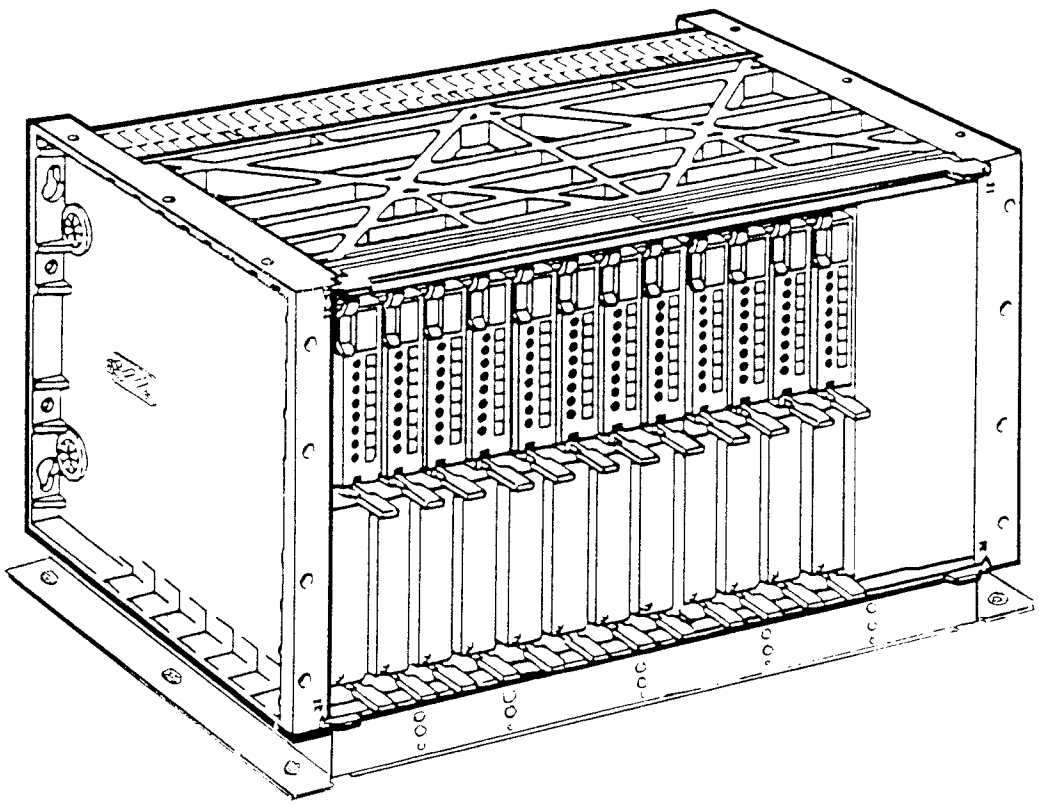
ALSTOM

12-SLOT I/O SUBRACK

8859-4003



GEM80 USER INFORMATION

CONTENTS

CONTENTS

1. INTRODUCTION

1.1 Purpose of the document

The purpose of this document is to provide installation and connection information for the 8859-4003 I/O subrack and its optional I/O modules. Technical specifications, as well as descriptions and examples of the connections along with addressing operations and maintenance details are included in these instructions.

1.2 I/O Subracks

1.2.1 Description

The GEM80 8859-4003 is a 19" racking system which accommodates both Verification and Basic I/O modules. These modules provide an electrically isolated interface between the plant and GEM80 Controllers. The 8859-4003 allows simultaneous operation of 8-point, 16-point and 32-point Basic I/O modules and all Verification I/O modules, it also incorporates a plant output enable facility, for use with certain types of output modules.

A single subrack may house up to 12 Verification I/O modules. The number of Basic I/O modules that can be housed in a single subrack depends on the combinations of 8, 16 and 32-point modules required.

Figure 1.1 shows a 12-slot I/O subrack with 12 I/O modules.

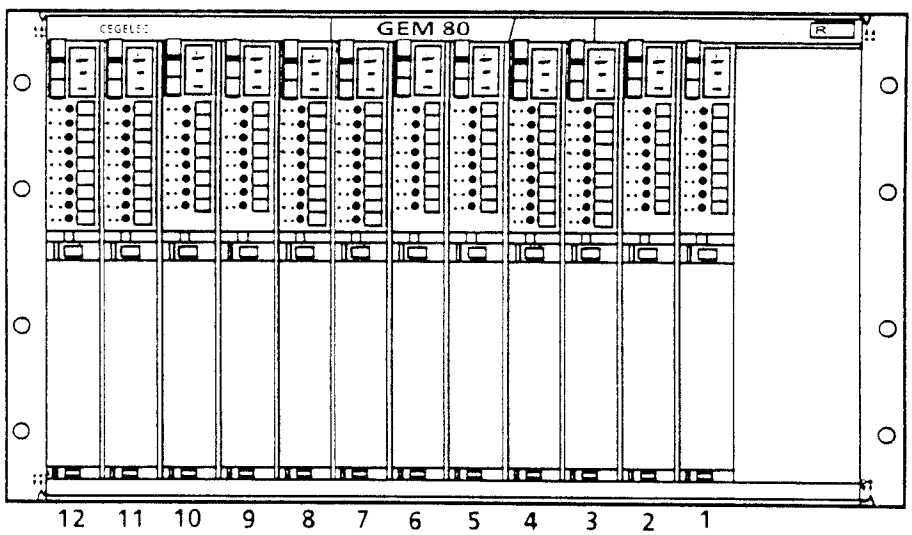


Figure 1.1 - 12-slot Subrack

2. PRODUCT COMPLIANCE

This product complies with the essential safety requirements of the Low Voltage Directive (1), and the Electromagnetic Compatibility Directive (2). However, it is outside the scope of the Directives and the CE Marking and Declaration of Conformity requirements of the Directives cannot be applied.

(1) Low Voltage Directive 73/23/EEC of 19 February 1973, amended by The CE Marking Directive 93/68/EEC of 22 July 1993.

(2) Electromagnetic Compatibility Directive 589/336/EEC of 3 May 1989 amended by The Directive 92/31/EEC of 28 April 1992

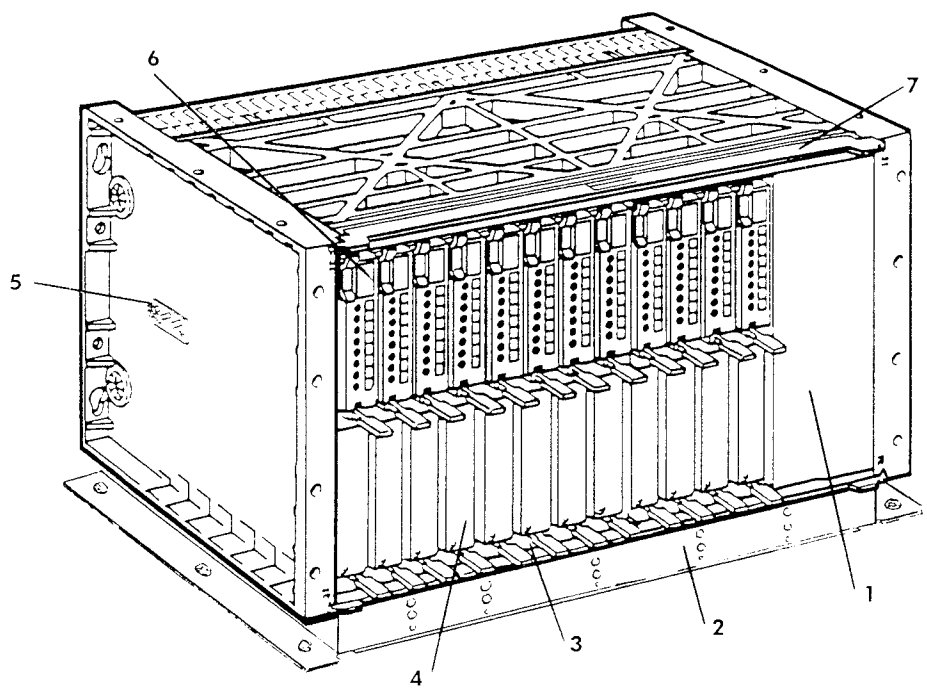
3. SPECIFICATION

Number of Slots for I/O modules	12
Mechanical	
Weight	Approximately 6.5kg without modules
Mounting	19" (483mm) rack mounting Conforms to IEC297-1 (1975) Mounting Dimensions of panels and racks
Subrack Dimensions	256 x 483 x 332mm (H x W x D) with modules inserted, allowing for plant wiring.
Environmental	
Temperature Range	Storage -20°C to 70°C Operating 0°C to 60°C
Humidity	5% to 95% RH non condensing
Fire Resistance	UL94-V0
Tests	GEM80 Standard

4. HARDWARE IDENTIFICATION

4.1 A 12-slot I/O Subrack

A 12-slot I/O subrack with its optional I/O modules is illustrated in Figure 4.1



1. Blanking Panel
2. Subrack Spacer
3. Address Labels
4. I/O Modules (12 optional)
5. Earth Stud
6. Upper Label
7. Module Retaining Bolt

Figure 4.1 - I/O Subrack

4.2 Blanking Panel

The right-hand end of the subrack is fitted with a blanking panel.

Any spare slots in the subrack should be fitted with blanking panels. They are used to keep unwanted material out of the subrack and prevent maintenance personnel using intentionally vacant slots.

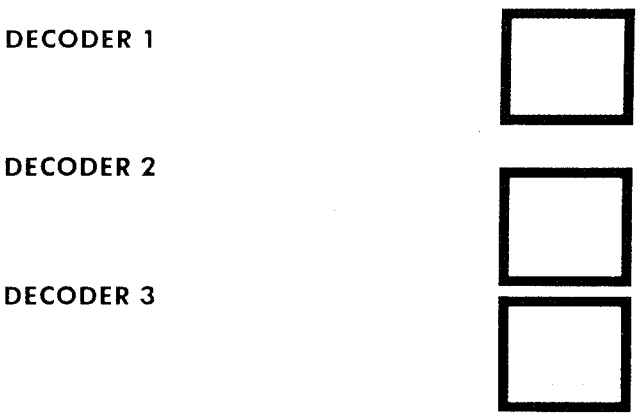
Blanking panels are available in single or double width sizes.

4.3 Subrack Labelling

The upper label has provision for marking subrack reference numbers (e.g. R1, R2 etc).

4.3.1 Decoder Switch Labels

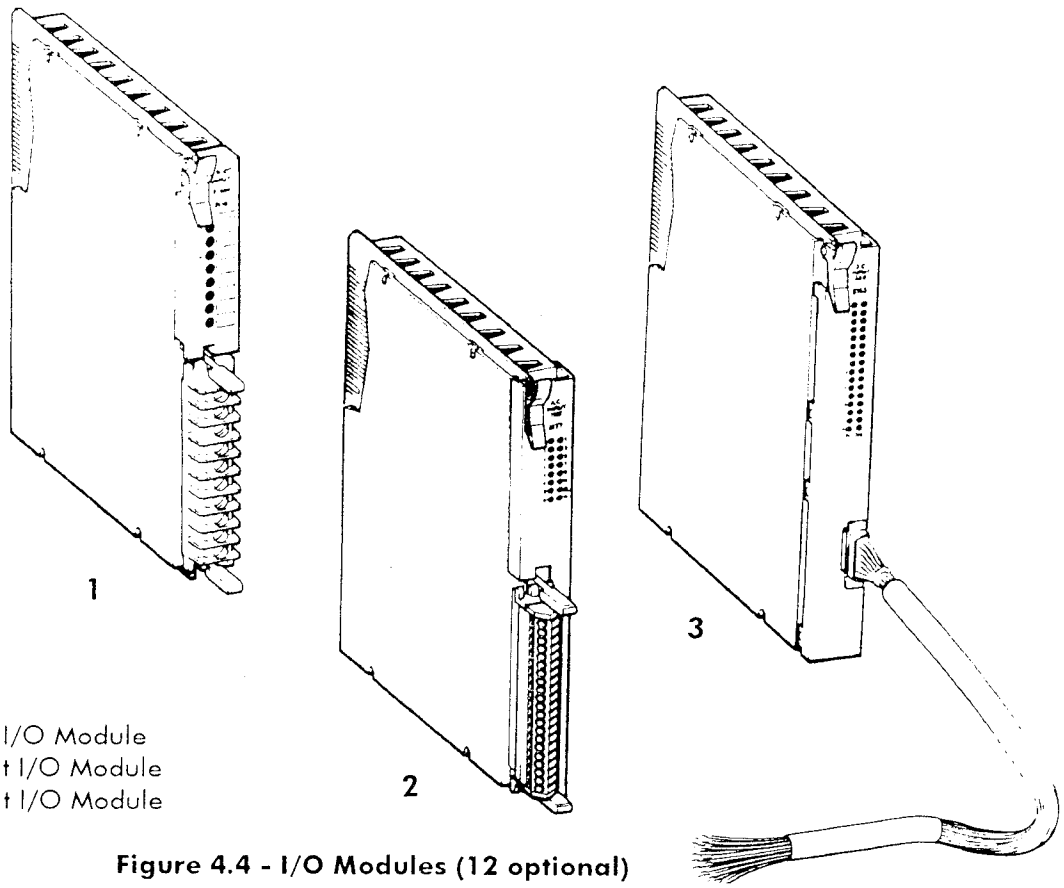
A label for recording the decoder switch settings is fitted to the inside of the subrack right-hand side sheet.



1. Decoder Switch Setting S1
2. Decoder Switch Setting S2
3. Decoder Switch Setting S3

Figure 4.2 - Decoder Switch Label

4.4 I/O Modules



1. 8-Point I/O Module
2. 16-Point I/O Module
3. 32-point I/O Module

Figure 4.4 - I/O Modules (12 optional)

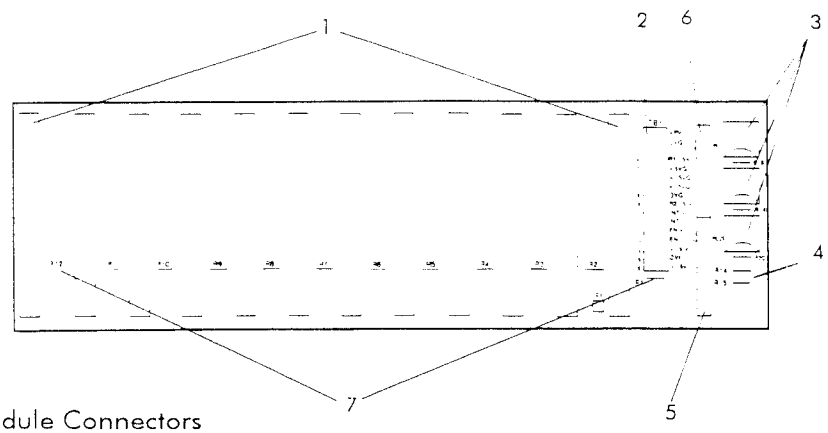
4.5 Earth Stud

The location of the earth stud is illustrated in Figure 4.1

4.6 Module Retention

This is achieved at the top and bottom edges of the subrack with an integral sliding 'bolt' (orange retainer).

4.7 12-Slot Subrack Upper Backplane



1. Module Connectors
2. Terminal Block TB1
3. Address decoder switches SW1-3
4. Power selection resistors
5. Verification I/O Ribbon connector PL2
6. Basic I/O Ribbon Connector PL1
7. Module Interlock Resistors R1-12

Figure 4.5 - Upper Backplane

4.8 Wiring Tray

The wiring tray is fitted onto the bottom of a subrack to provide a 2U (88.5mm) space between subracks.

The tray must be earthed to the subrack earth stud.

4.9 Rear Cover (optional)

A rear cover is available as an optional extra.

5. INSTALLATION

5.1 Subrack Mounting

The subrack has a very simple mounting procedure which utilises the side sheet front or rear flange for fixing purposes. Both front and rear flanges have four fixing holes.

Under normal circumstances only the top and bottom holes will be required to secure the subrack assembly, however, in conditions of high shock/vibration it may be necessary to use the additional holes. To aid rear mounting, the top hole on each rear flange has a 'keyhole' shape.

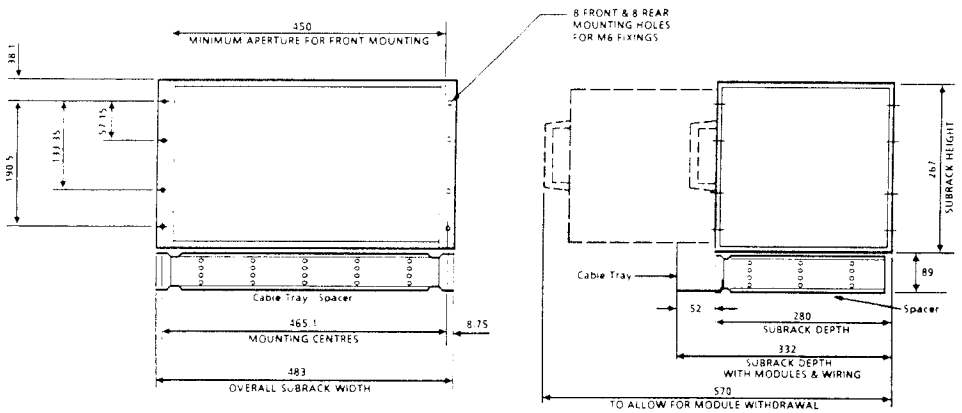


Figure 5.1 - Subrack and Spacer/Tray Dimensions

5.1.1 Front Flange Mounting

Note:
Front flange mounting requires a flat surface at the rear of the mounting panel.

To assist with the mounting procedure, threaded inserts have been fitted in the subrack fixing holes which accommodate the mounting screws. 7mm holes are required in the mounting panel to give clearance for the mounting screws. Mounting pegs are provided which enable the subrack to be held in the 'mounted' position prior to securing with the fixing screw.

(1) When direct access to the rear face of the mounting panel is possible, the subrack mounting procedure is as follows:-

(a) Insert a mounting peg into the top fixing hole of each of the subrack flanges.

(b) Offer the subrack assembly up to the rear of the mounting panel and locate the two pegs in the top fixing holes of the panel. The pegs will hold the assembly in the correct fixing position.

(c) Fit and tighten the lower fixing screws into position.

(d) Replace the mounting pegs with the upper fixing screws.

(e) Tighten all securing screws to a torque of 28lb/ins. (0.32kg/m)

(2) If direct access to the rear of the mounting panel is not possible, the subrack assembly mounting procedure is as follows:-

(a) Ensure that the space at the rear of the mounting panel is a minimum of 600mm wide and 500mm deep with an aperture of 450mm.

(b) Insert a mounting peg into the fixing hole of each of the subrack flanges.

(c) Insert the subrack assembly sideways through the mounting panel aperture, rotate the subrack to offer the front of the assembly to the rear of the mounting panel and locate the two pegs in the top fixing holes of the panel. The pegs will hold the assembly in the correct fixing position.

(d) Repeat items (1) (c) to (1) (e) above.

5.1.2 Rear Flange Mounting

Rear fixing is either by inserts fitted into the rear mounting panel or by taptite screws. The length of the screws is 7mm + the length required into the rear mounting panel and the screw head should be POSIPAN.

Each rear flange has four fixing holes. Under normal circumstances only the top and bottom holes will be required to secure the subrack assembly, however in conditions of high shock/vibration it may be necessary to use the additional holes. To aid rear mounting the top hole on each flange has a keyhole shape.

Subrack mounting using the rear flanges is carried out as follows:-

(1) Insert a mounting screw into each of the uppermost fixing holes on the mounting panel leaving at least 10mm of thread projecting.

(2) Offer the subrack assembly up to the mounting panel allowing the screw threads to pass through the keyhole shape. The subrack assembly will locate onto the screws and be held in position prior to securing.

(3) Insert the two lower fixing screws.

(4) Tighten all four screws to a torque of 28lbs/ins. (0.32kg/m)

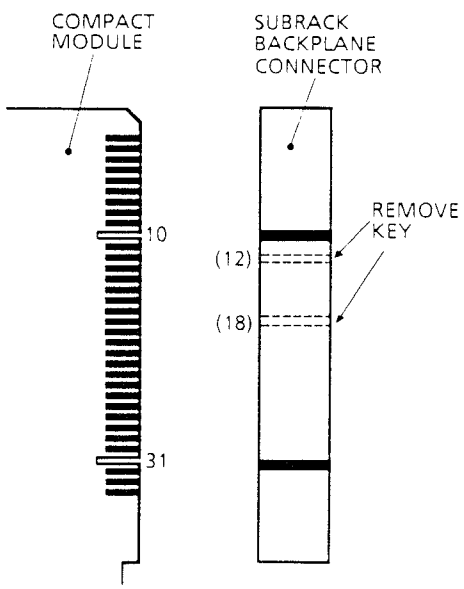


Figure 5.2 - Basic Input Module Coding

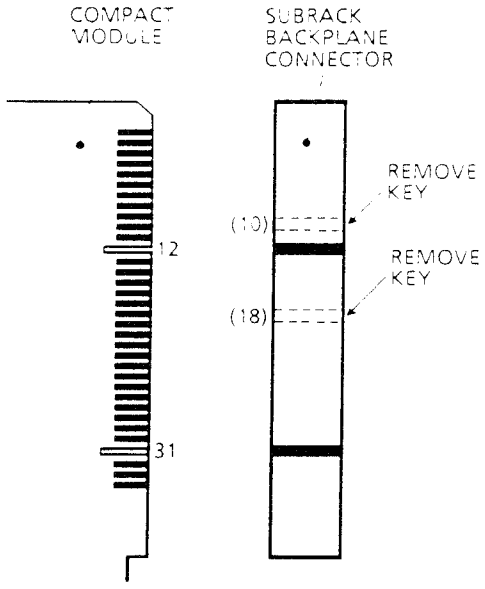


Figure 5.3 - Basic Output Module Coding

5.2 Installation of I/O Modules

The I/O subrack slots for the I/O modules have in-built mechanical coding to prevent incorrect module insertion, therefore, a module will only fit into its designated position.

5.2.1 Coding

Each edge connector of the subrack backplane is fitted with coding keys in positions 10, 12, 18, and 31. Key 31 is used as a guide and must NOT be removed. To code for an input module use key 10 and remove key 12. To code for an output module use key 12 and remove key 10. Key 18 is for Verification I/O Modules and must be removed if using a Basic I/O module.

The mechanical coding can be changed at any time by changing the key positions. It may also be necessary to change your GEM80 program.

If a slot is not in use, leave all four coding pegs in place.

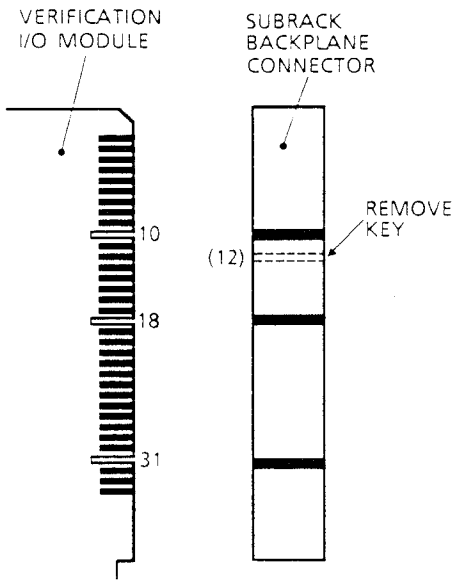


Figure 5.4 - Verification Input Module Coding

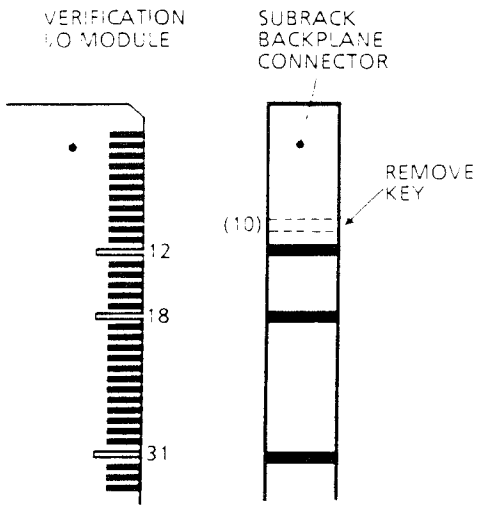


Figure 5.5 - Verification Output Module Coding

5.2.2 Fitting

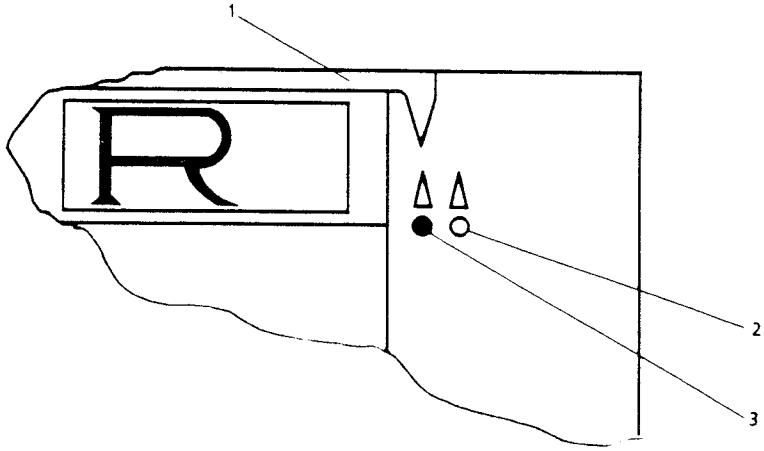
Modules must be located in the appropriate top and bottom integral guide slots and pushed in using a minimum of force until the module is fully inserted into the backplane connector.

Should the module jam, release it by pulling it out a short distance and try again. Excessive force could make the problem worse and may damage the equipment.

5.2.3 Locking

Module retention is ONLY necessary in high shock or vibration conditions where the module could become disconnected. Under normal conditions, retention will not be required and the orange sliding 'retainer' should be left in the open position.

Note:
Open and closed indication is provided by a pointer on the mechanism being positioned opposite the open or closed symbols which are marked on the subrack flanges. See Figure 5.6.



1. Orange Sliding Retainer
2. Open Symbol
3. Closed Symbol

Figure 5.6 - Open and Closed Symbols

If module retention is required the following procedure should be carried out:

(1) Ensure that the 'retainer' is in the open "O" position.

(2) Check that each module has a small slot cut into the upper and lower edges of the p.c.b approximately 10mm from the front edge.

Note:
I/O modules may have a blanking plug fitted in the top slot. Before fitting the module into the subrack remove this plug but retain it for future use (the plug must be re-fitted should it be required to insert the module into a metal subrack).

(3) Fit modules into their correct positions in the subrack. Ensure that they are all fully inserted.

(4) Slide the top 'retainer' towards the left until the pointer is opposite the closed "O" position.

(5) Slide the bottom 'retainer' towards the right until the pointer is opposite the closed "O" position. All modules are now retained in position.

Note:
Any one module, without the slots cut in the p.c.b. edge or with the blanking plug in or not fully inserted, will prevent the correct operation of the 'retainer'.

5.2.4 Releasing

To remove a module, slide the upper and lower retainer to the open position and lift the ejection handle at the top . This separates the module from the rear connector, pushing the module far enough out to be withdrawn.

5.2.5 High Heat Dissipating Modules

When using a large number of output modules which have a high heat dissipation, distribute them evenly between and across I/O racks to avoid hotspots and locally heated areas.

6. CONNECTION

6.1 I/O Ribbons

The Basic and Verification I/O ribbon cables are 26-way cables, of which 25 cores are used. Core 2 is not used as pin 2 of the connectors is used for mechanical coding.

The cables connect the Basic or Verification I/O highways from a Controller subrack to the I/O Subracks.

6.1.1 Basic I/O Ribbon

The Basic I/O Ribbon connects to PL1 on the subrack backplane.

Note:
A subrack can only accept one Basic I/O ribbon, however, the Basic I/O ribbon can be connected to more than one subrack. Up to three subracks may be used on the same Basic I/O ribbon, either, to allow different physical location of modules or to provide extra module space. It is not possible to exceed the number of I/O points for the ribbon.

6.1.2 Verification I/O Ribbon

A Verification I/O ribbon connects to PL5 on the subrack backplane.

6.2 I/O Modules Low Voltage Power

Power for the +15V logic supply of the I/O Modules can be supplied via the Basic I/O Ribbon Cable, the Verification Highway Ribbon Cable, the Verification Highway Ribbon Cable or from an external source.

6.2.1 Power 'IN' from a GEM80 Controller via the Basic I/O ribbon

For power 'IN' via a Basic I/O ribbon, connect a wire link between the terminal block points TB1.4 and TB1.7.

For power 'IN' via a Verification I/O ribbon, connect a wire link between terminal block points TB1.9 and TB1.7. See Figure 6.1.

6.2.2 Power 'IN' from a separate source

For power 'IN' from a GEM80 power module or a separate power supply, connect the discrete wires to TB1.3 (+15VG) and TB1.1 (0VG) on the terminal block.

6.2.3 Verification +5V supply

Verification I/O modules require an additional +5V supply. This is not available from the Verification I/O ribbon and must be provided separately. Connect this supply to terminals TB1 and TB2.

6.2.4 Wire Sizes

The maximum size of discrete wiring that can be used with terminals TB1 and TB2 is 2.5mm^2. Any wire link terminations should be made with a wire size of 16/0.20 (20 AWG).

Note:
Power supplies 'MUST NOT' be used in parallel. Connections to Terminal Block (TB1) on the subrack backplane are used to make sure that power sources are isolated from each other.

For segregation purposes the Basic I/O power wiring is of the 'VERY CLEAN' category. For further information on segregation refer to your GEM80 Technical Manual.

The 8859-4003 terminal block connections are summarised in Table 6.1.

Table 6.1 Terminal Block Connections

TB1 - Number	Ref.	Function	Notes
1 3	VPV Enable	- -	
4	R1 + 15V	Basic I/O Power	Power 'IN' Via Basic I/O Ribbon fit link TB1.4 to TB1.5
9	R2 + 15V	Verification I/O Power	Power 'IN' Via verification I/O Ribbon fit link TB1.4 to TB1.7
5	+5VG	+5V Power Verification I/O only	Power 'IN' from Power Supply module in GEM80 Controller or separate power supply by discrete wiring
7	+15VG	+15V I/O Power	
8	0VG	0V	
6	+15VG	+15V I/O Power	Power to other I/O Subracks by discrete wiring
2	0VG	0V	

6.2.5 Power 'OUT' from Discrete wires

Excess power can be supplied to additional I/O subracks by connecting discrete wires to TB1.7 (+15VG) and TB1.8 (0VG) or TB1.4 (+15VG) and TB1.2 (0VG).

6.3 Output Module Enable

Output Modules with an enable feature are locally enabled from the +15V supply at the subrack. No user action is necessary if the enable is used in this mode.

Output modules can be enabled from a remote mode and all outputs can be held in the "OFF" state until:

(1) An enable signal at +15V d.c. ±10% is present

and

(2) The GEM80 Controller initiates the output "ON".

The enable signal is supplied to the subrack and will enable all "output enable" modules contained in the subrack. The enable signal would normally be provided via the watch-dog relay so that the output are inhibited on initial switch on and when the watch-dog opens.

6.3.1 Output Enable Connections

The output enable signal can be provided in two ways

(1) From the +15V for the subrack modules taken through the watch-dog relay follower contacts. This requires the removal of R15. Figure 5 shows the connections to be made.

(2) From a separate external supply. This requires the removal of the two zero ohm resistors R14 and R15. Figures 5.2 shows the connections to be made at the terminal block (TB1).

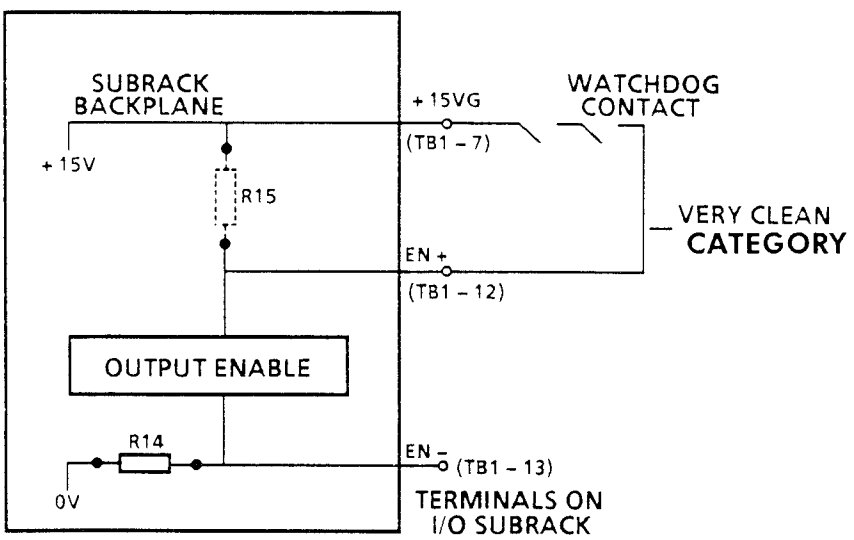


Figure 6.1 - Connection of Output Enable Signal using the GEM80 Power Supply

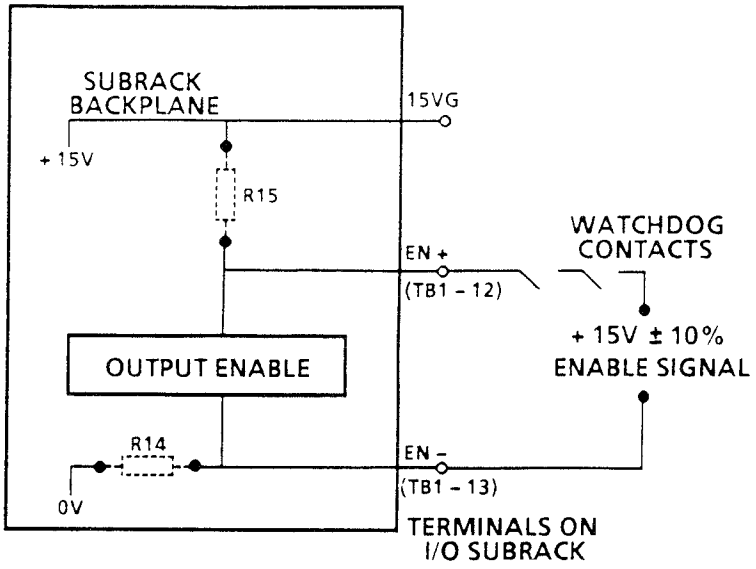


Figure 6.2 - Connection of Output Enable Signal using an External Power Supply

6.3.2 Segregation

The segregation category will depend on the power supply providing the enable signal. If the signal is derived from the GEM80 power module then it is considered to be "very clean" and must be separate from any 'dirty' plant side wiring. If the signal is supplied from a remote power supply which is also supplying 'dirty' circuits then the enable wiring can be run with other 'dirty' plant-side wiring. It must not be run alongside 'clean' or 'very clean' plant-side wiring.

The external circuitry required for both output enable methods falls into the "very clean" category.

6.3.3 Wiring Sizes

The maximum size of wire that can be terminated at the EN + and EN - terminals is 2.5 sq.mm. These terminals are located on the terminal board, TB1, on the Upper Backplane.

6.4 Electrical Interlocking (module in position)

A circuit consisting of links is incorporated within the subrack and I/O modules. This is arranged in such a way that when all the modules are fitted, a series chain of links if completed giving a short circuit. If, however, a module is removed the series chain of links is broken giving an open circuit.

This system could be used to interlock with a relay coil or an input channel of a Basic I/O module. This may if required, be part of the system healthy checks in the user program, so that if the Basic I/O input channel to which the interlocks connect is high, then all I/O modules are fitted. Connections for this are shown in Figure 5.3.

In circumstances where the I/O subrack is not completely full of modules, a shorting link in the form of a zero ohm resistor is fitted on the backplane so that the series chain of interlocks would be completed by the zero ohm resistors if not modules were put in the subrack. To activate the module interlock system, it is necessary to cut out the zero ohm resistor at each connector where an I/O module is fitted, see Figure 5.4.

Note:
The zero ohm resistors are located immediately to the right of the I/O module connectors.

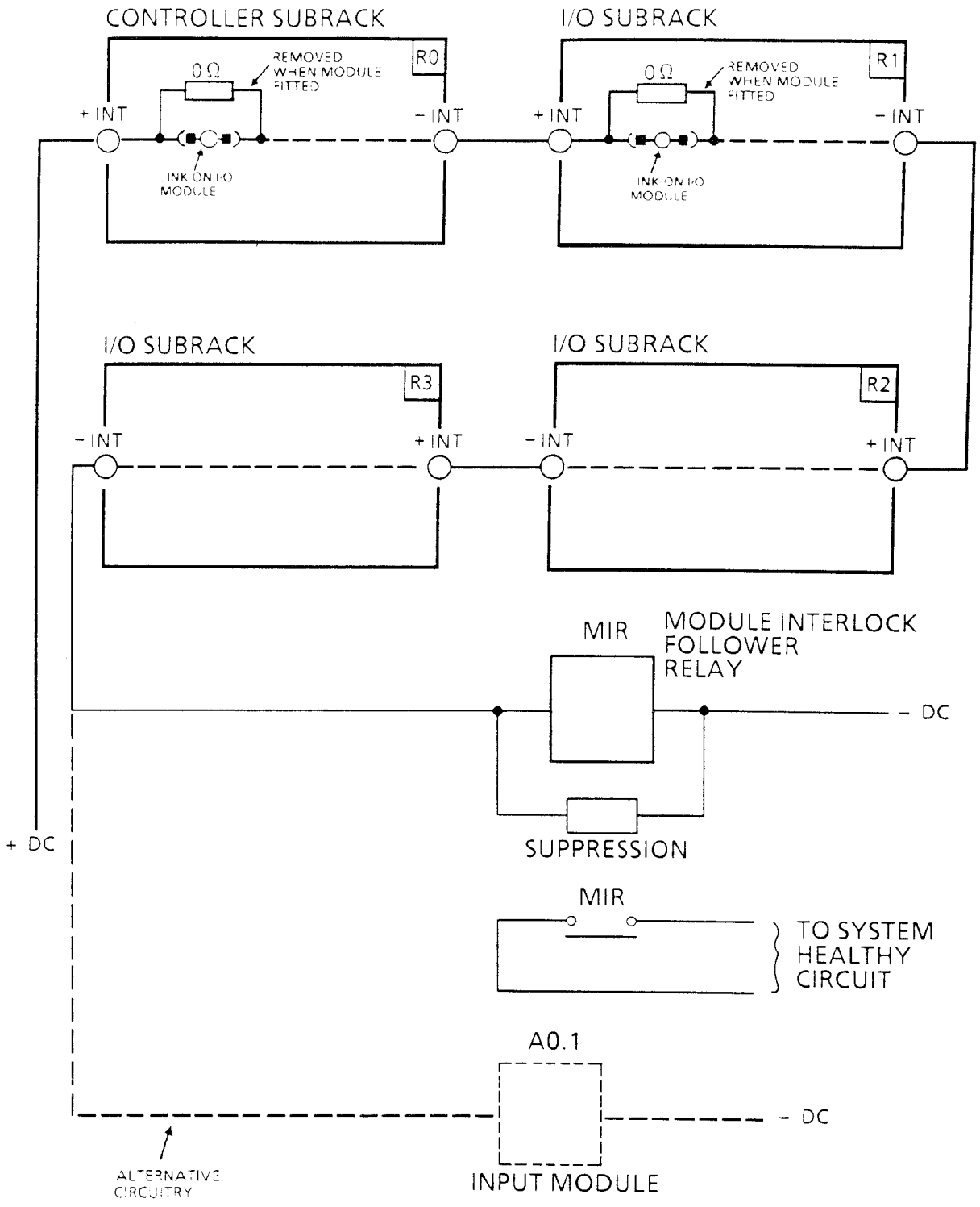
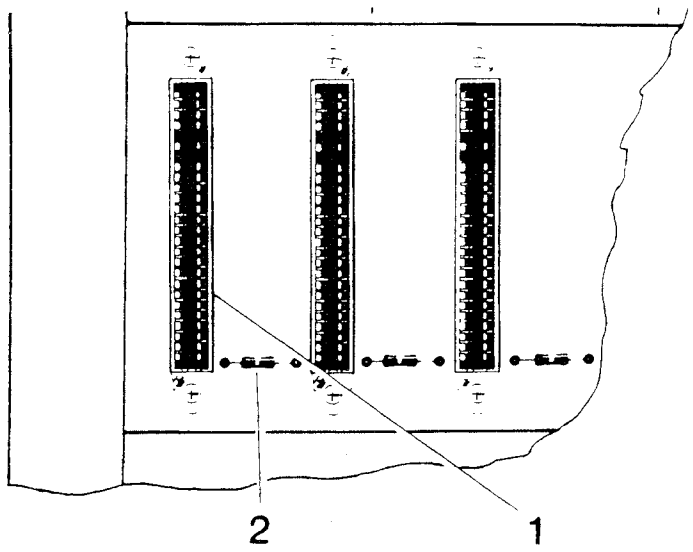


Figure 6.3 - Typical module interlock circuit



1. Upper Backplane Edge Connector
2. Associated zero ohm resistor (cut out when a module is to be fitted

Figure 6.4 - Zero Ohm Resistors for Basic I/O Module Interlock System

6.4.1 Module Interlock Circuit Ratings

Circuit :	Volt free contact
	For use in d.c. only, with restrictions of 50V d.c. and 0.5A peak.
Operation:	Closed when all I/O modules are fully inserted into the rack.
Connections:	Terminals on subrack backplane. Remove power module for access. Maximum wire size 2.5mm^2.

6.5 Earthing

It is essential that the I/O subrack is properly earthed. Safety earth cable must be a minimum of 2.5mm^2 green/yellow insulated wire and must be fitted in accordance with the Installation Instructions in your GEM80 Technical Manual.

Earth stud locations are shown in Figure 4.1

7. OPERATION

7.1. Basic I/O (Ribbon 1)

I/O subracks can be used with 8, 16, and 32-point modules and the address of each module has to be unique. Some addresses are determined by decoder switches and some by module position alone.

There are three address decoder switches, located at the right-hand end of the subrack backplane. For access, remove the blanking panel. Each switch has ten settings numbered 0 to 9 inclusive. Settings 0 to 7 select specific module addresses for specific subrack slots. If a switch is not used it should be adjusted to setting 8 or 9.

GEM80 uses 16-bit words. Each word may be a word of INPUT or a word of OUTPUT, but not both. Therefore, 8-point modules must be installed in groups of two inputs or two outputs.

Table 7.1 shows that each decoder switch setting corresponds to two 16-bit addresses. This means that a switch will set the address of four 8-point modules or two 16-point modules.

Table 7.1 Decoder Switch Settings

Switch Settings S1, S2, S3	Ribbon 1 Addresses Selected
0	0 & 1
1	2 & 3
2	4 & 5
3	6 & 7
4	8 & 9
5	10 & 11
6	12 & 13
7	14 & 15
8	Not Used
9	Not Used

7.2 Address Decoder Switches

7.2.1 Switch Settings for 8 Point Modules

The I/O subrack accepts 8-point modules in any slot as all slots are user-addressable. A decoder switch, S1, or S2, selects the addresses for a group of four adjacent 8-point modules. Table 7.2 shows how 8-point addresses are allocated by the switches. S1 covers the addresses for slots 1, 2, 3 & 4, S2 for slots 5, 6, 7 & 8 and S3 for slots 9, 10, 11 & 12.

Note:

On any Basic I/O ribbon each address may only be used once.

Table 7.2 Decoder Settings for 8 Point Modules

Switch Setting	Ribbon 1 Address	Sub Rack Slot		
		SW1	SW2	SW3
0	0.0 - 0.7	1	5	9
	0.8 - 0.15	2	6	10
	1.0 - 1.7	3	7	11
	1.8 - 1.15	4	8	12
1	2.0 - 2.7	1	5	9
	2.8 - 2.15	2	6	10
	3.0 - 3.7	3	7	11
	3.8 - 3.15	4	8	12
2	4.0 - 4.7	1	5	9
	4.8 - 4.15	2	6	10
	5.0 - 5.7	3	7	11
	5.8 - 5.15	4	8	12
3	6.0 - 6.7	1	5	9
	6.8 - 6.15	2	6	10
	7.0 - 7.7	3	7	11
	7.8 - 7.15	4	8	12
4	8.0 - 8.7	1	5	9
	8.8 - 8.15	2	6	10
	9.0 - 9.7	3	7	11
	9.8 - 9.15	4	8	12
5	10.0 - 10.7	1	5	9
	10.8 - 10.15	2	6	10
	11.0 - 11.7	3	7	11
	11.8 - 11.15	4	8	12
6	12.0 - 12.7	1	5	9
	12.8 - 12.15	2	6	10
	13.0 - 13.7	3	7	11
	13.8 - 13.15	4	8	12
7	14.0 - 14.7	1	5	9
	14.8 - 14.15	2	6	10
	15.0 - 15.7	3	7	11
	15.8 - 15.15	4	8	12

7.2.2 Switch Settings for 16 Point Modules

16 point modules can be located in slots 1 to 12 of which the lowest numbered slots are allocated an address according to the decoder switch settings. The six highest numbered slots have fixed addresses.

Table 7.3 shows how 16 point addresses are allocated by the switches and Table 7.4 indicates those with fixed addresses.

Table 7.3 Decoder Settings for 16 point Modules

Switch Setting	Ribbon 1 Address	Sub Rack Slot		
		SW1	SW2	SW3
0	0.0 - 0.15	1	3	5
	1.00 - 1.15	2	4	6
1	2.0 - 2.15	1	3	5
	3.00 - 3.15	2	4	6
2	4.00 - 4.15	1	3	5
	5.00 - 5.15	2	4	6
3	6.00 - 6.15	1	3	5
	7.00 - 7.15	2	4	6
4	8.00 - 8.15	1	3	5
	9.00 - 9.15	2	4	6
5	10.00 - 10.15	1	3	5
	11.00 - 11.15	2	4	6
6	12.00 - 12.15	1	3	5
	13.00 - 13.15	2	4	6
7	14.00 - 14.15	1	3	5
	15.00 - 15.15	2	4	6

Table 7.4 16-point Module Fixed Addresses

(NA = not applicable, i.e. selectable addresses, not fixed)

Slot	1	2	3	4	5	6	7	8	9	10	11	12
Basic I/O Ribbon 1 16-point	NA	NA	NA	NA	NA	NA	10.0 - 10.15	11.0 - 11.15	12.0 - 12.15	13.0 - 13.15	14.0 - 14.15	15.0 - 15.15

7.2.3 32-point Modules

Decoder switches do not address 32-point modules; their addresses are fixed by slot position. Table 7.5 shows how addresses are allocated by slot position.

Note:
On any Basic I/O ribbon each address may only be used once.

Table 7.5 32-Point Module Fixed Addresses

Slot	1	2	3	4	5	6	7	8	9	10	11	12
Ribbon 1 32-point	0.0-1.15	2.0-3.15	4.0-5.15	6.0-7.15	-	8.0-9.15	-	10.0-11.15	-	12.0-13.15	-	14.0-15.15

7.2.4 Subrack Address Label Markings

The lower subrack label has provision for marking I/O address references. The label can be marked in situ if required, but preferably it should be removed by lifting the protective cover at one end and sliding it out. The references should be recorded by marking with a black pen or a proprietary marking system (e.g Letraset). Use an A or B prefix in the reference to indicate input or output addresses.

Refit the label and protective cover after marking by sliding it into the lower front rail.

7.2.5 Decoder Switch Label Markings

The label for recording the decoder switch settings is fitted to the inside of the subrack right-hand side sheet. Marking should be carried out with a black pen or a proprietary marking system (e.g. Letraset).

7.3 Basic I/O (ribbons 2 to 32)

7.3.1 Address Range

Tables 7.1 to 7.5 show addresses for Basic I/O ribbon 1. When the subrack is connected to Basic I/O ribbon 2 and above an offset must be added to the address shown to give the correct address range for the ribbon. The offset is given by the formula:-

16 x (N - 1) Where N is the Basic I/O ribbon number.

For example, the offset for Basic I/O ribbon 5 is:- 16 x (5 - 1) = 64

This gives the address range 64 to 79.

For further information about Basic I/O refer to your GEM80 Technical Manual.

7.4 Verification I/O

7.4.1 Addressing Verification I/O Modules

The addresses of Verification I/O modules on a Verification I/O highway are determined by setting switches on the modules themselves.

The switches are set to the required base address, which then becomes the address of the first channel, this means that one channel has one address. The remaining channels of the module are automatically allocated consecutive addresses starting at base address +1.

Care must be exercised when setting the address "window", to ensure that address requirements do not overlap with addresses for other modules.

Additional details can be found in the relevant data sheets for verification modules.

8. CONFIGURATION

8.1 Configuration of 12-slot subracks

8.1.1 Configuration Check Sheet

The Configuration Check Sheet, at the end of this document is to simplify the process of configuration. The Check Sheet may be photocopied as many times as necessary.
The way to use the Check Sheet is outlined in Section 8.1.2.

8.1.2 Configuration Procedure

The following order should be adopted when allocating subrack space and completing the check sheet:-

1. Locate single width, 32-point Basic I/O modules in the lower numbered slots available. Use slots 1 to 4 only if you want a compact layout.

2. Write in the module type and description for each 32-point Basic I/O Module.

3. Read off the addresses used from the 32-point module address row and write them in below the module type and description.

4. Delete the addresses selected in step 3 from the 16 and 8-point Basic I/O module address rows and decoder switch tables.

5. Locate 16-point Basic I/O modules in the highest numbered slots available. Keep the selectable address locations, slots 1 to 6, until last, for flexibility.

6. Write in the module type and description for each 16-point Basic I/O Module.

7. Read the addresses used from the 16-point module address row and write them in beneath the module type and description. If 16-point Basic I/O modules have been located in slots 1 to 6, decide on the addresses to be used and write them in beneath the module type and description.

8. Delete the addresses selected in step 7 from the 32 and 8 point Basic I/O module address rows and decoder switch tables.

9. Locate 8-point Basic I/O modules in the remaining slots.

10. Write in the module type and description for each 8-point Basic I/O module.

11. From the 8-point Basic I/O module address row, decide on the addresses to be used and write them in below the module type and description.

12. Read off the decoder switch settings from the decoder switch tables.

13. Locate Verification I/O modules and allocate the base address.

14. Write in the module type and description for each Verification I/O module.

15. Check that the chosen base addresses on the Verification I/O modules do not conflict with each other or the address range chosen for the 8191 Expander module.

16. Check the whole procedure again.

9. MAINTENANCE

9.1 Cleaning and Visual Inspection

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

9.1.1 General Maintenance

(1) Dust and dirt should be removed periodically from enclosures. Use a vacuum cleaner, brushes and soft cloths.

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

(2) Visual checks should be made for signs of wiring or component damage and any damaged wiring or components should be renewed.

(3) Check all terminations within enclosures for security.

9.2 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).

In any event it is recommended that all spare modules are powered up every 9 months.

10. ORDERING CODES

12-slot I/O Subrack	8859-4003
Subrack	8891-4110
Subrack spacer	8890-4703
Back plane	25X9292/10

Optional Items

Single Blanking Panel	8122-4001
Double Blanking Panel	8122-4002
Rear Cover	8891-4247

11. ADDITIONAL INFORMATION

Further information and help on GEM80 products or applications can be obtained from:

your local Representative

or

Customer Services Dept.
Tel. 01782 781111
International Code 44 1782 781111

CONFIGURATION CHECK SHEET

Subrack No Ribbon No	Slot 12	Slot 11	Slot 10	Slot 9	Slot 8	Slot 7	Slot 6	Slot 5	Slot 4	Slot 3	Slot 2	Slot 1
Module Type No												
B=Basic V=Verification												
Description No of I/O Points Voltage, etc.												
Address word A = input B = output												
I/O point nos												
Address decoder switch used												
Switch settings												

32 POINT MODULES

Address												
I/O Points												

16 POINT MODULES

Address	Switch setting							SW 3		SW 2		SW 1	
	0	15	14	13	12	11	10	1	0	1	0	1	0
	1							3	2	3	2	3	2
	2							5	4	5	4	5	4
	3							7	6	7	6	7	6
	4							9	8	9	8	9	8
	5							11	10	11	10	11	10
	6							13	12	13	12	13	12
	7							15	14	15	14	15	14
I/O Points		0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15	0-15

8 POINT MODULES

Address	Switch setting	SW 3				SW 2				SW 1			
	0	1	1	0	0	1	1	0	0	1	1	0	0
	1	3	3	2	2	3	3	2	2	3	3	2	2
	2	5	5	4	4	5	5	4	4	5	5	4	4
	3	7	7	6	6	7	7	6	6	7	7	6	6
	4	9	9	8	8	9	9	8	8	9	9	8	8
	5	11	11	10	10	11	11	10	10	11	11	10	10
	6	13	13	12	12	13	13	12	12	13	13	12	12
	7	15	15	14	14	15	15	14	14	15	15	14	14
I/O Points		8-15	0-7	8-16	0-7	8-15	0-7	8-15	0-7	8-15	0-7	8-15	0-7

VERIFICATION MODULES

Address												

ALSTOM

ALSTOM T&D Ltd, Power Conversion, Product Service Centre, West Avenue, Kidsgrove, Stoke-on-Trent, Staffordshire, ST7 1TW
Tel +44 (0)1782 781010 Fax +44 (0)1782 781133 E-mail: psc_kidsgrove@powerconv.alstom.com www.alstom.com