/K-Table exchange.

To obtain the fastest response from the WorldFIP to Serial Link Gateway, the data rate controlled by P10 is set to 19200 baud. This configuration is for asynchronous 32 word J-K table exchange without byte swapping. This requires two VCOMs to be configured. This quantity is entered in P69. Because no other VCOMs are used, and due to the asynchronous nature of the two VCOMs, they occupy all 2000 time slots, alternating between the two. This is shown in Figure 7-3.

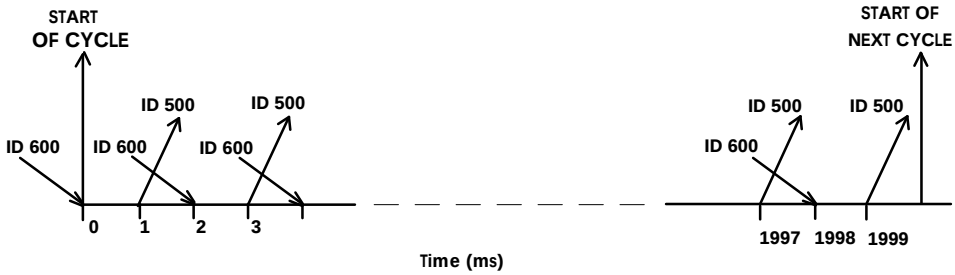


Figure 7-3 VCOM Timing for In-built Configuration 3

The serial link transfer trigger period and transfer trigger phase are set to zero, in P22 and P23 respectively, so that the link runs asynchronously.

No SYNC VCOM is used and thus the transfers to and from the FIP database are asynchronous. The BA will control when data is transferred across the FIP Network.

VCOM position 0 is the consumed VCOM and has an ID of @600. The period is set to zero to indicate it is an asynchronous VCOM. The refreshment/ promptness time-out is set to 2000ms. This is a large value which gives a high tolerance to detection of stale data. Being an asynchronous VCOM its phase is set to zero. The VCOM has a length of 64 bytes.

VCOM position 1 is the produced VCOM and has an ID of @500. Its period is set to zero to indicate it is an asynchronous VCOM. The refreshment/ promptness time-out is set to 2000ms. This is a large value which gives a high tolerance to detection of stale data. Being an asynchronous VCOM its phase is set to zero. The VCOM has a length of -64 bytes (negative for produced).

This network is set for SlowFIP compliance, with P571 equal to zero.

Only route 0 is used in this configuration. P600 reflects J-K table exchange by being set to 100. The tributary address is set to 0. For 32 words of J-Table and K-Table exchange 2 classes are required.

Route 0 class record 0 is for G-Table to K-Table transfer without byte swapping. This class has an ID of @102. Its length is 64 bytes (32 K-Tables) and associated VCOM @600. Since it has its own VCOM, the data begins at the start of the VCOM (offset 0). The data table pointer is zero indicating data is to be put in the first K-Table for this route (K0).

Route 0 class record 1 is for J-Table to G-Table transfer without byte swapping. This class has an ID of @103. Its length 64 bytes (32 J-Tables) and associated VCOM @500. Since it has its own VCOM, the data begins at the start of the VCOM (offset 0). The data table pointer is zero indicating data is to be taken from the first J-Table for this route (J0).

Fault Tolerance when entering RUNNING LOCKED state, Network Scaling parameters, Conversion parameters, freeze and fallback are not applicable in this none F8000 compliant configuration.

7.3 Configuration Parameter Tables

7.3.1 P10-P68 Serial Link Configuration

Table	Description	In-built Configurations			User Configuration
		1 SW1=2	2 SW1=3	3 SW1=4	
P10	Serial link baudrate	19200	19200	19200	
P11	Serial link operating mode	0	0	0	
P12	Reserved	0	0	0	0
P13	Reserved	0	0	0	0
P14	Reserved	0	0	0	0
P15	Reserved	0	0	0	0
P16	Reserved	0	0	0	0
P17	Reserved	0	0	0	0
P18	Reserved	0	0	0	0
P19	Reserved	0	0	0	0
P20	Reserved	0	0	0	0
P21	Reserved	0	0	0	0
P22	Trigger period	60	300	0	
P23	Trigger phase	6	6	0	
P24	Reserved	0	0	0	0
P25	Reserved	0	0	0	0
P26	Reserved	0	0	0	0
P27	Reserved	0	0	0	0
P28	Reserved	0	0	0	0
P29	Reserved	0	0	0	0
P30	Reserved	0	0	0	0
P31	Reserved	0	0	0	0
P32	Reserved	0	0	0	0
P33	Reserved	0	0	0	0
P34	Reserved	0	0	0	0
P35	Reserved	0	0	0	0
P36	Reserved	0	0	0	0
P37	Reserved	0	0	0	0
P38	Reserved	0	0	0	0
P39	Reserved	0	0	0	0
P40	Reserved	0	0	0	0
P41	Reserved	0	0	0	0
P42	Reserved	0	0	0	0
P43	Reserved	0	0	0	0
P44	Reserved	0	0	0	0
P45	Reserved	0	0	0	0
P46	Reserved	0	0	0	0
P47	Reserved	0	0	0	0
P48	Reserved	0	0	0	0
P49	Reserved	0	0	0	0
P50	Reserved	0	0	0	0
P51	Reserved	0	0	0	0
P52	Reserved	0	0	0	0
P53	Reserved	0	0	0	0
P54	Reserved	0	0	0	0
P55	Reserved	0	0	0	0
P56	Reserved	0	0	0	0
P57	Reserved	0	0	0	0
P58	Reserved	0	0	0	0
P59	Reserved	0	0	0	0
P60	Reserved	0	0	0	0
P61	Reserved	0	0	0	0
P62	Reserved	0	0	0	0
P63	Reserved	0	0	0	0

Table	Description	In-built Configurations			User Configuration
		1 SW1=2	2 SW1=3	3 SW1=4	
P64	Reserved	0	0	0	0
P65	Reserved	0	0	0	0
P66	Reserved	0	0	0	0
P67	Reserved	0	0	0	0
P68	Reserved	0	0	0	0

7.3.2 P69-P569 VCOM Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P69	Number of VCOMs		5	10	2	
P70	VCOM	VCOM ID	@9801	@9801	@600	
P71	Position	Period (ms)	60	300	0	
P72	0	Refr/promt t/o (ms)	0	0	2000	
P73		Phase (ms)	0	0	0	
P74		Length (bytes)	0	0	64	
P75	VCOM	VCOM ID	@8040	@8040	@500	
P76	Position	Period (ms)	60	300	0	
P77	1	Refr/promt t/o (ms)	2000	2000	2000	
P78		Phase (ms)	2	2	0	
P79		Length (bytes)	112	112	-64	
P80	VCOM	VCOM ID	@8030	@8030	0	
P81	Position	Period (ms)	60	300	0	
P82	2	Refr/promt t/o (ms)	2000	2000	0	
P83		Phase (ms)	3	3	0	
P84		Length (bytes)	96	96	0	
P85	VCOM	VCOM ID	@8000	@8000	0	
P86	Position	Period (ms)	60	300	0	
P87	3	Refr/promt t/o (ms)	2000	2000	0	
P88		Phase (ms)	4	4	0	
P89		Length (bytes)	120	120	0	
P90	VCOM	VCOM ID	@0000	@0000	0	
P91	Position	Period (ms)	60	300	0	
P92	4	Refr/promt t/o (ms)	2000	2000	0	
P93		Phase (ms)	58	293	0	
P94		Length (bytes)	-40	-40	0	
P95	VCOM	VCOM ID	0	@0001	0	
P96	Position	Period (ms)	0	300	0	
P97	5	Refr/promt t/o (ms)	0	2000	0	
P98		Phase (ms)	0	294	0	
P99		Length (bytes)	0	-40	0	
P100	VCOM	VCOM ID	0	@0002	0	
P101	Position	Period (ms)	0	300	0	
P102	6	Refr/promt t/o (ms)	0	2000	0	
P103		Phase (ms)	0	295	0	
P104		Length (bytes)	0	-40	0	
P105	VCOM	VCOM ID	0	@0003	0	
P106	Position	Period (ms)	0	300	0	
P107	7	Refr/promt t/o (ms)	0	2000	0	
P108		Phase (ms)	0	296	0	
P109		Length (bytes)	0	-40	0	
P110	VCOM	VCOM ID	0	@0004	0	
P111	Position	Period (ms)	0	300	0	
P112	8	Refr/promt t/o (ms)	0	2000	0	
P113		Phase (ms)	0	297	0	
P114		Length (bytes)	0	-40	0	
P115	VCOM	VCOM ID	0	@0005	0	
P116	Position	Period (ms)	0	300	0	
P117	9	Refr/promt t/o (ms)	0	2000	0	
P118		Phase (ms)	0	298	0	
P119		Length (bytes)	0	-40	0	
P120	VCOM	VCOM ID	0	0	0	
P121	Position	Period (ms)	0	0	0	
P122	10	Refr/promt t/o (ms)	0	0	0	
P123		Phase (ms)	0	0	0	
P124		Length (bytes)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P125	VCOM	VCOM ID	0	0	0	
P126	Position	Period (ms)	0	0	0	
P127	11	Refr/promt t/o (ms)	0	0	0	
P128		Phase (ms)	0	0	0	
P129		Length (bytes)	0	0	0	
P130	VCOM	VCOM ID	0	0	0	
P131	Position	Period (ms)	0	0	0	
P132	12	Refr/promt t/o (ms)	0	0	0	
P133		Phase (ms)	0	0	0	
P134		Length (bytes)	0	0	0	
P135	VCOM	VCOM ID	0	0	0	
P136	Position	Period (ms)	0	0	0	
P137	13	Refr/promt t/o (ms)	0	0	0	
P138		Phase (ms)	0	0	0	
P139		Length (bytes)	0	0	0	
P140	VCOM	VCOM ID	0	0	0	
P141	Position	Period (ms)	0	0	0	
P142	14	Refr/promt t/o (ms)	0	0	0	
P143		Phase (ms)	0	0	0	
P144		Length (bytes)	0	0	0	
P145	VCOM	VCOM ID	0	0	0	
P146	Position	Period (ms)	0	0	0	
P147	15	Refr/promt t/o (ms)	0	0	0	
P148		Phase (ms)	0	0	0	
P149		Length (bytes)	0	0	0	
P150	VCOM	VCOM ID	0	0	0	
P151	Position	Period (ms)	0	0	0	
P152	16	Refr/promt t/o (ms)	0	0	0	
P153		Phase (ms)	0	0	0	
P154		Length (bytes)	0	0	0	
P155	VCOM	VCOM ID	0	0	0	
P156	Position	Period (ms)	0	0	0	
P157	17	Refr/promt t/o (ms)	0	0	0	
P158		Phase (ms)	0	0	0	
P159		Length (bytes)	0	0	0	
P160	VCOM	VCOM ID	0	0	0	
P161	Position	Period (ms)	0	0	0	
P162	18	Refr/promt t/o (ms)	0	0	0	
P163		Phase (ms)	0	0	0	
P164		Length (bytes)	0	0	0	
P165	VCOM	VCOM ID	0	0	0	
P166	Position	Period (ms)	0	0	0	
P167	19	Refr/promt t/o (ms)	0	0	0	
P168		Phase (ms)	0	0	0	
P169		Length (bytes)	0	0	0	
P170	VCOM	VCOM ID	0	0	0	
P171	Position	Period (ms)	0	0	0	
P172	20	Refr/promt t/o (ms)	0	0	0	
P173		Phase (ms)	0	0	0	
P174		Length (bytes)	0	0	0	
P175	VCOM	VCOM ID	0	0	0	
P176	Position	Period (ms)	0	0	0	
P177	21	Refr/promt t/o (ms)	0	0	0	
P178		Phase (ms)	0	0	0	
P179		Length (bytes)	0	0	0	
P180	VCOM	VCOM ID	0	0	0	
P181	Position	Period (ms)	0	0	0	
P182	22	Refr/promt t/o (ms)	0	0	0	
P183		Phase (ms)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P184		Length (bytes)	0	0	0	
P185	VCOM	VCOM ID	0	0	0	
P186	Position	Period (ms)	0	0	0	
P187	23	Refr/promt t/o (ms)	0	0	0	
P188		Phase (ms)	0	0	0	
P189		Length (bytes)	0	0	0	
P190	VCOM	VCOM ID	0	0	0	
P191	Position	Period (ms)	0	0	0	
P192	24	Refr/promt t/o (ms)	0	0	0	
P193		Phase (ms)	0	0	0	
P194		Length (bytes)	0	0	0	
P195	VCOM	VCOM ID	0	0	0	
P196	Position	Period (ms)	0	0	0	
P197	25	Refr/promt t/o (ms)	0	0	0	
P198		Phase (ms)	0	0	0	
P199		Length (bytes)	0	0	0	
P200	VCOM	VCOM ID	0	0	0	
P201	Position	Period (ms)	0	0	0	
P202	26	Refr/promt t/o (ms)	0	0	0	
P203		Phase (ms)	0	0	0	
P204		Length (bytes)	0	0	0	
P205	VCOM	VCOM ID	0	0	0	
P206	Position	Period (ms)	0	0	0	
P207	27	Refr/promt t/o (ms)	0	0	0	
P208		Phase (ms)	0	0	0	
P209		Length (bytes)	0	0	0	
P210	VCOM	VCOM ID	0	0	0	
P211	Position	Period (ms)	0	0	0	
P212	28	Refr/promt t/o (ms)	0	0	0	
P213		Phase (ms)	0	0	0	
P214		Length (bytes)	0	0	0	
P215	VCOM	VCOM ID	0	0	0	
P216	Position	Period (ms)	0	0	0	
P217	29	Refr/promt t/o (ms)	0	0	0	
P218		Phase (ms)	0	0	0	
P219		Length (bytes)	0	0	0	
P220	VCOM	VCOM ID	0	0	0	
P221	Position	Period (ms)	0	0	0	
P222	30	Refr/promt t/o (ms)	0	0	0	
P223		Phase (ms)	0	0	0	
P224		Length (bytes)	0	0	0	
P225	VCOM	VCOM ID	0	0	0	
P226	Position	Period (ms)	0	0	0	
P227	31	Refr/promt t/o (ms)	0	0	0	
P228		Phase (ms)	0	0	0	
P229		Length (bytes)	0	0	0	
P230	VCOM	VCOM ID	0	0	0	
P231	Position	Period (ms)	0	0	0	
P232	32	Refr/promt t/o (ms)	0	0	0	
P233		Phase (ms)	0	0	0	
P234		Length (bytes)	0	0	0	
P235	VCOM	VCOM ID	0	0	0	
P236	Position	Period (ms)	0	0	0	
P237	33	Refr/promt t/o (ms)	0	0	0	
P238		Phase (ms)	0	0	0	
P239		Length (bytes)	0	0	0	
P240	VCOM	VCOM ID	0	0	0	
P241	Position	Period (ms)	0	0	0	
P242	34	Refr/promt t/o (ms)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P243		Phase (ms)	0	0	0	
P244		Length (bytes)	0	0	0	
P245	VCOM	VCOM ID	0	0	0	
P246	Position	Period (ms)	0	0	0	
P247	35	Refr/promt t/o (ms)	0	0	0	
P248		Phase (ms)	0	0	0	
P249		Length (bytes)	0	0	0	
P250	VCOM	VCOM ID	0	0	0	
P251	Position	Period (ms)	0	0	0	
P252	36	Refr/promt t/o (ms)	0	0	0	
P253		Phase (ms)	0	0	0	
P254		Length (bytes)	0	0	0	
P255	VCOM	VCOM ID	0	0	0	
P256	Position	Period (ms)	0	0	0	
P257	37	Refr/promt t/o (ms)	0	0	0	
P258		Phase (ms)	0	0	0	
P259		Length (bytes)	0	0	0	
P260	VCOM	VCOM ID	0	0	0	
P261	Position	Period (ms)	0	0	0	
P262	38	Refr/promt t/o (ms)	0	0	0	
P263		Phase (ms)	0	0	0	
P264		Length (bytes)	0	0	0	
P265	VCOM	VCOM ID	0	0	0	
P266	Position	Period (ms)	0	0	0	
P267	39	Refr/promt t/o (ms)	0	0	0	
P268		Phase (ms)	0	0	0	
P269		Length (bytes)	0	0	0	
P270	VCOM	VCOM ID	0	0	0	
P271	Position	Period (ms)	0	0	0	
P272	40	Refr/promt t/o (ms)	0	0	0	
P273		Phase (ms)	0	0	0	
P274		Length (bytes)	0	0	0	
P275	VCOM	VCOM ID	0	0	0	
P276	Position	Period (ms)	0	0	0	
P277	41	Refr/promt t/o (ms)	0	0	0	
P278		Phase (ms)	0	0	0	
P279		Length (bytes)	0	0	0	
P280	VCOM	VCOM ID	0	0	0	
P281	Position	Period (ms)	0	0	0	
P282	42	Refr/promt t/o (ms)	0	0	0	
P283		Phase (ms)	0	0	0	
P284		Length (bytes)	0	0	0	
P285	VCOM	VCOM ID	0	0	0	
P286	Position	Period (ms)	0	0	0	
P287	43	Refr/promt t/o (ms)	0	0	0	
P288		Phase (ms)	0	0	0	
P289		Length (bytes)	0	0	0	
P290	VCOM	VCOM ID	0	0	0	
P291	Position	Period (ms)	0	0	0	
P292	44	Refr/promt t/o (ms)	0	0	0	
P293		Phase (ms)	0	0	0	
P294		Length (bytes)	0	0	0	
P295	VCOM	VCOM ID	0	0	0	
P296	Position	Period (ms)	0	0	0	
P297	45	Refr/promt t/o (ms)	0	0	0	
P298		Phase (ms)	0	0	0	
P299		Length (bytes)	0	0	0	
P300	VCOM	VCOM ID	0	0	0	
P301	Position	Period (ms)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P302	46	Refr/promt t/o (ms)	0	0	0	
P303		Phase (ms)	0	0	0	
P304		Length (bytes)	0	0	0	
P305	VCOM	VCOM ID	0	0	0	
P306	Position	Period (ms)	0	0	0	
P307	47	Refr/promt t/o (ms)	0	0	0	
P308		Phase (ms)	0	0	0	
P309		Length (bytes)	0	0	0	
P310	VCOM	VCOM ID	0	0	0	
P311	Position	Period (ms)	0	0	0	
P312	48	Refr/promt t/o (ms)	0	0	0	
P313		Phase (ms)	0	0	0	
P314		Length (bytes)	0	0	0	
P315	VCOM	VCOM ID	0	0	0	
P316	Position	Period (ms)	0	0	0	
P317	49	Refr/promt t/o (ms)	0	0	0	
P318		Phase (ms)	0	0	0	
P319		Length (bytes)	0	0	0	
P320	VCOM	VCOM ID	0	0	0	
P321	Position	Period (ms)	0	0	0	
P322	50	Refr/promt t/o (ms)	0	0	0	
P323		Phase (ms)	0	0	0	
P324		Length (bytes)	0	0	0	
P325	VCOM	VCOM ID	0	0	0	
P326	Position	Period (ms)	0	0	0	
P327	51	Refr/promt t/o (ms)	0	0	0	
P328		Phase (ms)	0	0	0	
P329		Length (bytes)	0	0	0	
P330	VCOM	VCOM ID	0	0	0	
P331	Position	Period (ms)	0	0	0	
P332	52	Refr/promt t/o (ms)	0	0	0	
P333		Phase (ms)	0	0	0	
P334		Length (bytes)	0	0	0	
P335	VCOM	VCOM ID	0	0	0	
P336	Position	Period (ms)	0	0	0	
P337	53	Refr/promt t/o (ms)	0	0	0	
P338		Phase (ms)	0	0	0	
P339		Length (bytes)	0	0	0	
P340	VCOM	VCOM ID	0	0	0	
P341	Position	Period (ms)	0	0	0	
P342	54	Refr/promt t/o (ms)	0	0	0	
P343		Phase (ms)	0	0	0	
P344		Length (bytes)	0	0	0	
P345	VCOM	VCOM ID	0	0	0	
P346	Position	Period (ms)	0	0	0	
P347	55	Refr/promt t/o (ms)	0	0	0	
P348		Phase (ms)	0	0	0	
P349		Length (bytes)	0	0	0	
P350	VCOM	VCOM ID	0	0	0	
P351	Position	Period (ms)	0	0	0	
P352	56	Refr/promt t/o (ms)	0	0	0	
P353		Phase (ms)	0	0	0	
P354		Length (bytes)	0	0	0	
P355	VCOM	VCOM ID	0	0	0	
P356	Position	Period (ms)	0	0	0	
P357	57	Refr/promt t/o (ms)	0	0	0	
P358		Phase (ms)	0	0	0	
P359		Length (bytes)	0	0	0	
P360	VCOM	VCOM ID	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P361	Position	Period (ms)	0	0	0	
P362	58	Refr/promt t/o (ms)	0	0	0	
P363		Phase (ms)	0	0	0	
P364		Length (bytes)	0	0	0	
P365	VCOM	VCOM ID	0	0	0	
P366	Position	Period (ms)	0	0	0	
P367	59	Refr/promt t/o (ms)	0	0	0	
P368		Phase (ms)	0	0	0	
P369		Length (bytes)	0	0	0	
P370	VCOM	VCOM ID	0	0	0	
P371	Position	Period (ms)	0	0	0	
P372	60	Refr/promt t/o (ms)	0	0	0	
P373		Phase (ms)	0	0	0	
P374		Length (bytes)	0	0	0	
P375	VCOM	VCOM ID	0	0	0	
P376	Position	Period (ms)	0	0	0	
P377	61	Refr/promt t/o (ms)	0	0	0	
P378		Phase (ms)	0	0	0	
P379		Length (bytes)	0	0	0	
P380	VCOM	VCOM ID	0	0	0	
P381	Position	Period (ms)	0	0	0	
P382	62	Refr/promt t/o (ms)	0	0	0	
P383		Phase (ms)	0	0	0	
P384		Length (bytes)	0	0	0	
P385	VCOM	VCOM ID	0	0	0	
P387	Position	Period (ms)	0	0	0	
P387	63	Refr/promt t/o (ms)	0	0	0	
P388		Phase (ms)	0	0	0	
P389		Length (bytes)	0	0	0	
P390	VCOM	VCOM ID	0	0	0	
P391	Position	Period (ms)	0	0	0	
P392	64	Refr/promt t/o (ms)	0	0	0	
P393		Phase (ms)	0	0	0	
P394		Length (bytes)	0	0	0	
P395	VCOM	VCOM ID	0	0	0	
P396	Position	Period (ms)	0	0	0	
P397	65	Refr/promt t/o (ms)	0	0	0	
P398		Phase (ms)	0	0	0	
P399		Length (bytes)	0	0	0	
P400	VCOM	VCOM ID	0	0	0	
P401	Position	Period (ms)	0	0	0	
P402	66	Refr/promt t/o (ms)	0	0	0	
P403		Phase (ms)	0	0	0	
P404		Length (bytes)	0	0	0	
P405	VCOM	VCOM ID	0	0	0	
P406	Position	Period (ms)	0	0	0	
P407	67	Refr/promt t/o (ms)	0	0	0	
P408		Phase (ms)	0	0	0	
P409		Length (bytes)	0	0	0	
P410	VCOM	VCOM ID	0	0	0	
P411	Position	Period (ms)	0	0	0	
P412	68	Refr/promt t/o (ms)	0	0	0	
P413		Phase (ms)	0	0	0	
P414		Length (bytes)	0	0	0	
P415	VCOM	VCOM ID	0	0	0	
P416	Position	Period (ms)	0	0	0	
P417	69	Refr/promt t/o (ms)	0	0	0	
P418		Phase (ms)	0	0	0	
P419		Length (bytes)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P420	VCOM	VCOM ID	0	0	0	
P421	Position	Period (ms)	0	0	0	
P422	70	Refr/promt t/o (ms)	0	0	0	
P423		Phase (ms)	0	0	0	
P424		Length (bytes)	0	0	0	
P425	VCOM	VCOM ID	0	0	0	
P426	Position	Period (ms)	0	0	0	
P427	71	Refr/promt t/o (ms)	0	0	0	
P428		Phase (ms)	0	0	0	
P429		Length (bytes)	0	0	0	
P430	VCOM	VCOM ID	0	0	0	
P431	Position	Period (ms)	0	0	0	
P432	72	Refr/promt t/o (ms)	0	0	0	
P433		Phase (ms)	0	0	0	
P434		Length (bytes)	0	0	0	
P435	VCOM	VCOM ID	0	0	0	
P436	Position	Period (ms)	0	0	0	
P437	73	Refr/promt t/o (ms)	0	0	0	
P438		Phase (ms)	0	0	0	
P439		Length (bytes)	0	0	0	
P440	VCOM	VCOM ID	0	0	0	
P441	Position	Period (ms)	0	0	0	
P442	74	Refr/promt t/o (ms)	0	0	0	
P443		Phase (ms)	0	0	0	
P444		Length (bytes)	0	0	0	
P445	VCOM	VCOM ID	0	0	0	
P446	Position	Period (ms)	0	0	0	
P447	75	Refr/promt t/o (ms)	0	0	0	
P458		Phase (ms)	0	0	0	
P449		Length (bytes)	0	0	0	
P450	VCOM	VCOM ID	0	0	0	
P451	Position	Period (ms)	0	0	0	
P452	76	Refr/promt t/o (ms)	0	0	0	
P453		Phase (ms)	0	0	0	
P454		Length (bytes)	0	0	0	
P455	VCOM	VCOM ID	0	0	0	
P456	Position	Period (ms)	0	0	0	
P457	77	Refr/promt t/o (ms)	0	0	0	
P458		Phase (ms)	0	0	0	
P459		Length (bytes)	0	0	0	
P460	VCOM	VCOM ID	0	0	0	
P461	Position	Period (ms)	0	0	0	
P462	78	Refr/promt t/o (ms)	0	0	0	
P463		Phase (ms)	0	0	0	
P464		Length (bytes)	0	0	0	
P465	VCOM	VCOM ID	0	0	0	
P466	Position	Period (ms)	0	0	0	
P467	79	Refr/promt t/o (ms)	0	0	0	
P468		Phase (ms)	0	0	0	
P469		Length (bytes)	0	0	0	
P470	VCOM	VCOM ID	0	0	0	
P471	Position	Period (ms)	0	0	0	
P472	80	Refr/promt t/o (ms)	0	0	0	
P473		Phase (ms)	0	0	0	
P474		Length (bytes)	0	0	0	
P475	VCOM	VCOM ID	0	0	0	
P476	Position	Period (ms)	0	0	0	
P477	81	Refr/promt t/o (ms)	0	0	0	
P478		Phase (ms)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P479		Length (bytes)	0	0	0	
P480	VCOM	VCOM ID	0	0	0	
P481	Position	Period (ms)	0	0	0	
P482	82	Refr/promt t/o (ms)	0	0	0	
P483		Phase (ms)	0	0	0	
P484		Length (bytes)	0	0	0	
P485	VCOM	VCOM ID	0	0	0	
P486	Position	Period (ms)	0	0	0	
P487	83	Refr/promt t/o (ms)	0	0	0	
P488		Phase (ms)	0	0	0	
P489		Length (bytes)	0	0	0	
P490	VCOM	VCOM ID	0	0	0	
P491	Position	Period (ms)	0	0	0	
P492	84	Refr/promt t/o (ms)	0	0	0	
P493		Phase (ms)	0	0	0	
P494		Length (bytes)	0	0	0	
P495	VCOM	VCOM ID	0	0	0	
P496	Position	Period (ms)	0	0	0	
P497	85	Refr/promt t/o (ms)	0	0	0	
P498		Phase (ms)	0	0	0	
P499		Length (bytes)	0	0	0	
P500	VCOM	VCOM ID	0	0	0	
P501	Position	Period (ms)	0	0	0	
P502	86	Refr/promt t/o (ms)	0	0	0	
P503		Phase (ms)	0	0	0	
P504		Length (bytes)	0	0	0	
P505	VCOM	VCOM ID	0	0	0	
P506	Position	Period (ms)	0	0	0	
P507	87	Refr/promt t/o (ms)	0	0	0	
P508		Phase (ms)	0	0	0	
P509		Length (bytes)	0	0	0	
P510	VCOM	VCOM ID	0	0	0	
P511	Position	Period (ms)	0	0	0	
P512	88	Refr/promt t/o (ms)	0	0	0	
P513		Phase (ms)	0	0	0	
P514		Length (bytes)	0	0	0	
P515	VCOM	VCOM ID	0	0	0	
P516	Position	Period (ms)	0	0	0	
P517	89	Refr/promt t/o (ms)	0	0	0	
P518		Phase (ms)	0	0	0	
P519		Length (bytes)	0	0	0	
P520	VCOM	VCOM ID	0	0	0	
P521	Position	Period (ms)	0	0	0	
P522	90	Refr/promt t/o (ms)	0	0	0	
P523		Phase (ms)	0	0	0	
P524		Length (bytes)	0	0	0	
P525	VCOM	VCOM ID	0	0	0	
P526	Position	Period (ms)	0	0	0	
P527	91	Refr/promt t/o (ms)	0	0	0	
P528		Phase (ms)	0	0	0	
P529		Length (bytes)	0	0	0	
P530	VCOM	VCOM ID	0	0	0	
P531	Position	Period (ms)	0	0	0	
P532	92	Refr/promt t/o (ms)	0	0	0	
P533		Phase (ms)	0	0	0	
P534		Length (bytes)	0	0	0	
P535	VCOM	VCOM ID	0	0	0	
P536	Position	Period (ms)	0	0	0	
P537	93	Refr/promt t/o (ms)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P538		Phase (ms)	0	0	0	
P539		Length (bytes)	0	0	0	
P540	VCOM	VCOM ID	0	0	0	
P541	Position	Period (ms)	0	0	0	
P542	94	Refr/promt t/o (ms)	0	0	0	
P543		Phase (ms)	0	0	0	
P544		Length (bytes)	0	0	0	
P545	VCOM	VCOM ID	0	0	0	
P546	Position	Period (ms)	0	0	0	
P547	95	Refr/promt t/o (ms)	0	0	0	
P548		Phase (ms)	0	0	0	
P549		Length (bytes)	0	0	0	
P550	VCOM	VCOM ID	0	0	0	
P551	Position	Period (ms)	0	0	0	
P552	96	Refr/promt t/o (ms)	0	0	0	
P553		Phase (ms)	0	0	0	
P554		Length (bytes)	0	0	0	
P555	VCOM	VCOM ID	0	0	0	
P556	Position	Period (ms)	0	0	0	
P557	97	Refr/promt t/o (ms)	0	0	0	
P558		Phase (ms)	0	0	0	
P559		Length (bytes)	0	0	0	
P560	VCOM	VCOM ID	0	0	0	
P561	Position	Period (ms)	0	0	0	
P562	98	Refr/promt t/o (ms)	0	0	0	
P563		Phase (ms)	0	0	0	
P564		Length (bytes)	0	0	0	
P565	VCOM	VCOM ID	0	0	0	
P566	Position	Period (ms)	0	0	0	
P567	99	Refr/promt t/o (ms)	0	0	0	
P568		Phase (ms)	0	0	0	
P569		Length (bytes)	0	0	0	

7.3.3 P570-P599 FIP Physical layer and F8000 compliance

Table	Description	In-built Configurations			User Configuration
		1 SW1=2	2 SW1=3	3 SW1=4	
P570	Reserved	0	0	0	0
P571	Network Compliance 0, 1 or 2	0	0	0	
P572	F8000 Config. version	1	1	0	
P573	Reserved	0	0	0	0
P574	Reserved	0	0	0	0
P575	Reserved	0	0	0	0
P576	Reserved	0	0	0	0
P577	Reserved	0	0	0	0
P578	Reserved	0	0	0	0
P579	Reserved	0	0	0	0
P580	Reserved	0	0	0	0
P581	Reserved	0	0	0	0
P582	Reserved	0	0	0	0
P583	Reserved	0	0	0	0
P584	Reserved	0	0	0	0
P585	Reserved	0	0	0	0
P586	Reserved	0	0	0	0
P587	Reserved	0	0	0	0
P588	Reserved	0	0	0	0
P589	Reserved	0	0	0	0
P590	Reserved	0	0	0	0
P591	Reserved	0	0	0	0
P592	Reserved	0	0	0	0
P593	Reserved	0	0	0	0
P594	Reserved	0	0	0	0
P595	Reserved	0	0	0	0
P596	Reserved	0	0	0	0
P597	Reserved	0	0	0	0
P598	Reserved	0	0	0	0
P599	Reserved	0	0	0	0

7.3.4 P600-663 Route 0 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P600	Route 0	Route compliance	2000	2000	100	
P601	Def.n	ESP Trib. address	0	0	0	
P602		Tx quantity (tables)	5	5	32	
P603		Class quantity	7	7	2	
P604	Route 0	Class type	0	0	@102	
P605	class	Associated VCOM	@8040	@8040	@600	
P606	record 0	Offset in VCOM (bytes)	0	0	0	
P607		Class length (bytes)	2	2	64	
P608		Data table offset (words)	0	0	0	
P609	Route 0	Class type	81	81	@103	
P610	class	Associated VCOM	@8030	@8030	@500	
P611	record 1	Offset in VCOM (bytes)	0	0	0	
P612		Class length (bytes)	4	4	64	
P613		Data table offset (words)	0	0	0	
P614	Route 0	Class type	80	80	0	
P615	class	Associated VCOM	@8000	@8000	0	
P616	record 2	Offset in VCOM (bytes)	0	0	0	
P617		Class length (bytes)	20	20	0	
P618		Data table offset (words)	0	0	0	
P619	Route 0	Class type	2	2	0	
P620	class	Associated VCOM	0	0	0	
P621	record 3	Offset in VCOM (bytes)	16	16	0	
P622		Class length (bytes)	24	24	0	
P623		Data table offset (words)	0	0	0	
P624	Route 0	Class type	3	3	0	
P625	class	Associated VCOM	0	0	0	
P626	record 4	Offset in VCOM (bytes)	12	12	0	
P627		Class length (bytes)	4	4	0	
P628		Data table offset (words)	0	0	0	
P629	Route 0	Class type	4	4	0	
P630	class	Associated VCOM	0	0	0	
P631	record 5	Offset in VCOM (bytes)	6	6	0	
P632		Class length (bytes)	6	6	0	
P633		Data table offset (words)	0	0	0	
P634	Route 0	Class type	1	1	0	
P635	class	Associated VCOM	0	0	0	
P636	record 6	Offset in VCOM (bytes)	0	0	0	
P637		Class length (bytes)	6	6	0	
P638		Data table offset (words)	0	0	0	
P639	Route 0	Class type	0	0	0	
P640	class	Associated VCOM	0	0	0	
P641	record 7	Offset in VCOM (bytes)	0	0	0	
P642		Class length (bytes)	0	0	0	
P643		Data table offset (words)	0	0	0	
P644	Route 0	Class type	0	0	0	
P645	class	Associated VCOM	0	0	0	
P646	record 8	Offset in VCOM (bytes)	0	0	0	
P647		Class length (bytes)	0	0	0	
P648		Data table offset (words)	0	0	0	
P649	Route 0	Class type	0	0	0	
P650	class	Associated VCOM	0	0	0	
P651	record 9	Offset in VCOM (bytes)	0	0	0	
P652		Class length (bytes)	0	0	0	
P653		Data table offset (words)	0	0	0	
P654	Route 0	Class type	0	0	0	
P655	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P656	record 10	Offset in VCOM (bytes)	0	0	0	
P657		Class length (bytes)	0	0	0	
P658		Data table offset (words)	0	0	0	
P659	Route 0	Class type	0	0	0	
P660	class	Associated VCOM	0	0	0	
P661	record 11	Offset in VCOM (bytes)	0	0	0	
P662		Class length (bytes)	0	0	0	
P663		Data table offset (words)	0	0	0	

7.3.5 P664-727 Route 1 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P664	Route 1	Route compliance	0	2000	0	
P665	Def.n	ESP Trib. address	0	1	0	
P666		Tx quantity (tables)	0	5	0	
P667		Class quantity	0	7	0	
P668	Route 1	Class type	0	0	0	
P669	class	Associated VCOM	0	@8040	0	
P670	record 0	Offset in VCOM (bytes)	0	2	0	
P671		Class length (bytes)	0	2	0	
P672		Data table offset (words)	0	0	0	
P673	Route 1	Class type	0	81	0	
P674	class	Associated VCOM	0	@8030	0	
P675	record 1	Offset in VCOM (bytes)	0	4	0	
P676		Class length (bytes)	0	4	0	
P677		Data table offset (words)	0	0	0	
P678	Route 1	Class type	0	80	0	
P679	class	Associated VCOM	0	@8000	0	
P680	record 2	Offset in VCOM (bytes)	0	20	0	
P681		Class length (bytes)	0	20	0	
P682		Data table offset (words)	0	0	0	
P683	Route 1	Class type	0	2	0	
P684	class	Associated VCOM	0	1	0	
P685	record 3	Offset in VCOM (bytes)	0	16	0	
P686		Class length (bytes)	0	24	0	
P687		Data table offset (words)	0	0	0	
P688	Route 1	Class type	0	3	0	
P689	class	Associated VCOM	0	1	0	
P690	record 4	Offset in VCOM (bytes)	0	12	0	
P691		Class length (bytes)	0	4	0	
P692		Data table offset (words)	0	0	0	
P693	Route 1	Class type	0	4	0	
P694	class	Associated VCOM	0	1	0	
P695	record 5	Offset in VCOM (bytes)	0	6	0	
P696		Class length (bytes)	0	6	0	
P697		Data table offset (words)	0	0	0	
P698	Route 1	Class type	0	1	0	
P699	class	Associated VCOM	0	1	0	
P700	record 6	Offset in VCOM (bytes)	0	0	0	
P701		Class length (bytes)	0	6	0	
P702		Data table offset (words)	0	0	0	
P703	Route 1	Class type	0	0	0	
P704	class	Associated VCOM	0	0	0	
P705	record 7	Offset in VCOM (bytes)	0	0	0	
P706		Class length (bytes)	0	0	0	
P707		Data table offset (words)	0	0	0	
P708	Route 1	Class type	0	0	0	
P709	class	Associated VCOM	0	0	0	
P710	record 8	Offset in VCOM (bytes)	0	0	0	
P711		Class length (bytes)	0	0	0	
P712		Data table offset (words)	0	0	0	
P713	Route 1	Class type	0	0	0	
P714	class	Associated VCOM	0	0	0	
P715	record 9	Offset in VCOM (bytes)	0	0	0	
P716		Class length (bytes)	0	0	0	
P717		Data table offset (words)	0	0	0	
P718	Route 1	Class type	0	0	0	
P719	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P720	record 10	Offset in VCOM (bytes)	0	0	0	
P721		Class length (bytes)	0	0	0	
P722		Data table offset (words)	0	0	0	
P723	Route 1	Class type	0	0	0	
P724	class	Associated VCOM	0	0	0	
P725	record 11	Offset in VCOM (bytes)	0	0	0	
P726		Class length (bytes)	0	0	0	
P727		Data table offset (words)	0	0	0	

7.3.6 P728-791 Route 2 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P728	Route 2	Route compliance	0	2000	0	
P729	Def.n	ESP Trib. address	0	2	0	
P730		Tx quantity (tables)	0	5	0	
P731		Class quantity	0	7	0	
P732	Route 2	Class type	0	0	0	
P733	class	Associated VCOM	0	@8040	0	
P734	record 0	Offset in VCOM (bytes)	0	4	0	
P735		Class length (bytes)	0	2	0	
P736		Data table offset (words)	0	0	0	
P737	Route 2	Class type	0	81	0	
P738	class	Associated VCOM	0	@8030	0	
P739	record 1	Offset in VCOM (bytes)	0	8	0	
P740		Class length (bytes)	0	4	0	
P741		Data table offset (words)	0	0	0	
P742	Route 2	Class type	0	80	0	
P743	class	Associated VCOM	0	@8000	0	
P744	record 2	Offset in VCOM (bytes)	0	40	0	
P745		Class length (bytes)	0	20	0	
P746		Data table offset (words)	0	0	0	
P747	Route 2	Class type	0	2	0	
P748	class	Associated VCOM	0	2	0	
P749	record 3	Offset in VCOM (bytes)	0	16	0	
P750		Class length (bytes)	0	24	0	
P751		Data table offset (words)	0	0	0	
P752	Route 2	Class type	0	3	0	
P753	class	Associated VCOM	0	2	0	
P754	record 4	Offset in VCOM (bytes)	0	12	0	
P755		Class length (bytes)	0	4	0	
P756		Data table offset (words)	0	0	0	
P757	Route 2	Class type	0	4	0	
P758	class	Associated VCOM	0	2	0	
P759	record 5	Offset in VCOM (bytes)	0	6	0	
P760		Class length (bytes)	0	6	0	
P761		Data table offset (words)	0	0	0	
P762	Route 2	Class type	0	1	0	
P763	class	Associated VCOM	0	2	0	
P764	record 6	Offset in VCOM (bytes)	0	0	0	
P765		Class length (bytes)	0	6	0	
P766		Data table offset (words)	0	0	0	
P767	Route 2	Class type	0	0	0	
P768	class	Associated VCOM	0	0	0	
P769	record 7	Offset in VCOM (bytes)	0	0	0	
P770		Class length (bytes)	0	0	0	
P771		Data table offset (words)	0	0	0	
P772	Route 2	Class type	0	0	0	
P773	class	Associated VCOM	0	0	0	
P774	record 8	Offset in VCOM (bytes)	0	0	0	
P775		Class length (bytes)	0	0	0	
P776		Data table offset (words)	0	0	0	
P777	Route 2	Class type	0	0	0	
P778	class	Associated VCOM	0	0	0	
P779	record 9	Offset in VCOM (bytes)	0	0	0	
P780		Class length (bytes)	0	0	0	
P781		Data table offset (words)	0	0	0	
P782	Route 2	Class type	0	0	0	
P783	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P784	record 10	Offset in VCOM (bytes)	0	0	0	
P785		Class length (bytes)	0	0	0	
P786		Data table offset (words)	0	0	0	
P787	Route 2	Class type	0	0	0	
P788	class	Associated VCOM	0	0	0	
P789	record 11	Offset in VCOM (bytes)	0	0	0	
P790		Class length (bytes)	0	0	0	
P791		Data table offset (words)	0	0	0	

7.3.7 P792-855 Route 3 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P792	Route 3	Route compliance	0	2000	0	
P793	Def.n	ESP Trib. address	0	3	0	
P794		Tx quantity (tables)	0	5	0	
P795		Class quantity	0	7	0	
P796	Route 3	Class type	0	0	0	
P797	class	Associated VCOM	0	@8040	0	
P798	record 0	Offset in VCOM (bytes)	0	6	0	
P799		Class length (bytes)	0	2	0	
P800		Data table offset (words)	0	0	0	
P801	Route 3	Class type	0	81	0	
P802	class	Associated VCOM	0	@8030	0	
P803	record 1	Offset in VCOM (bytes)	0	12	0	
P804		Class length (bytes)	0	4	0	
P805		Data table offset (words)	0	0	0	
P806	Route 3	Class type	0	80	0	
P807	class	Associated VCOM	0	@8000	0	
P808	record 2	Offset in VCOM (bytes)	0	60	0	
P809		Class length (bytes)	0	20	0	
P810		Data table offset (words)	0	0	0	
P811	Route 3	Class type	0	2	0	
P812	class	Associated VCOM	0	3	0	
P813	record 3	Offset in VCOM (bytes)	0	16	0	
P814		Class length (bytes)	0	24	0	
P815		Data table offset (words)	0	0	0	
P816	Route 3	Class type	0	3	0	
P817	class	Associated VCOM	0	3	0	
P818	record 4	Offset in VCOM (bytes)	0	12	0	
P819		Class length (bytes)	0	4	0	
P820		Data table offset (words)	0	0	0	
P821	Route 3	Class type	0	4	0	
P822	class	Associated VCOM	0	3	0	
P823	record 5	Offset in VCOM (bytes)	0	6	0	
P824		Class length (bytes)	0	6	0	
P825		Data table offset (words)	0	0	0	
P826	Route 3	Class type	0	1	0	
P827	class	Associated VCOM	0	3	0	
P828	record 6	Offset in VCOM (bytes)	0	0	0	
P829		Class length (bytes)	0	6	0	
P830		Data table offset (words)	0	0	0	
P831	Route 3	Class type	0	0	0	
P832	class	Associated VCOM	0	0	0	
P833	record 7	Offset in VCOM (bytes)	0	0	0	
P834		Class length (bytes)	0	0	0	
P835		Data table offset (words)	0	0	0	
P836	Route 3	Class type	0	0	0	
P837	class	Associated VCOM	0	0	0	
P838	record 8	Offset in VCOM (bytes)	0	0	0	
P839		Class length (bytes)	0	0	0	
P840		Data table offset (words)	0	0	0	
P841	Route 3	Class type	0	0	0	
P842	class	Associated VCOM	0	0	0	
P843	record 9	Offset in VCOM (bytes)	0	0	0	
P844		Class length (bytes)	0	0	0	
P845		Data table offset (words)	0	0	0	
P846	Route 3	Class type	0	0	0	
P847	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P848	record 10	Offset in VCOM (bytes)	0	0	0	
P849		Class length (bytes)	0	0	0	
P850		Data table offset (words)	0	0	0	
P851	Route 3	Class type	0	0	0	
P852	class	Associated VCOM	0	0	0	
P853	record 11	Offset in VCOM (bytes)	0	0	0	
P854		Class length (bytes)	0	0	0	
P855		Data table offset (words)	0	0	0	

7.3.8 P856-919 Route 4 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P856	Route 4	Route compliance	0	2000	0	
P857	Def.n	ESP Trib. address	0	4	0	
P858		Tx quantity (tables)	0	5	0	
P859		Class quantity	0	7	0	
P860	Route 4	Class type	0	0	0	
P861	class	Associated VCOM	0	@8040	0	
P862	record 0	Offset in VCOM (bytes)	0	8	0	
P863		Class length (bytes)	0	2	0	
P864		Data table offset (words)	0	0	0	
P865	Route 4	Class type	0	81	0	
P866	class	Associated VCOM	0	@8030	0	
P867	record 1	Offset in VCOM (bytes)	0	16	0	
P868		Class length (bytes)	0	4	0	
P869		Data table offset (words)	0	0	0	
P870	Route 4	Class type	0	80	0	
P871	class	Associated VCOM	0	@8000	0	
P872	record 2	Offset in VCOM (bytes)	0	80	0	
P873		Class length (bytes)	0	20	0	
P874		Data table offset (words)	0	0	0	
P875	Route 4	Class type	0	2	0	
P876	class	Associated VCOM	0	4	0	
P877	record 3	Offset in VCOM (bytes)	0	16	0	
P878		Class length (bytes)	0	24	0	
P879		Data table offset (words)	0	0	0	
P880	Route 4	Class type	0	3	0	
P881	class	Associated VCOM	0	4	0	
P882	record 4	Offset in VCOM (bytes)	0	12	0	
P883		Class length (bytes)	0	4	0	
P884		Data table offset (words)	0	0	0	
P885	Route 4	Class type	0	4	0	
P886	class	Associated VCOM	0	4	0	
P887	record 5	Offset in VCOM (bytes)	0	6	0	
P888		Class length (bytes)	0	6	0	
P889		Data table offset (words)	0	0	0	
P890	Route 4	Class type	0	1	0	
P891	class	Associated VCOM	0	4	0	
P892	record 6	Offset in VCOM (bytes)	0	0	0	
P893		Class length (bytes)	0	6	0	
P894		Data table offset (words)	0	0	0	
P895	Route 4	Class type	0	0	0	
P896	class	Associated VCOM	0	0	0	
P897	record 7	Offset in VCOM (bytes)	0	0	0	
P898		Class length (bytes)	0	0	0	
P899		Data table offset (words)	0	0	0	
P900	Route 4	Class type	0	0	0	
P901	class	Associated VCOM	0	0	0	
P902	record 8	Offset in VCOM (bytes)	0	0	0	
P903		Class length (bytes)	0	0	0	
P904		Data table offset (words)	0	0	0	
P905	Route 4	Class type	0	0	0	
P906	class	Associated VCOM	0	0	0	
P907	record 9	Offset in VCOM (bytes)	0	0	0	
P908		Class length (bytes)	0	0	0	
P909		Data table offset (words)	0	0	0	
P910	Route 4	Class type	0	0	0	
P911	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P912	record 10	Offset in VCOM (bytes)	0	0	0	
P913		Class length (bytes)	0	0	0	
P914		Data table offset (words)	0	0	0	
P915	Route 4	Class type	0	0	0	
P916	class	Associated VCOM	0	0	0	
P917	record 11	Offset in VCOM (bytes)	0	0	0	
P918		Class length (bytes)	0	0	0	
P919		Data table offset (words)	0	0	0	

7.3.9 P920-983 Route 5 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P920	Route 5	Route compliance	0	2000	0	
P921	Definition	ESP Trib. address	0	5	0	
P922		Tx quantity (tables)	0	5	0	
P923		Class quantity	0	7	0	
P924	Route 5	Class type	0	0	0	
P925	class	Associated VCOM	0	@8040	0	
P926	record 0	Offset in VCOM (bytes)	0	10	0	
P927		Class length (bytes)	0	2	0	
P928		Data table offset (words)	0	0	0	
P929	Route 5	Class type	0	81	0	
P930	class	Associated VCOM	0	@8030	0	
P931	record 1	Offset in VCOM (bytes)	0	20	0	
P932		Class length (bytes)	0	4	0	
P933		Data table offset (words)	0	0	0	
P934	Route 5	Class type	0	80	0	
P935	class	Associated VCOM	0	@8000	0	
P936	record 2	Offset in VCOM (bytes)	0	100	0	
P937		Class length (bytes)	0	20	0	
P938		Data table offset (words)	0	0	0	
P939	Route 5	Class type	0	2	0	
P940	class	Associated VCOM	0	5	0	
P941	record 3	Offset in VCOM (bytes)	0	16	0	
P942		Class length (bytes)	0	24	0	
P943		Data table offset (words)	0	0	0	
P944	Route 5	Class type	0	3	0	
P945	class	Associated VCOM	0	5	0	
P946	record 4	Offset in VCOM (bytes)	0	12	0	
P947		Class length (bytes)	0	4	0	
P948		Data table offset (words)	0	0	0	
P949	Route 5	Class type	0	4	0	
P950	class	Associated VCOM	0	5	0	
P951	record 5	Offset in VCOM (bytes)	0	6	0	
P952		Class length (bytes)	0	6	0	
P953		Data table offset (words)	0	0	0	
P954	Route 5	Class type	0	1	0	
P955	class	Associated VCOM	0	5	0	
P956	record 6	Offset in VCOM (bytes)	0	0	0	
P957		Class length (bytes)	0	6	0	
P958		Data table offset (words)	0	0	0	
P959	Route 5	Class type	0	0	0	
P960	class	Associated VCOM	0	0	0	
P961	record 7	Offset in VCOM (bytes)	0	0	0	
P962		Class length (bytes)	0	0	0	
P963		Data table offset (words)	0	0	0	
P964	Route 5	Class type	0	0	0	
P965	class	Associated VCOM	0	0	0	
P966	record 8	Offset in VCOM (bytes)	0	0	0	
P967		Class length (bytes)	0	0	0	
P968		Data table offset (words)	0	0	0	
P969	Route 5	Class type	0	0	0	
P970	class	Associated VCOM	0	0	0	
P971	record 9	Offset in VCOM (bytes)	0	0	0	
P972		Class length (bytes)	0	0	0	
P973		Data table offset (words)	0	0	0	
P974	Route 5	Class type	0	0	0	
P975	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P976	record 10	Offset in VCOM (bytes)	0	0	0	
P977		Class length (bytes)	0	0	0	
P978		Data table offset (words)	0	0	0	
P979	Route 5	Class type	0	0	0	
P980	class	Associated VCOM	0	0	0	
P981	record 11	Offset in VCOM (bytes)	0	0	0	
P982		Class length (bytes)	0	0	0	
P983		Data table offset (words)	0	0	0	

7.3.10 P984-1047 Route 6 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 Sw1=3	3 SW1=4	
P984	Route 6	Route compliance	0	0	0	
P985	Def.n	ESP Trib. address	0	0	0	
P986		Tx quantity (tables)	0	0	0	
P987		Class quantity	0	0	0	
P988	Route 6	Class type	0	0	0	
P989	class	Associated VCOM	0	0	0	
P990	record 0	Offset in VCOM (bytes)	0	0	0	
P991		Class length (bytes)	0	0	0	
P992		Data table offset (words)	0	0	0	
P993	Route 6	Class type	0	0	0	
P994	class	Associated VCOM	0	0	0	
P995	record 1	Offset in VCOM (bytes)	0	0	0	
P996		Class length (bytes)	0	0	0	
P997		Data table offset (words)	0	0	0	
P998	Route 6	Class type	0	0	0	
P999	class	Associated VCOM	0	0	0	
P1000	record 2	Offset in VCOM (bytes)	0	0	0	
P1001		Class length (bytes)	0	0	0	
P1002		Data table offset (words)	0	0	0	
P1003	Route 6	Class type	0	0	0	
P1004	class	Associated VCOM	0	0	0	
P1005	record 3	Offset in VCOM (bytes)	0	0	0	
P1006		Class length (bytes)	0	0	0	
P1007		Data table offset (words)	0	0	0	
P1008	Route 6	Class type	0	0	0	
P1009	class	Associated VCOM	0	0	0	
P1010	record 4	Offset in VCOM (bytes)	0	0	0	
P1011		Class length (bytes)	0	0	0	
P1012		Data table offset (words)	0	0	0	
P1013	Route 6	Class type	0	0	0	
P1014	class	Associated VCOM	0	0	0	
P1015	record 5	Offset in VCOM (bytes)	0	0	0	
P1016		Class length (bytes)	0	0	0	
P1017		Data table offset (words)	0	0	0	
P1018	Route 6	Class type	0	0	0	
P1019	class	Associated VCOM	0	0	0	
P1020	record 6	Offset in VCOM (bytes)	0	0	0	
P1021		Class length (bytes)	0	0	0	
P1022		Data table offset (words)	0	0	0	
P1023	Route 6	Class type	0	0	0	
P1024	class	Associated VCOM	0	0	0	
P1025	record 7	Offset in VCOM (bytes)	0	0	0	
P1026		Class length (bytes)	0	0	0	
P1027		Data table offset (words)	0	0	0	
P1028	Route 6	Class type	0	0	0	
P1029	class	Associated VCOM	0	0	0	
P1030	record 8	Offset in VCOM (bytes)	0	0	0	
P1031		Class length (bytes)	0	0	0	
P1032		Data table offset (words)	0	0	0	
P1033	Route 6	Class type	0	0	0	
P1034	class	Associated VCOM	0	0	0	
P1035	record 9	Offset in VCOM (bytes)	0	0	0	
P1036		Class length (bytes)	0	0	0	
P1037		Data table offset (words)	0	0	0	
P1038	Route 6	Class type	0	0	0	
P1039	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 Sw1=3	3 SW1=4	
P1040	record 10	Offset in VCOM (bytes)	0	0	0	
P1041		Class length (bytes)	0	0	0	
P1042		Data table offset (words)	0	0	0	
P1043	Route 6	Class type	0	0	0	
P1044	class	Associated VCOM	0	0	0	
P1045	record 11	Offset in VCOM (bytes)	0	0	0	
P1046		Class length (bytes)	0	0	0	
P1047		Data table offset (words)	0	0	0	

7.3.11 P1048-1111 Route 7 Configuration

Table	Description		In-built Configurations			User Configuration
			1 Sw1=2	2 SW1=3	3 SW1=4	
P1048	Route 7	Route compliance	0	0	0	
P1049	Def.n	ESP Trib. address	0	0	0	
P1050		Tx quantity (tables)	0	0	0	
P1051		Class quantity	0	0	0	
P1052	Route 7	Class type	0	0	0	
P1053	class	Associated VCOM	0	0	0	
P1054	record 0	Offset in VCOM (bytes)	0	0	0	
P1055		Class length (bytes)	0	0	0	
P1056		Data table offset (words)	0	0	0	
P1057	Route 7	Class type	0	0	0	
P1058	class	Associated VCOM	0	0	0	
P1059	record 1	Offset in VCOM (bytes)	0	0	0	
P1060		Class length (bytes)	0	0	0	
P1061		Data table offset (words)	0	0	0	
P1062	Route 7	Class type	0	0	0	
P1063	class	Associated VCOM	0	0	0	
P1064	record 2	Offset in VCOM (bytes)	0	0	0	
P1065		Class length (bytes)	0	0	0	
P1066		Data table offset (words)	0	0	0	
P1067	Route 7	Class type	0	0	0	
P1068	class	Associated VCOM	0	0	0	
P1069	record 3	Offset in VCOM (bytes)	0	0	0	
P1070		Class length (bytes)	0	0	0	
P1071		Data table offset (words)	0	0	0	
P1072	Route 7	Class type	0	0	0	
P1073	class	Associated VCOM	0	0	0	
P1074	record 4	Offset in VCOM (bytes)	0	0	0	
P1075		Class length (bytes)	0	0	0	
P1076		Data table offset (words)	0	0	0	
P1077	Route 7	Class type	0	0	0	
P1078	class	Associated VCOM	0	0	0	
P1079	record 5	Offset in VCOM (bytes)	0	0	0	
P1080		Class length (bytes)	0	0	0	
P1081		Data table offset (words)	0	0	0	
P1082	Route 7	Class type	0	0	0	
P1083	class	Associated VCOM	0	0	0	
P1084	record 6	Offset in VCOM (bytes)	0	0	0	
P1085		Class length (bytes)	0	0	0	
P1086		Data table offset (words)	0	0	0	
P1087	Route 7	Class type	0	0	0	
P1088	class	Associated VCOM	0	0	0	
P1089	record 7	Offset in VCOM (bytes)	0	0	0	
P1090		Class length (bytes)	0	0	0	
P1091		Data table offset (words)	0	0	0	
P1092	Route 7	Class type	0	0	0	
P1093	class	Associated VCOM	0	0	0	
P1094	record 8	Offset in VCOM (bytes)	0	0	0	
P1095		Class length (bytes)	0	0	0	
P1096		Data table offset (words)	0	0	0	
P1097	Route 7	Class type	0	0	0	
P1098	class	Associated VCOM	0	0	0	
P1099	record 9	Offset in VCOM (bytes)	0	0	0	
P1100		Class length (bytes)	0	0	0	
P1101		Data table offset (words)	0	0	0	
P1102	Route 7	Class type	0	0	0	
P1103	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 Sw1=2	2 SW1=3	3 SW1=4	
P1104	record 10	Offset in VCOM (bytes)	0	0	0	
P1105		Class length (bytes)	0	0	0	
P1106		Data table offset (words)	0	0	0	
P1107	Route 7	Class type	0	0	0	
P1108	class	Associated VCOM	0	0	0	
P1109	record 11	Offset in VCOM (bytes)	0	0	0	
P1110		Class length (bytes)	0	0	0	
P1111		Data table offset (words)	0	0	0	

7.3.12 P1112-1175 Route 8 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1112	Route 8	Route compliance	0	0	0	
P1113	Def.n	ESP Trib. address	0	0	0	
P1114		Tx quantity (tables)	0	0	0	
P1115		Class quantity	0	0	0	
P1116	Route 8	Class type	0	0	0	
P1117	class	Associated VCOM	0	0	0	
P1118	record 0	Offset in VCOM (bytes)	0	0	0	
P1119		Class length (bytes)	0	0	0	
P1120		Data table offset (words)	0	0	0	
P1121	Route 8	Class type	0	0	0	
P1122	class	Associated VCOM	0	0	0	
P1123	record 1	Offset in VCOM (bytes)	0	0	0	
P1124		Class length (bytes)	0	0	0	
P1125		Data table offset (words)	0	0	0	
P1126	Route 8	Class type	0	0	0	
P1127	class	Associated VCOM	0	0	0	
P1128	record 2	Offset in VCOM (bytes)	0	0	0	
P1129		Class length (bytes)	0	0	0	
P1130		Data table offset (words)	0	0	0	
P1131	Route 8	Class type	0	0	0	
P1132	class	Associated VCOM	0	0	0	
P1133	record 3	Offset in VCOM (bytes)	0	0	0	
P1134		Class length (bytes)	0	0	0	
P1135		Data table offset (words)	0	0	0	
P1136	Route 8	Class type	0	0	0	
P1137	class	Associated VCOM	0	0	0	
P1138	record 4	Offset in VCOM (bytes)	0	0	0	
P1139		Class length (bytes)	0	0	0	
P1140		Data table offset (words)	0	0	0	
P1141	Route 8	Class type	0	0	0	
P1142	class	Associated VCOM	0	0	0	
P1143	record 5	Offset in VCOM (bytes)	0	0	0	
P1144		Class length (bytes)	0	0	0	
P1145		Data table offset (words)	0	0	0	
P1146	Route 8	Class type	0	0	0	
P1147	class	Associated VCOM	0	0	0	
P1148	record 6	Offset in VCOM (bytes)	0	0	0	
P1149		Class length (bytes)	0	0	0	
P1150		Data table offset (words)	0	0	0	
P1151	Route 8	Class type	0	0	0	
P1152	class	Associated VCOM	0	0	0	
P1153	record 7	Offset in VCOM (bytes)	0	0	0	
P1154		Class length (bytes)	0	0	0	
P1155		Data table offset (words)	0	0	0	
P1156	Route 8	Class type	0	0	0	
P1157	class	Associated VCOM	0	0	0	
P1158	record 8	Offset in VCOM (bytes)	0	0	0	
P1159		Class length (bytes)	0	0	0	
P1160		Data table offset (words)	0	0	0	
P1161	Route 8	Class type	0	0	0	
P1162	class	Associated VCOM	0	0	0	
P1163	record 9	Offset in VCOM (bytes)	0	0	0	
P1164		Class length (bytes)	0	0	0	
P1165		Data table offset (words)	0	0	0	
P1166	Route 8	Class type	0	0	0	
P1167	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1168	record 10	Offset in VCOM (bytes)	0	0	0	
P1169		Class length (bytes)	0	0	0	
P1170		Data table offset (words)	0	0	0	
P1171	Route 8	Class type	0	0	0	
P1172	class	Associated VCOM	0	0	0	
P1173	record 11	Offset in VCOM (bytes)	0	0	0	
P1174		Class length (bytes)	0	0	0	
P1175		Data table offset (words)	0	0	0	

7.3.13 P1176-1239 Route 9 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1176	Route 9	Route compliance	0	0	0	
P1177	Def.n	ESP Trib. address	0	0	0	
P1178		Tx quantity (tables)	0	0	0	
P1179		Class quantity	0	0	0	
P1180	Route 9	Class type	0	0	0	
P1181	class	Associated VCOM	0	0	0	
P1182	record 0	Offset in VCOM (bytes)	0	0	0	
P1183		Class length (bytes)	0	0	0	
P1184		Data table offset (words)	0	0	0	
P1185	Route 9	Class type	0	0	0	
P1186	class	Associated VCOM	0	0	0	
P1187	record 1	Offset in VCOM (bytes)	0	0	0	
P1188		Class length (bytes)	0	0	0	
P1189		Data table offset (words)	0	0	0	
P1190	Route 9	Class type	0	0	0	
P1191	class	Associated VCOM	0	0	0	
P1192	record 2	Offset in VCOM (bytes)	0	0	0	
P1193		Class length (bytes)	0	0	0	
P1194		Data table offset (words)	0	0	0	
P1195	Route 9	Class type	0	0	0	
P1196	class	Associated VCOM	0	0	0	
P1197	record 3	Offset in VCOM (bytes)	0	0	0	
P1198		Class length (bytes)	0	0	0	
P1199		Data table offset (words)	0	0	0	
P1200	Route 9	Class type	0	0	0	
P1201	class	Associated VCOM	0	0	0	
P1202	record 4	Offset in VCOM (bytes)	0	0	0	
P1203		Class length (bytes)	0	0	0	
P1204		Data table offset (words)	0	0	0	
P1205	Route 9	Class type	0	0	0	
P1206	class	Associated VCOM	0	0	0	
P1207	record 5	Offset in VCOM (bytes)	0	0	0	
P1208		Class length (bytes)	0	0	0	
P1209		Data table offset (words)	0	0	0	
P1210	Route 9	Class type	0	0	0	
P1211	class	Associated VCOM	0	0	0	
P1212	record 6	Offset in VCOM (bytes)	0	0	0	
P1213		Class length (bytes)	0	0	0	
P1214		Data table offset (words)	0	0	0	
P1215	Route 9	Class type	0	0	0	
P1216	class	Associated VCOM	0	0	0	
P1217	record 7	Offset in VCOM (bytes)	0	0	0	
P1218		Class length (bytes)	0	0	0	
P1219		Data table offset (words)	0	0	0	
P1220	Route 9	Class type	0	0	0	
P1221	class	Associated VCOM	0	0	0	
P1222	record 8	Offset in VCOM (bytes)	0	0	0	
P1223		Class length (bytes)	0	0	0	
P1224		Data table offset (words)	0	0	0	
P1225	Route 9	Class type	0	0	0	
P1226	class	Associated VCOM	0	0	0	
P1227	record 9	Offset in VCOM (bytes)	0	0	0	
P1228		Class length (bytes)	0	0	0	
P1229		Data table offset (words)	0	0	0	
P1230	Route 9	Class type	0	0	0	
P1231	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1232	record 10	Offset in VCOM (bytes)	0	0	0	
P1233		Class length (bytes)	0	0	0	
P1234		Data table offset (words)	0	0	0	
P1235	Route 9	Class type	0	0	0	
P1236	class	Associated VCOM	0	0	0	
P1237	record 11	Offset in VCOM (bytes)	0	0	0	
P1238		Class length (bytes)	0	0	0	
P1239		Data table offset (words)	0	0	0	

7.3.14 P1240-1303 Route 10 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1240	Route 10	Route compliance	0	0	0	
P1241	Def.n	ESP Trib. address	0	0	0	
P1242		Tx quantity (tables)	0	0	0	
P1243		Class quantity	0	0	0	
P1244	Route 10	Class type	0	0	0	
P1245	class	Associated VCOM	0	0	0	
P1246	record 0	Offset in VCOM (bytes)	0	0	0	
P1247		Class length (bytes)	0	0	0	
P1248		Data table offset (words)	0	0	0	
P1249	Route 10	Class type	0	0	0	
P1250	class	Associated VCOM	0	0	0	
P1251	record 1	Offset in VCOM (bytes)	0	0	0	
P1252		Class length (bytes)	0	0	0	
P1253		Data table offset (words)	0	0	0	
P1254	Route 10	Class type	0	0	0	
P1255	class	Associated VCOM	0	0	0	
P1256	record 2	Offset in VCOM (bytes)	0	0	0	
P1257		Class length (bytes)	0	0	0	
P1258		Data table offset (words)	0	0	0	
P1259	Route 10	Class type	0	0	0	
P1260	class	Associated VCOM	0	0	0	
P1261	record 3	Offset in VCOM (bytes)	0	0	0	
P1262		Class length (bytes)	0	0	0	
P1263		Data table offset (words)	0	0	0	
P1264	Route 10	Class type	0	0	0	
P1265	class	Associated VCOM	0	0	0	
P1266	record 4	Offset in VCOM (bytes)	0	0	0	
P1267		Class length (bytes)	0	0	0	
P1268		Data table offset (words)	0	0	0	
P1269	Route 10	Class type	0	0	0	
P1270	class	Associated VCOM	0	0	0	
P1271	record 5	Offset in VCOM (bytes)	0	0	0	
P1272		Class length (bytes)	0	0	0	
P1273		Data table offset (words)	0	0	0	
P1274	Route 10	Class type	0	0	0	
P1275	class	Associated VCOM	0	0	0	
P1276	record 6	Offset in VCOM (bytes)	0	0	0	
P1277		Class length (bytes)	0	0	0	
P1278		Data table offset (words)	0	0	0	
P1279	Route 10	Class type	0	0	0	
P1280	class	Associated VCOM	0	0	0	
P1281	record 7	Offset in VCOM (bytes)	0	0	0	
P1282		Class length (bytes)	0	0	0	
P1283		Data table offset (words)	0	0	0	
P1284	Route 10	Class type	0	0	0	
P1285	class	Associated VCOM	0	0	0	
P1286	record 8	Offset in VCOM (bytes)	0	0	0	
P1287		Class length (bytes)	0	0	0	
P1288		Data table offset (words)	0	0	0	
P1289	Route 10	Class type	0	0	0	
P1290	class	Associated VCOM	0	0	0	
P1291	record 9	Offset in VCOM (bytes)	0	0	0	
P1292		Class length (bytes)	0	0	0	
P1293		Data table offset (words)	0	0	0	
P1294	Route 10	Class type	0	0	0	
P1295	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1296	record 10	Offset in VCOM (bytes)	0	0	0	
P1297		Class length (bytes)	0	0	0	
P1298		Data table offset (words)	0	0	0	
P1299	Route 10	Class type	0	0	0	
P1300	class	Associated VCOM	0	0	0	
P1301	record 11	Offset in VCOM (bytes)	0	0	0	
P1302		Class length (bytes)	0	0	0	
P1303		Data table offset (words)	0	0	0	

7.3.15 P1304-1367 Route 11 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1304	Route 11	Route compliance	0	0	0	
P1305	Def.n	ESP Trib. address	0	0	0	
P1306		Tx quantity (tables)	0	0	0	
P1307		Class quantity	0	0	0	
P1308	Route 11	Class type	0	0	0	
P1309	class	Associated VCOM	0	0	0	
P1310	record 0	Offset in VCOM (bytes)	0	0	0	
P1311		Class length (bytes)	0	0	0	
P1312		Data table offset (words)	0	0	0	
P1313	Route 11	Class type	0	0	0	
P1314	class	Associated VCOM	0	0	0	
P1315	record 1	Offset in VCOM (bytes)	0	0	0	
P1316		Class length (bytes)	0	0	0	
P1317		Data table offset (words)	0	0	0	
P1318	Route 11	Class type	0	0	0	
P1319	class	Associated VCOM	0	0	0	
P1320	record 2	Offset in VCOM (bytes)	0	0	0	
P1321		Class length (bytes)	0	0	0	
P1322		Data table offset (words)	0	0	0	
P1323	Route 11	Class type	0	0	0	
P1324	class	Associated VCOM	0	0	0	
P1325	record 3	Offset in VCOM (bytes)	0	0	0	
P1326		Class length (bytes)	0	0	0	
P1327		Data table offset (words)	0	0	0	
P1328	Route 11	Class type	0	0	0	
P1329	class	Associated VCOM	0	0	0	
P1330	record 4	Offset in VCOM (bytes)	0	0	0	
P1331		Class length (bytes)	0	0	0	
P1332		Data table offset (words)	0	0	0	
P1333	Route 11	Class type	0	0	0	
P1334	class	Associated VCOM	0	0	0	
P1335	record 5	Offset in VCOM (bytes)	0	0	0	
P1336		Class length (bytes)	0	0	0	
P1337		Data table offset (words)	0	0	0	
P1338	Route 11	Class type	0	0	0	
P1339	class	Associated VCOM	0	0	0	
P1340	record 6	Offset in VCOM (bytes)	0	0	0	
P1341		Class length (bytes)	0	0	0	
P1342		Data table offset (words)	0	0	0	
P1343	Route 11	Class type	0	0	0	
P1344	class	Associated VCOM	0	0	0	
P1345	record 7	Offset in VCOM (bytes)	0	0	0	
P1346		Class length (bytes)	0	0	0	
P1347		Data table offset (words)	0	0	0	
P1348	Route 11	Class type	0	0	0	
P1349	class	Associated VCOM	0	0	0	
P1350	record 8	Offset in VCOM (bytes)	0	0	0	
P1351		Class length (bytes)	0	0	0	
P1352		Data table offset (words)	0	0	0	
P1353	Route 11	Class type	0	0	0	
P1354	class	Associated VCOM	0	0	0	
P1355	record 9	Offset in VCOM (bytes)	0	0	0	
P1356		Class length (bytes)	0	0	0	
P1357		Data table offset (words)	0	0	0	
P1358	Route 11	Class type	0	0	0	
P1359	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1360	record 10	Offset in VCOM (bytes)	0	0	0	
P1361		Class length (bytes)	0	0	0	
P1362		Data table offset (words)	0	0	0	
P1363	Route 11	Class type	0	0	0	
P1364	class	Associated VCOM	0	0	0	
P1365	record 11	Offset in VCOM (bytes)	0	0	0	
P1366		Class length (bytes)	0	0	0	
P1367		Data table offset (words)	0	0	0	

7.3.16 P1368-1431 Route 12 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1368	Route 12	Route compliance	0	0	0	
P1369	Def.n	ESP Trib. address	0	0	0	
P1370		Tx quantity (tables)	0	0	0	
P1371		Class quantity	0	0	0	
P1372	Route 12	Class type	0	0	0	
P1373	class	Associated VCOM	0	0	0	
P1374	record 0	Offset in VCOM (bytes)	0	0	0	
P1375		Class length (bytes)	0	0	0	
P1376		Data table offset (words)	0	0	0	
P1377	Route 12	Class type	0	0	0	
P1378	class	Associated VCOM	0	0	0	
P1379	record 1	Offset in VCOM (bytes)	0	0	0	
P1380		Class length (bytes)	0	0	0	
P1381		Data table offset (words)	0	0	0	
P1382	Route 12	Class type	0	0	0	
P1383	class	Associated VCOM	0	0	0	
P1384	record 2	Offset in VCOM (bytes)	0	0	0	
P1385		Class length (bytes)	0	0	0	
P1386		Data table offset (words)	0	0	0	
P1387	Route 12	Class type	0	0	0	
P1388	class	Associated VCOM	0	0	0	
P1389	record 3	Offset in VCOM (bytes)	0	0	0	
P1390		Class length (bytes)	0	0	0	
P1391		Data table offset (words)	0	0	0	
P1392	Route 12	Class type	0	0	0	
P1393	class	Associated VCOM	0	0	0	
P1394	record 4	Offset in VCOM (bytes)	0	0	0	
P1395		Class length (bytes)	0	0	0	
P1396		Data table offset (words)	0	0	0	
P1397	Route 12	Class type	0	0	0	
P1398	class	Associated VCOM	0	0	0	
P1399	record 5	Offset in VCOM (bytes)	0	0	0	
P1400		Class length (bytes)	0	0	0	
P1401		Data table offset (words)	0	0	0	
P1402	Route 12	Class type	0	0	0	
P1403	class	Associated VCOM	0	0	0	
P1404	record 6	Offset in VCOM (bytes)	0	0	0	
P1405		Class length (bytes)	0	0	0	
P1406		Data table offset (words)	0	0	0	
P1407	Route 12	Class type	0	0	0	
P1408	class	Associated VCOM	0	0	0	
P1409	record 7	Offset in VCOM (bytes)	0	0	0	
P1410		Class length (bytes)	0	0	0	
P1411		Data table offset (words)	0	0	0	
P1412	Route 12	Class type	0	0	0	
P1413	class	Associated VCOM	0	0	0	
P1414	record 8	Offset in VCOM (bytes)	0	0	0	
P1415		Class length (bytes)	0	0	0	
P1416		Data table offset (words)	0	0	0	
P1417	Route 12	Class type	0	0	0	
P1418	class	Associated VCOM	0	0	0	
P1419	record 9	Offset in VCOM (bytes)	0	0	0	
P1420		Class length (bytes)	0	0	0	
P1421		Data table offset (words)	0	0	0	
P1422	Route 12	Class type	0	0	0	
P1423	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1424	record 10	Offset in VCOM (bytes)	0	0	0	
P1425		Class length (bytes)	0	0	0	
P1426		Data table offset (words)	0	0	0	
P1427	Route 12	Class type	0	0	0	
P1428	class	Associated VCOM	0	0	0	
P1429	record 11	Offset in VCOM (bytes)	0	0	0	
P1430		Class length (bytes)	0	0	0	
P1431		Data table offset (words)	0	0	0	

7.3.17 P1432-1495 Route 13 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1432	Route 13	Route compliance	0	0	0	
P1433	Def.n	ESP Trib. address	0	0	0	
P1434		Tx quantity (tables)	0	0	0	
P1435		Class quantity	0	0	0	
P1436	Route 13	Class type	0	0	0	
P1437	class	Associated VCOM	0	0	0	
P1438	record 0	Offset in VCOM (bytes)	0	0	0	
P1439		Class length (bytes)	0	0	0	
P1440		Data table offset (words)	0	0	0	
P1441	Route 13	Class type	0	0	0	
P1442	class	Associated VCOM	0	0	0	
P1443	record 1	Offset in VCOM (bytes)	0	0	0	
P1444		Class length (bytes)	0	0	0	
P1445		Data table offset (words)	0	0	0	
P1446	Route 13	Class type	0	0	0	
P1447	class	Associated VCOM	0	0	0	
P1448	record 2	Offset in VCOM (bytes)	0	0	0	
P1449		Class length (bytes)	0	0	0	
P1450		Data table offset (words)	0	0	0	
P1451	Route 13	Class type	0	0	0	
P1452	class	Associated VCOM	0	0	0	
P1453	record 3	Offset in VCOM (bytes)	0	0	0	
P1454		Class length (bytes)	0	0	0	
P1455		Data table offset (words)	0	0	0	
P1456	Route 13	Class type	0	0	0	
P1457	class	Associated VCOM	0	0	0	
P1458	record 4	Offset in VCOM (bytes)	0	0	0	
P1459		Class length (bytes)	0	0	0	
P1460		Data table offset (words)	0	0	0	
P1461	Route 13	Class type	0	0	0	
P1462	class	Associated VCOM	0	0	0	
P1463	record 5	Offset in VCOM (bytes)	0	0	0	
P1464		Class length (bytes)	0	0	0	
P1465		Data table offset (words)	0	0	0	
P1466	Route 13	Class type	0	0	0	
P1467	class	Associated VCOM	0	0	0	
P1468	record 6	Offset in VCOM (bytes)	0	0	0	
P1469		Class length (bytes)	0	0	0	
P1470		Data table offset (words)	0	0	0	
P1471	Route 13	Class type	0	0	0	
P1472	class	Associated VCOM	0	0	0	
P1473	record 7	Offset in VCOM (bytes)	0	0	0	
P1474		Class length (bytes)	0	0	0	
P1475		Data table offset (words)	0	0	0	
P1476	Route 13	Class type	0	0	0	
P1477	class	Associated VCOM	0	0	0	
P1478	record 8	Offset in VCOM (bytes)	0	0	0	
P1479		Class length (bytes)	0	0	0	
P1480		Data table offset (words)	0	0	0	
P1481	Route 13	Class type	0	0	0	
P1482	class	Associated VCOM	0	0	0	
P1483	record 9	Offset in VCOM (bytes)	0	0	0	
P1484		Class length (bytes)	0	0	0	
P1485		Data table offset (words)	0	0	0	
P1486	Route 13	Class type	0	0	0	
P1487	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1488	record 10	Offset in VCOM (bytes)	0	0	0	
P1489		Class length (bytes)	0	0	0	
P1490		Data table offset (words)	0	0	0	
P1491	Route 13	Class type	0	0	0	
P1492	class	Associated VCOM	0	0	0	
P1493	record 11	Offset in VCOM (bytes)	0	0	0	
P1494		Class length (bytes)	0	0	0	
P1495		Data table offset (words)	0	0	0	

7.3.18 P1496-1559 Route 14 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1496	Route 14	Route compliance	0	0	0	
P1497	Def.n	ESP Trib. address	0	0	0	
P1498		Tx quantity (tables)	0	0	0	
P1499		Class quantity	0	0	0	
P1500	Route 14	Class type	0	0	0	
P1501	class	Associated VCOM	0	0	0	
P1502	record 0	Offset in VCOM (bytes)	0	0	0	
P1503		Class length (bytes)	0	0	0	
P1504		Data table offset (words)	0	0	0	
P1505	Route 14	Class type	0	0	0	
P1506	class	Associated VCOM	0	0	0	
P1507	record 1	Offset in VCOM (bytes)	0	0	0	
P1508		Class length (bytes)	0	0	0	
P1509		Data table offset (words)	0	0	0	
P1510	Route 14	Class type	0	0	0	
P1511	class	Associated VCOM	0	0	0	
P1512	record 2	Offset in VCOM (bytes)	0	0	0	
P1513		Class length (bytes)	0	0	0	
P1514		Data table offset (words)	0	0	0	
P1515	Route 14	Class type	0	0	0	
P1516	class	Associated VCOM	0	0	0	
P1517	record 3	Offset in VCOM (bytes)	0	0	0	
P1518		Class length (bytes)	0	0	0	
P1519		Data table offset (words)	0	0	0	
P1520	Route 14	Class type	0	0	0	
P1521	class	Associated VCOM	0	0	0	
P1522	record 4	Offset in VCOM (bytes)	0	0	0	
P1523		Class length (bytes)	0	0	0	
P1524		Data table offset (words)	0	0	0	
P1525	Route 14	Class type	0	0	0	
P1526	class	Associated VCOM	0	0	0	
P1527	record 5	Offset in VCOM (bytes)	0	0	0	
P1528		Class length (bytes)	0	0	0	
P1529		Data table offset (words)	0	0	0	
P1530	Route 14	Class type	0	0	0	
P1531	class	Associated VCOM	0	0	0	
P1532	record 6	Offset in VCOM (bytes)	0	0	0	
P1533		Class length (bytes)	0	0	0	
P1534		Data table offset (words)	0	0	0	
P1535	Route 14	Class type	0	0	0	
P1536	class	Associated VCOM	0	0	0	
P1537	record 7	Offset in VCOM (bytes)	0	0	0	
P1538		Class length (bytes)	0	0	0	
P1539		Data table offset (words)	0	0	0	
P1540	Route 14	Class type	0	0	0	
P1541	class	Associated VCOM	0	0	0	
P1542	record 8	Offset in VCOM (bytes)	0	0	0	
P1543		Class length (bytes)	0	0	0	
P1544		Data table offset (words)	0	0	0	
P1545	Route 14	Class type	0	0	0	
P1546	class	Associated VCOM	0	0	0	
P1547	record 9	Offset in VCOM (bytes)	0	0	0	
P1548		Class length (bytes)	0	0	0	
P1549		Data table offset (words)	0	0	0	
P1550	Route 14	Class type	0	0	0	
P1551	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1552	record 10	Offset in VCOM (bytes)	0	0	0	
P1553		Class length (bytes)	0	0	0	
P1554		Data table offset (words)	0	0	0	
P1555	Route 14	Class type	0	0	0	
P1556	class	Associated VCOM	0	0	0	
P1557	record 11	Offset in VCOM (bytes)	0	0	0	
P1558		Class length (bytes)	0	0	0	
P1559		Data table offset (words)	0	0	0	

7.3.19 P1560-1623 Route 15 Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1560	Route 15	Route compliance	0	0	0	
P1561	Def.n	ESP Trib. address	0	0	0	
P1562		Tx quantity (tables)	0	0	0	
P1563		Class quantity	0	0	0	
P1564	Route 15	Class type	0	0	0	
P1565	class	Associated VCOM	0	0	0	
P1566	record 0	Offset in VCOM (bytes)	0	0	0	
P1567		Class length (bytes)	0	0	0	
P1568		Data table offset (words)	0	0	0	
P1569	Route 15	Class type	0	0	0	
P1570	class	Associated VCOM	0	0	0	
P1571	record 1	Offset in VCOM (bytes)	0	0	0	
P1572		Class length (bytes)	0	0	0	
P1573		Data table offset (words)	0	0	0	
P1574	Route 15	Class type	0	0	0	
P1575	class	Associated VCOM	0	0	0	
P1576	record 2	Offset in VCOM (bytes)	0	0	0	
P1577		Class length (bytes)	0	0	0	
P1578		Data table offset (words)	0	0	0	
P1579	Route 15	Class type	0	0	0	
P1580	class	Associated VCOM	0	0	0	
P1581	record 3	Offset in VCOM (bytes)	0	0	0	
P1582		Class length (bytes)	0	0	0	
P1583		Data table offset (words)	0	0	0	
P1584	Route 15	Class type	0	0	0	
P1585	class	Associated VCOM	0	0	0	
P1586	record 4	Offset in VCOM (bytes)	0	0	0	
P1587		Class length (bytes)	0	0	0	
P1588		Data table offset (words)	0	0	0	
P1589	Route 15	Class type	0	0	0	
P1590	class	Associated VCOM	0	0	0	
P1591	record 5	Offset in VCOM (bytes)	0	0	0	
P1592		Class length (bytes)	0	0	0	
P1593		Data table offset (words)	0	0	0	
P1594	Route 15	Class type	0	0	0	
P1595	class	Associated VCOM	0	0	0	
P1596	record 6	Offset in VCOM (bytes)	0	0	0	
P1597		Class length (bytes)	0	0	0	
P1598		Data table offset (words)	0	0	0	
P1599	Route 15	Class type	0	0	0	
P1600	class	Associated VCOM	0	0	0	
P1601	record 7	Offset in VCOM (bytes)	0	0	0	
P1602		Class length (bytes)	0	0	0	
P1603		Data table offset (words)	0	0	0	
P1604	Route 15	Class type	0	0	0	
P1605	class	Associated VCOM	0	0	0	
P1606	record 8	Offset in VCOM (bytes)	0	0	0	
P1607		Class length (bytes)	0	0	0	
P1608		Data table offset (words)	0	0	0	
P1609	Route 15	Class type	0	0	0	
P1610	class	Associated VCOM	0	0	0	
P1611	record 9	Offset in VCOM (bytes)	0	0	0	
P1612		Class length (bytes)	0	0	0	
P1613		Data table offset (words)	0	0	0	
P1614	Route 15	Class type	0	0	0	
P1615	class	Associated VCOM	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1616	record 10	Offset in VCOM (bytes)	0	0	0	
P1617		Class length (bytes)	0	0	0	
P1618		Data table offset (words)	0	0	0	
P1619	Route 15	Class type	0	0	0	
P1620	class	Associated VCOM	0	0	0	
P1621	record 11	Offset in VCOM (bytes)	0	0	0	
P1622		Class length (bytes)	0	0	0	
P1623		Data table offset (words)	0	0	0	

7.3.20 P1624-1639 Fault Tolerance When Entering RUNNING LOCKED Mode

Table	Description	In-built Configurations			User Configuration
		1 SW1=2	2 SW1=3	3 SW1=4	
P1624	Fault tolerance route 0 (ms)	3600	3600	0	
P1625	Fault tolerance route 1 (ms)	0	3600	0	
P1626	Fault tolerance route 2 (ms)	0	3600	0	
P1627	Fault tolerance route 3 (ms)	0	3600	0	
P1628	Fault tolerance route 4 (ms)	0	3600	0	
P1629	Fault tolerance route 5 (ms)	0	3600	0	
P1630	Fault tolerance route 6 (ms)	0	0	0	
P1631	Fault tolerance route 7 (ms)	0	0	0	
P1632	Fault tolerance route 8 (ms)	0	0	0	
P1633	Fault tolerance route 9 (ms)	0	0	0	
P1634	Fault tolerance route 10 (ms)	0	0	0	
P1635	Fault tolerance route 11 (ms)	0	0	0	
P1636	Fault tolerance route 12 (ms)	0	0	0	
P1637	Fault tolerance route 13 (ms)	0	0	0	
P1638	Fault tolerance route 14 (ms)	0	0	0	
P1639	Fault tolerance route 15 (ms)	0	0	0	

7.3.21 P1640-1807 Scaling/Conversion In-built Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1640	Network	Current scaling	10000	10000	0	
P1641	wide	Frequency scaling	10000	10000	0	
P1642		(Reserved)	10000	10000	0	
P1643		Angular speed scaling	10000	10000	0	
P1644		Power scaling	10000	10000	0	
P1645		Torque scaling	10000	10000	0	
P1646		Voltage scaling	10000	10000	0	
P1647		Flux scaling	10000	10000	0	
P1648	Route 0	Current conversion	5000	5000	0	
P1649		Frequency conversion	5000	5000	0	
P1650		(Reserved)	5000	5000	0	
P1651		Angular speed conversion	5000	5000	0	
P1652		Power conversion	5000	5000	0	
P1653		Torque conversion	5000	5000	0	
P1654		Voltage conversion	5000	5000	0	
P1655		Flux conversion	5000	5000	0	
P1656		Full load current	100	100	0	
P1657		Percentage overrating	50	50	0	
P1658	Route 1	Current conversion	0	5000	0	
P1659		Frequency conversion	0	5000	0	
P1660		(Reserved)	0	5000	0	
P1661		Angular speed conversion	0	5000	0	
P1662		Power conversion	0	5000	0	
P1663		Torque conversion	0	5000	0	
P1664		Voltage conversion	0	5000	0	
P1665		Flux conversion	0	5000	0	
P1666		Full load current	0	100	0	
P1667		Percentage overrating	0	50	0	
P1668	Route 2	Current conversion	0	5000	0	
P1669		Frequency conversion	0	5000	0	
P1670		(Reserved)	0	5000	0	
P1671		Angular speed conversion	0	5000	0	
P1672		Power conversion	0	5000	0	
P1673		Torque conversion	0	5000	0	
P1674		Voltage conversion	0	5000	0	
P1675		Flux conversion	0	5000	0	
P1676		Full load current	0	100	0	
P1677		Percentage overrating	0	50	0	
P1678	Route 3	Current conversion	0	5000	0	
P1679		Frequency conversion	0	5000	0	
P1680		(Reserved)	0	5000	0	
P1681		Angular speed conversion	0	5000	0	
P1682		Power conversion	0	5000	0	
P1683		Torque conversion	0	5000	0	
P1684		Voltage conversion	0	5000	0	
P1685		Flux conversion	0	5000	0	
P1686		Full load current	0	100	0	
P1687		Percentage overrating	0	50	0	
P1688	Route 4	Current conversion	0	5000	0	
P1689		Frequency conversion	0	5000	0	
P1690		(Reserved)	0	5000	0	
P1691		Angular speed conversion	0	5000	0	
P1692		Power conversion	0	5000	0	
P1693		Torque conversion	0	5000	0	
P1694		Voltage conversion	0	5000	0	
P1695		Flux conversion	0	5000	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1696		Full load current	0	100	0	
P1697		Percentage overrating	0	50	0	
P1698	Route 5	Current conversion	0	5000	0	
P1699		Frequency conversion	0	5000	0	
P1700		(Reserved)	0	5000	0	
P1701		Angular speed conversion	0	5000	0	
P1702		Power conversion	0	5000	0	
P1703		Torque conversion	0	5000	0	
P1704		Voltage conversion	0	5000	0	
P1705		Flux conversion	0	5000	0	
P1706		Full load current	0	100	0	
P1707		Percentage overrating	0	50	0	
P1708	Route 6	Current conversion	0	0	0	
P1709		Frequency conversion	0	0	0	
P1710		(Reserved)	0	0	0	
P1711		Angular speed conversion	0	0	0	
P1712		Power conversion	0	0	0	
P1713		Torque conversion	0	0	0	
P1714		Voltage conversion	0	0	0	
P1715		Flux conversion	0	0	0	
P1716		Full load current	0	0	0	
P1717		Percentage overrating	0	0	0	
P1718	Route 7	Current conversion	0	0	0	
P1719		Frequency conversion	0	0	0	
P1720		(Reserved)	0	0	0	
P1721		Angular speed conversion	0	0	0	
P1722		Power conversion	0	0	0	
P1723		Torque conversion	0	0	0	
P1724		Voltage conversion	0	0	0	
P1725		Flux conversion	0	0	0	
P1726		Full load current	0	0	0	
P1727		Percentage overrating	0	0	0	
P1728	Route 8	Current conversion	0	0	0	
P1729		Frequency conversion	0	0	0	
P1730		(Reserved)	0	0	0	
P1731		Angular speed conversion	0	0	0	
P1732		Power conversion	0	0	0	
P1733		Torque conversion	0	0	0	
P1734		Voltage conversion	0	0	0	
P1735		Flux conversion	0	0	0	
P1736		Full load current	0	0	0	
P1737		Percentage overrating	0	0	0	
P1738	Route 9	Current conversion	0	0	0	
P1739		Frequency conversion	0	0	0	
P1740		(Reserved)	0	0	0	
P1741		Angular speed conversion	0	0	0	
P1742		Power conversion	0	0	0	
P1743		Torque conversion	0	0	0	
P1744		Voltage conversion	0	0	0	
P1745		Flux conversion	0	0	0	
P1746		Full load current	0	0	0	
P1747		Percentage overrating	0	0	0	
P1748	Route 10	Current conversion	0	0	0	
P1749		Frequency conversion	0	0	0	
P1750		(Reserved)	0	0	0	
P1751		Angular speed conversion	0	0	0	
P1752		Power conversion	0	0	0	
P1753		Torque conversion	0	0	0	
P1754		Voltage conversion	0	0	0	
P1755		Flux conversion	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1756		Full load current	0	0	0	
P1757		Percentage overrating	0	0	0	
P1758	Route 11	Current conversion	0	0	0	
P1759		Frequency conversion	0	0	0	
P1760		(Reserved)	0	0	0	
P1761		Angular speed conversion	0	0	0	
P1762		Power conversion	0	0	0	
P1763		Torque conversion	0	0	0	
P1764		Voltage conversion	0	0	0	
P1765		Flux conversion	0	0	0	
P1766		Full load current	0	0	0	
P1767		Percentage overrating	0	0	0	
P1768	Route 12	Current conversion	0	0	0	
P1769		Frequency conversion	0	0	0	
P1770		(Reserved)	0	0	0	
P1771		Angular speed conversion	0	0	0	
P1772		Power conversion	0	0	0	
P1773		Torque conversion	0	0	0	
P1774		Voltage conversion	0	0	0	
P1775		Flux conversion	0	0	0	
P1776		Full load current	0	0	0	
P1777		Percentage overrating	0	0	0	
P1778	Route 13	Current conversion	0	0	0	
P1779		Frequency conversion	0	0	0	
P1780		(Reserved)	0	0	0	
P1781		Angular speed conversion	0	0	0	
P1782		Power conversion	0	0	0	
P1783		Torque conversion	0	0	0	
P1784		Voltage conversion	0	0	0	
P1785		Flux conversion	0	0	0	
P1786		Full load current	0	0	0	
P1787		Percentage overrating	0	0	0	
P1788	Route 14	Current conversion	0	0	0	
P1789		Frequency conversion	0	0	0	
P1790		(Reserved)	0	0	0	
P1791		Angular speed conversion	0	0	0	
P1792		Power conversion	0	0	0	
P1793		Torque conversion	0	0	0	
P1794		Voltage conversion	0	0	0	
P1795		Flux conversion	0	0	0	
P1796		Full load current	0	0	0	
P1797		Percentage overrating	0	0	0	
P1798	Route 15	Current conversion	0	0	0	
P1799		Frequency conversion	0	0	0	
P1800		(Reserved)	0	0	0	
P1801		Angular speed conversion	0	0	0	
P1802		Power conversion	0	0	0	
P1803		Torque conversion	0	0	0	
P1804		Voltage conversion	0	0	0	
P1805		Flux conversion	0	0	0	
P1806		Full load current	0	0	0	
P1807		Percentage overrating	0	0	0	

7.3.22 P1808-1935 Freeze/Fallback In-built Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1808	Route	Orders freeze/f'back select word 1	0	0	0	
P1809	0	Orders freeze/f'back select word 2	0	0	0	
P1810		Setpoints freeze/f'back select	0	0	0	
P1811		Orders fallback value word 1	4	4	0	
P1812		Orders fallback value word 2	0	0	0	
P1813		Upper current limit fallback	5000	5000	0	
P1814		Speed reference fallback	5000	5000	0	
P1815		Main electromag. torque ref. f'back	5000	5000	0	
P1816	Route	Orders freeze/f'back select word 1	0	0	0	
P1817	1	Orders freeze/f'back select word 2	0	0	0	
P1818		Setpoints freeze/f'back select	0	0	0	
P1819		Orders fallback value word 1	0	4	0	
P1820		Orders fallback value word 2	0	0	0	
P1821		Upper current limit fallback	0	5000	0	
P1822		Speed reference fallback	0	5000	0	
P1823		Main electromag. torque ref. f'back	0	5000	0	
P1824	Route	Orders freeze/f'back select word 1	0	0	0	
P1825	2	Orders freeze/f'back select word 2	0	0	0	
P1826		Setpoints freeze/f'back select	0	0	0	
P1827		Orders fallback value word 1	0	4	0	
P1828		Orders fallback value word 2	0	0	0	
P1829		Upper current limit fallback	0	5000	0	
P1830		Speed reference fallback	0	5000	0	
P1831		Main electromag. torque ref. f'back	0	5000	0	
P1832	Route	Orders freeze/f'back select word 1	0	0	0	
P1833	3	Orders freeze/f'back select word 2	0	0	0	
P1834		Setpoints freeze/f'back select	0	0	0	
P1835		Orders fallback value word 1	0	4	0	
P1836		Orders fallback value word 2	0	0	0	
P1837		Upper current limit fallback	0	5000	0	
P1838		Speed reference fallback	0	5000	0	
P1839		Main electromag. torque ref. f'back	0	5000	0	
P1840	Route	Orders freeze/f'back select word 1	0	0	0	
P1841	4	Orders freeze/f'back select word 2	0	0	0	
P1842		Setpoints freeze/f'back select	0	0	0	
P1843		Orders fallback value word 1	0	4	0	
P1844		Orders fallback value word 2	0	0	0	
P1845		Upper current limit fallback	0	5000	0	
P1846		Speed reference fallback	0	5000	0	
P1847		Main electromag. torque ref. f'back	0	5000	0	
P1848	Route	Orders freeze/f'back select word 1	0	0	0	
P1849	5	Orders freeze/f'back select word 2	0	0	0	
P1850		Setpoints freeze/f'back select	0	0	0	
P1851		Orders fallback value word 1	0	4	0	
P1852		Orders fallback value word 2	0	0	0	
P1853		Upper current limit fallback	0	5000	0	
P1854		Speed reference fallback	0	5000	0	
P1855		Main electromag. torque ref. f'back	0	5000	0	
P1856	Route	Orders freeze/f'back select word 1	0	0	0	
P1857	6	Orders freeze/f'back select word 2	0	0	0	
P1858		Setpoints freeze/f'back select	0	0	0	
P1859		Orders fallback value word 1	0	0	0	
P1860		Orders fallback value word 2	0	0	0	
P1861		Upper current limit fallback	0	0	0	
P1862		Speed reference fallback	0	0	0	
P1863		Main electromag. torque ref. f'back	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1864	Route	Orders freeze/f'back select word 1	0	0	0	
P1865	7	Orders freeze/f'back select word 2	0	0	0	
P1866		Setpoints freeze/f'back select	0	0	0	
P1867		Orders fallback value word 1	0	0	0	
P1868		Orders fallback value word 2	0	0	0	
P1869		Upper current limit fallback	0	0	0	
P1870		Speed reference fallback	0	0	0	
P1871		Main electromag. torque ref. f'back	0	0	0	
P1872	Route	Orders freeze/f'back select word 1	0	0	0	
P1873	8	Orders freeze/f'back select word 2	0	0	0	
P1874		Setpoints freeze/f'back select	0	0	0	
P1875		Orders fallback value word 1	0	0	0	
P1876		Orders fallback value word 2	0	0	0	
P1877		Upper current limit fallback	0	0	0	
P1878		Speed reference fallback	0	0	0	
P1879		Main electromag. torque ref. f'back	0	0	0	
P1880	Route	Orders freeze/f'back select word 1	0	0	0	
P1881	9	Orders freeze/f'back select word 2	0	0	0	
P1882		Setpoints freeze/f'back select	0	0	0	
P1883		Orders fallback value word 1	0	0	0	
P1884		Orders fallback value word 2	0	0	0	
P1885		Upper current limit fallback	0	0	0	
P1886		Speed reference fallback	0	0	0	
P1887		Main electromag. torque ref. f'back	0	0	0	
P1888	Route	Orders freeze/f'back select word 1	0	0	0	
P1889	10	Orders freeze/f'back select word 2	0	0	0	
P1890		Setpoints freeze/f'back select	0	0	0	
P1891		Orders fallback value word 1	0	0	0	
P1892		Orders fallback value word 2	0	0	0	
P1893		Upper current limit fallback	0	0	0	
P1894		Speed reference fallback	0	0	0	
P1895		Main electromag. torque ref. f'back	0	0	0	
P1896	Route	Orders freeze/f'back select word 1	0	0	0	
P1897	11	Orders freeze/f'back select word 2	0	0	0	
P1898		Setpoints freeze/f'back select	0	0	0	
P1899		Orders fallback value word 1	0	0	0	
P1900		Orders fallback value word 2	0	0	0	
P1901		Upper current limit fallback	0	0	0	
P1902		Speed reference fallback	0	0	0	
P1903		Main electromag. torque ref. f'back	0	0	0	
P1904	Route	Orders freeze/f'back select word 1	0	0	0	
P1905	12	Orders freeze/f'back select word 2	0	0	0	
P1906		Setpoints freeze/f'back select	0	0	0	
P1907		Orders fallback value word 1	0	0	0	
P1908		Orders fallback value word 2	0	0	0	
P1909		Upper current limit fallback	0	0	0	
P1910		Speed reference fallback	0	0	0	
P1911		Main electromag. torque ref. f'back	0	0	0	
P1912	Route	Orders freeze/f'back select word 1	0	0	0	
P1913	13	Orders freeze/f'back select word 2	0	0	0	
P1914		Setpoints freeze/f'back select	0	0	0	
P1915		Orders fallback value word 1	0	0	0	
P1916		Orders fallback value word 2	0	0	0	
P1917		Upper current limit fallback	0	0	0	
P1918		Speed reference fallback	0	0	0	
P1919		Main electromag. torque ref. f'back	0	0	0	
P1920	Route	Orders freeze/f'back select word 1	0	0	0	
P1921	14	Orders freeze/f'back select word 2	0	0	0	
P1922		Setpoints freeze/f'back select	0	0	0	
P1923		Orders fallback value word 1	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1924		Orders fallback value word 2	0	0	0	
P1925		Upper current limit fallback	0	0	0	
P1926		Speed reference fallback	0	0	0	
P1927		Main electromag. torque ref. f'back	0	0	0	
P1928	Route	Orders freeze/f'back select word 1	0	0	0	
P1929	15	Orders freeze/f'back select word 2	0	0	0	
P1930		Setpoints freeze/f'back select	0	0	0	
P1931		Orders fallback value word 1	0	0	0	
P1932		Orders fallback value word 2	0	0	0	
P1933		Upper current limit fallback	0	0	0	
P1934		Speed reference fallback	0	0	0	
P1935		Main electromag. torque ref. f'back	0	0	0	

7.3.23 P1936-2033 Position Control In-built Configuration

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1936	Network	Length scaling (low word)	0	0	0	
P1937	wide	Length scaling (high word)	0	0	0	
P1938	Route 0	Length conversion (low word)	0	0	0	
P1939		Length conversion (high word)	0	0	0	
P1940		Position fallback (low word)	0	0	0	
P1941		Position fallback (high word)	0	0	0	
P1942		Datum fallback (low word)	0	0	0	
P1943		Datum fallback (high word)	0	0	0	
P1944	Route 1	Length conversion (low word)	0	0	0	
P1945		Length conversion (high word)	0	0	0	
P1946		Position fallback (low word)	0	0	0	
P1947		Position fallback (high word)	0	0	0	
P1948		Datum fallback (low word)	0	0	0	
P1949		Datum fallback (high word)	0	0	0	
P1950	Route 2	Length conversion (low word)	0	0	0	
P1951		Length conversion (high word)	0	0	0	
P1952		Position fallback (low word)	0	0	0	
P1953		Position fallback (high word)	0	0	0	
P1954		Datum fallback (low word)	0	0	0	
P1955		Datum fallback (high word)	0	0	0	
P1956	Route 3	Length conversion (low word)	0	0	0	
P1957		Length conversion (high word)	0	0	0	
P1958		Position fallback (low word)	0	0	0	
P1959		Position fallback (high word)	0	0	0	
P1960		Datum fallback (low word)	0	0	0	
P1961		Datum fallback (high word)	0	0	0	
P1962	Route 4	Length conversion (low word)	0	0	0	
P1963		Length conversion (high word)	0	0	0	
P1964		Position fallback (low word)	0	0	0	
P1965		Position fallback (high word)	0	0	0	
P1966		Datum fallback (low word)	0	0	0	
P1967		Datum fallback (high word)	0	0	0	
P1968	Route 5	Length conversion (low word)	0	0	0	
P1969		Length conversion (high word)	0	0	0	
P1970		Position fallback (low word)	0	0	0	
P1971		Position fallback (high word)	0	0	0	
P1972		Datum fallback (low word)	0	0	0	
P1973		Datum fallback (high word)	0	0	0	
P1974	Route 6	Length conversion (low word)	0	0	0	
P1975		Length conversion (high word)	0	0	0	
P1976		Position fallback (low word)	0	0	0	
P1977		Position fallback (high word)	0	0	0	
P1978		Datum fallback (low word)	0	0	0	
P1979		Datum fallback (high word)	0	0	0	
P1980	Route 7	Length conversion (low word)	0	0	0	
P1981		Length conversion (high word)	0	0	0	
P1982		Position fallback (low word)	0	0	0	
P1983		Position fallback (high word)	0	0	0	
P1984		Datum fallback (low word)	0	0	0	
P1985	Route 8	Length conversion (low word)	0	0	0	
P1986		Length conversion (high word)	0	0	0	
P1987		Position fallback (low word)	0	0	0	
P1988		Position fallback (high word)	0	0	0	
P1989		Datum fallback (low word)	0	0	0	
P1990		Datum fallback (high word)	0	0	0	
P1991	Route 9	Length conversion (low word)	0	0	0	

Table	Description		In-built Configurations			User Configuration
			1 SW1=2	2 SW1=3	3 SW1=4	
P1992		Length conversion (high word)	0	0	0	
P1993		Position fallback (low word)	0	0	0	
P1994		Position fallback (high word)	0	0	0	
P1995		Datum fallback (low word)	0	0	0	
P1996		Datum fallback (high word)	0	0	0	
P1997	Route 10	Length conversion (low word)	0	0	0	
P1998		Length conversion (high word)	0	0	0	
P1999		Position fallback (low word)	0	0	0	
P2000		Position fallback (high word)	0	0	0	
P2001		Datum fallback (low word)	0	0	0	
P2002		Datum fallback (high word)	0	0	0	
P2003	Route 11	Length conversion (low word)	0	0	0	
P2004		Length conversion (high word)	0	0	0	
P2005		Position fallback (low word)	0	0	0	
P2006		Position fallback (high word)	0	0	0	
P2007		Datum fallback (low word)	0	0	0	
P2008		Datum fallback (high word)	0	0	0	
P2009	Route 12	Length conversion (low word)	0	0	0	
P2010		Length conversion (high word)	0	0	0	
P2011		Position fallback (low word)	0	0	0	
P2012		Position fallback (high word)	0	0	0	
P2013		Datum fallback (low word)	0	0	0	
P2014		Datum fallback (high word)	0	0	0	
P2015	Route 13	Length conversion (low word)	0	0	0	
P2016		Length conversion (high word)	0	0	0	
P2017		Position fallback (low word)	0	0	0	
P2018		Position fallback (high word)	0	0	0	
P2019		Datum fallback (low word)	0	0	0	
P2020		Datum fallback (high word)	0	0	0	
P2021	Route 14	Length conversion (low word)	0	0	0	
P2022		Length conversion (high word)	0	0	0	
P2023		Position fallback (low word)	0	0	0	
P2024		Position fallback (high word)	0	0	0	
P2025		Datum fallback (low word)	0	0	0	
P2026		Datum fallback (high word)	0	0	0	
P2027	Route 15	Length conversion (low word)	0	0	0	
P2028		Length conversion (high word)	0	0	0	
P2029		Position fallback (low word)	0	0	0	
P2030		Position fallback (high word)	0	0	0	
P2031		Datum fallback (low word)	0	0	0	
P2032		Datum fallback (high word)	0	0	0	

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8. Spares and Re-order Information

8.1 Spares.

The interface does not contain any user replaceable parts and must be returned to the manufacturer for repair.

The executive firmware can be upgraded by the user if necessary.

Please contact Customer Support for details.

8.2 Re-order Information.

Description	Order code	Comment
WorldFIP to Serial Link Gateway.	Alspa DI100	
Remote Keypad Cable (3 metres)	GDS1009-4001	For communicating between the unit's Programming port and a PC equipped with a 9 pin serial port connection
Gemesys 3	8891-4653	A programming package for the Microsoft™ Windows™3.1 environment.

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