

GEM 80/301, 302 and 303 CONTROLLERS

ORDERING CODES

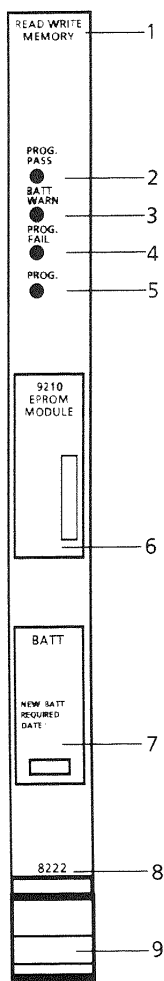
Processor Subracks

Model	Sub-rack Qty	Power Module		Modules included					Slots provided for:		Ordering Code
		Type	Qty	I/O Proc 8213	Ladder Proc 8211	128K RAM 8222	192K RAM 8222	256K RAM 8222	Optional Central modules	Optional Fast I/O	
301(192K)	1	8917 ac/dc	1	1	1	0	1	0	3	4	8870-4757
301(192K)	1	8918dc only	1	1	1	0	1	0	3	4	8870-4758
301(256K)	1	8917 ac/dc	1	1	1	0	0	1	3	4	8870-4751
301(256K)	1	8918 dc only	1	1	1	0	0	1	3	4	8870-4752
301(384K)	1	8917 ac/dc	1	1	1	1	1	0	2	4	8870-4753
301(384K)	1	8918 dc only	1	1	1	1	1	0	2	4	8870-4754
301(512K)	1	8917 ac/dc	1	1	1	0	0	2	2	4	8870-4755
301(512K)	1	8918 dc only	1	1	1	0	0	2	2	4	8870-4756
302(192K)	1	8917 ac/dc	1	1	1	0	1	0	7	0	8870-4767
302(192K)	1	8918 dc only	1	1	1	0	1	0	7	0	8870-4768
302(256K)	1	8917 ac/dc	1	1	1	0	0	1	7	0	8870-4761
302(256K)	1	8918 dc only	1	1	1	0	0	1	7	0	8870-4762
302(384K)	1	8917 ac/dc	1	1	1	1	1	0	6	0	8870-4763
302(384K)	1	8918 dc only	1	1	1	1	1	0	6	0	8870-4764
302(512K)	1	8917 ac/dc	1	1	1	0	0	2	6	0	8870-4765
302(512K)	1	8918 dc only	1	1	1	0	0	2	6	0	8870-4766
303(192K)	2	8917 ac/dc	2	1	1	0	1	0	12	0	8870-4777
303(192K)	2	8918 dc only	2	1	1	0	1	0	12	0	8870-4778
303(256K)	2	8917 ac/dc	2	1	1	0	0	1	12	0	8870-4771
303(256K)	2	8918 dc only	2	1	1	0	0	1	12	0	8870-4772
303(384K)	2	8917 ac/dc	2	1	1	1	1	0	11	0	8870-4773
303(384K)	2	8918 dc only	2	1	1	1	1	0	11	0	8870-4774
303(512K)	2	8917 ac/dc	2	1	1	0	0	2	11	0	8870-4775
303(512K)	2	8918 dc only	2	1	1	0	0	2	11	0	8870-4776

Central Modules

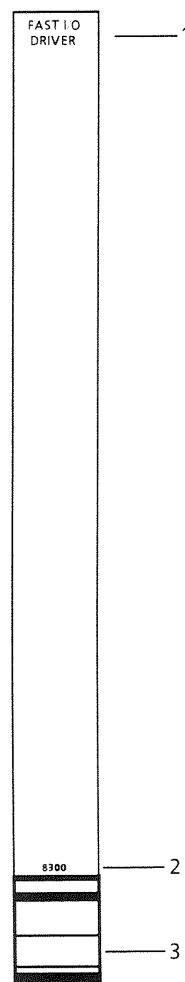
Module type	Function	Slots Used	Equipment called up by ordering code	Ordering Code
Second I/O Processor	For an extra 4096 I/O points	2	I/O Processor module Processor backplane	8800-4123
IMAGEM graphic video	For displaying data from the controller data tables on a video monitor	2	Video processor module Video output module Video backplane Ribbon cable Isolating termination panel	8815-4107
STARNET module	For inter-controller communications	2	Module and backplane	8816-4101
128K RAM module	For additional video formats	1	Module	8810-4119
256K RAM module	For additional video formats	1	Module	8810-4117
128K RAM module	For off-line data storage	1	Module	8810-4129
256K RAM module	For off-line data storage	1	Module	8810-4127
128K RAM module	For ladder expansion	1	Module	8222-4012
256K RAM module	For ladder expansion	1	Module	8222-4001
EPROM Sub-module for use with 8222 RAM/EPROM module	Secure storage of User Program	1	Sub-module	9210-4001
Fast I/O Driver	Required whenever the system contains Fast I/O Modules. Must not be fitted if there is no Fast I/O.	1	Module only	8300-4003

2. HARDWARE IDENTIFICATION



1. Module Function Label
2. 'PROG PASS' LED
3. Battery Warning Lamp (Lit for Battery Low)
4. 'PROG FAIL' LED
5. 'PROG' LED
6. EPROM Module
7. Battery
8. Module Ordering Code
9. Ejection Handle

Figure 2.5 - Read/Write Memory Module Front Panel



1. Module Function Label
2. Module Ordering Code
3. Ejection Handle

Figure 2.6 - Fast I/O Driver Module Front Panel

3. CONTROLLER ARCHITECTURE AND OPERATION

3.1 Controller Architecture

Figure 3.1 shows the Controller architecture. It has several memories and several micro-processors, each performing different duties and all connected to the Central Highway so that data can be interchanged between processors and memories.

The I/O Processor controls data movement between the Verification I/O Highway, Serial Communications Ports or the Programmer Port and the Memory modules.

The ladder processor executes the compiled user program.

The Fast I/O driver provides a buffer for data exchanges between the Central Highway and the Fast I/O modules.

The video processors output a picture from data stored in the video memory and host controller memory.

The user memory holds the following categories of information :-

- (1) Program instructions in 'compiled' form. See section 3.2.3 for further information.
- (2) Program instructions in 'uncompiled' form, referred to as 'source' program. See section 3.2.3 for further information.
- (3) Data tables, detailed in Section 4.
- (4) Video memory. See Section 8 for further information.
- (5) Mailboxes, used for inter-module message passing.
- (6) Off-line data storage.

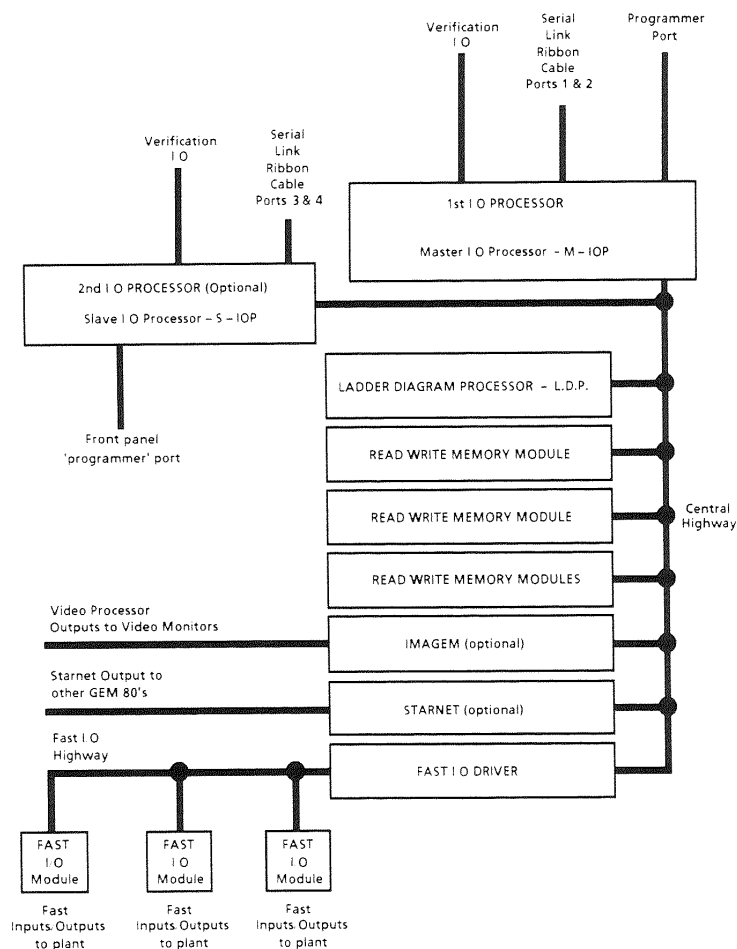


Figure 3.1 - Controller Architecture

16. MAINTENANCE

16.1 General

GEM 80 equipment requires very little maintenance. The memory support batteries have a long life expectancy, the period of which depends upon the extent of their use. Section 16.4 covers this topic.

16.2 Spare Modules

The fault finding procedures rely on substitution of suspected faulty modules with spare modules. These spare modules may be stored powered up (i.e. functional spares).

It is recommended that all spare modules are powered up every 9 months.

16.3 Cleaning and Visual Inspection of GEM 80

Cleaning and visual inspection of GEM 80 should be carried out at time intervals determined by the customer. The equipment should be isolated from its main supplies and associated equipment.

General Maintenance and Cleanliness

- a) Dust and dirt should periodically be removed from enclosures using a vacuum cleaner, brushes and soft cloths.

CAUTION... Never blow air into an enclosure to remove dust and dirt.

- b) Visual checks should be made for signs of wiring or component damage and any damaged wiring or components should be renewed.
- c) Check all terminations within enclosures for tightness.

16.4 Batteries

16.4.1 General

The Read/Write memory is supported by a non-rechargeable lithium/copper oxide battery. The battery life times are given below and depend on the proportion of time that the battery is supporting memory, and mains power is switched off :-

% of Time Supporting Memory	Life
100%	1.0 yr.
75%	1.3 yrs.
50%	2.0 yrs.
30%	3.3 yrs.

When the battery warning lamp is lit or when specified life times have expired the batteries should be renewed.

The batteries have a 10 year shelf life (typical), 5 years minimum.

16.4.2 Battery Replacement Procedure

The battery can be changed and the memory content retained, provided that power to the memory, is not interrupted for more than 10 minutes. Observe the Safety and Handling procedures in Section 18. Spares and Re-ordering Codes are detailed in Section 17.

Two types of memory module are available for use with the 310 series of controllers. In the 8220 module, the battery is only accessible by removing the memory module from the controller subrack. In the 8222, the battery is accessible from the front panel of the module. See Figure 2.5

8220 Memory Module

- (1) Switch the controller power off
- (2) Remove the memory module from the controller subrack
- (3) Avoid touching the module with metal tools since it is powered up. Carefully disconnect the leads from the battery mounted on the module. Untie the tie-wrap holding the battery down and remove the battery.
- (4) Fit the new battery and re-connect the lead with the red crimp to the +ve terminal and the other lead to the -ve terminal. Re-tie the tie-wrap to hold the battery in position.
- (5) Insert the module into the controller.
- (6) Switch the controller power on and check that the battery warning lamp is off.
- (7) Dispose of the old battery as detailed in Section 18 - Safety and Handling Information.

8222 Memory Module

- (1) Open the battery cover located on the module front panel.
- (2) Slide the battery out of its mounting.
- (3) Carefully disconnect the leads from the battery.
- (4) Fit the new battery.
- (5) Slide the battery back into position and close the cover.
- (6) Dispose of old the battery as detailed in Section 18 - Safety and Handling Information.

17. SPARES AND RE-ORDER CODES

17.2 Modules

(a) Central modules

The following ordering codes call up additional central modules, plus their associated backplanes, ribbon cables, and isolating termination panels as appropriate.

Module type	Function	Slots used	Equipment called up by ordering code	Ordering Code
Second I/O Processor (maximum 1 per subrack)	For doubling the amount of I/O and serial ports on the controller.	2	I/O processor module.Processor backplane.	8800-4125
IMAGEM Graphic Video (maximum 4 per subrack)	For displaying data taken from the controller's data tables on a video monitor.	2	Video processor module. Video output module. Video backplane. Ribbon cable. Isolating termination panel.	8815-4107
256K memory module	For ladder expansion.	1	Memory module. Socket.	8222-4001
256K memory module	For off-line data storage.	1	Memory module. Socket	8810-4127
128K memory module	For ladder expansion.	1	Memory module. Socket	8222-4012
128K memory module	For additional video formats.	1	Memory module. Socket	8810-4119
128K memory module	For off-line data storage.	1	Memory module. Socket	8810-4129
64K Memory module	For additional video formats.	1	Memory module. Socket.	8810-4120
256K EPROM submodule	For more secure storage of ladder program, presets and video.	1	EPROM memory submodule, including unprogrammed EPROMs.	9210-4001
STARNET module. (Double width module) Note 2.	For inter-controller communications with block message facility.	2	STARNET module. Backplane.	8816-4101
Fast I/O Driver	Required only when the system contains Fast I/O modules.	1	Module only.	8300-4003

Notes...

- 1 The quantity of slots used must be taken into account when assessing how many modules can be fitted into a GEM 80.310 series processor subrack.
- 2 You must specify ribbon cables and termination units separately, depending on how many ports, and of what type you are using.

(b) Fast I/O Modules

Details of the Fast I/O Modules are given on individual data sheets in the number ranges 884x and 886x, and are therefore omitted from this section.

17. SPARES AND RE-ORDER CODES

(c) Basic and Verification I/O Modules

Apart from the items given below, details of Basic and Verification I/O modules are given on individual data sheets and are therefore omitted from this section.

Module type	Function	Equipment called up by ordering code	Ordering Code
Power Module	To provide additional power for Basic and Verification I/O modules.	Module for 110/220V a.c. (isolated) or 24-60V d.c. (non-isolated, negative earth only). Mounts in 8857-4006 subracks.	9032-4002
Verification I/O expander unit	To provide Basic I/O ribbons for up to 512 points of Basic I/O.	Expander unit only. Mounts in a 8859-4003 12-slot I/O subrack.	8191-4004

17.3. Optional Extras

Ordering Code

20mA serial link termination unit (provides terminals for one port).	8924-0000
HDLC serial link termination unit (provides terminals for one port).	8587-4001
Ribbon cable for connecting either of the above to the controller (connects up to two 8924 units to the processor subrack; max. 1 per I/O processor, or 2 per STARNET module.)	8891-4077
Fibre-optic interface unit (converts 20mA serial link from an 8924-0000 unit to fibre-optic)	8927-0000
Cable loom for serial ports 1 or 3 (for connecting the above to an 8924-0000 unit)	8891-4079
Cable loom for serial ports 2 or 4 (for connecting the above to an 8924-0000 unit)	8891-4083
Mounting channel (for termination panels)	8959-0000

17.4. Special Processor Subracks

If it is required to add further central modules to a processor subrack after it has been delivered, it is a difficult job to fit the necessary backplanes and wire links, etc., which may involve the subrack having to be returned to the factory. Therefore it is strongly recommended that possible future module additions be considered at the ordering stage. A subrack can be prepared to accept further modules, even though these modules might not be purchased until a later date.

(a) Subrack preparation

For a second I/O processor	8899-4228
For an IMAGEM graphic video	8899-4230
For a STARNET module	8899-4226
For a 128K 192K 256K RAM or RAM/EPROM memory module	8899-4227

Note...The usage of each 64K block of RAM must be defined, e.g. whether required for extension program memory, for formats, or off-line storage, etc.

17. SPARES AND RE-ORDER CODES

(b) Module additions subsequent to original order.

Module	Subrack preparation required	Equipment called up by ordering code	Ordering Code
Second I/O processor	8899-4214	Module only. When ordering, replace the asterisk by the last digit of the ordering code for the first I/O processor already fitted.	8213-431*
IMAGEM graphic video	8899-4230	Video processor module. Video output module. Ribbon Cable. Isolating termination panel.	8815-4008
STARNET module	8899-4226	Module only.	8218-4003
128K RAM memory	8899-4227	Module only	8222-4012
256K RAM EPROM memory	8899-4227	RAM/EPROM module, without EPROM submodule	8222-4001
EPROM submodule	Requires 8222-4001 module (see above)	Plug-in submodule, including set of unprogrammed EPROM chips.	9210-4001

17.5. SPARES

Power Module for Controller subracks
For 88-264V a.c. 45-63Hz or 88-250V d.c. input
For 19-60V d.c. input

8917-4003
8918-4003

Power Module for I/O subrack
For 88-132V a.c. 176-264V a.c. 45-63Hz (isolated)
or 22-85V d.c. (non-isolated)

9032-4001

CORONET Interface for interface to CORONET LAN
Module plus connector

8193-4001

Ladder processor module (See note)
I/O processor module (See note)

8211-431*
8213-431*

Note... Replace the asterisk with the final digit appearing on the modules originally supplied; this digit must be identical on the ladder and I/O processors.

IMAGEM graphic video processor

8219-4003

IMAGEM graphic video output module

8216-4003

STARNET module

8218-4003

128K RAM memory module (for additional Video formats)

8222-4012

256K RAM memory module (for additional Video formats)

8222-4001

128K RAM memory module (for off-line data storage)

8222-4012

256K RAM memory module (for off-line data storage)

8222-4001

128K RAM memory module (for ladder extension)

8222-4012

256K RAM memory module (for ladder extension)

8222-4001

EPROM submodule for use with 8222 RAM/EPROM module.

9210-4001

Power fuse for 8917-4003 power supply (10A time delay, high breaking capacity)

82030/111

Power fuse for 8918-4003 power supply (20A time delay, high breaking capacity)

82022 287

Battery for memory module

20T0319.01



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