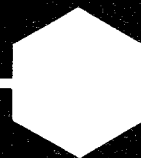


GEC Electrical Projects Limited

GEC Industrial Controls Limited

GEM 80



DESCRIPTION

The 8843 pulse input equipment interfaces two bi-directional pulse generators to GEM 80, and permits control of the counting of these pulses from external plant signals. Outputs are available which can be activated at user defined preset counts. Typical applications for this equipment include clutch and brake shears, position controlled shears, digital speed trim systems and cobble detection systems.

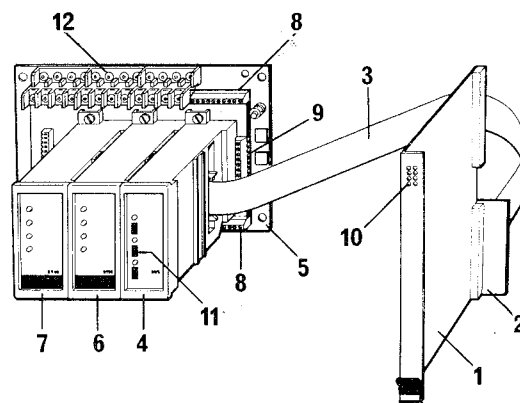
This equipment comprises a module which plugs into the GEM 80 fast I/O highway connected to a termination panel by a ribbon cable. Mounted on the termination panel is a special Delay Block which contains logic suitable for operating clutch and brake shears etc., and two logic I/O blocks; one input and one output.

The input and output signals are routed to and from the counters and associated logic via a mixture of thumbwheel switches mounted on the Delay Block and module mounted switching which can be configured by the control program. This system gives maximum flexibility and the capability of changing the routing during the execution of the program.

FEATURES

- Inputs and outputs monitored and driven independent of GEM 80 scan times. Fast response (~ 1.5 ms)
- User configurable rate multipliers for pulse scaling
- User configurable counters, control signals and control outputs
- Special purpose logic for clutch and brake sequencing
- Crystal Oscillator for accurate timing measurements
- Opto-isolation on all inputs and outputs except for the pulse output signal
- 50 kHz test and timing signal available to both counters.
- Presence of I/O blocks and power to pulse generators monitored

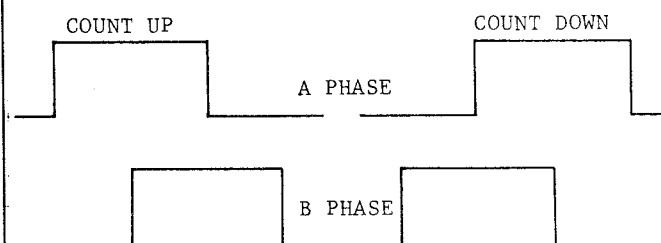
8843 Pulse Trains Input



- | | |
|---|--|
| 1. 8330 Fast I/O Module (single slot width) | 8. Plant Terminations for Pulse Generators |
| 2. 8079 Backplane | 9. Plant Terminations for power output to Pulse Generators |
| 3. Ribbon Cable | 10. Monitor Points |
| 4. 8998 Delay Block | 11. Thumbwheel Switches |
| 5. 8955 Termination Panel | 12. Plant Terminations to I/O Blocks |
| 6. Logic Input Block | |
| 7. Logic Output Block | |

SPECIFICATION

Number of pulse train inputs : 5 from two bi-directional pulse generators, one with a marker pulse



Typical Output Waveform from Pulse Generators

Pulse Generator Voltage : 11 to 26V (above 26V requires resistor in series with inputs)

Pulse inputs signal levels : >9 mA for logic 0
 <5 mA for logic 1

Absolute maximum current input

Average	:	25mA
Peak	:	50mA
Reverse voltage	:	5V

Built-in + 12V supply available for Pulse Generators	:	500mA maximum (derived from GEM 80 + 15V rail)
Power consumption from host controller (maximum)	:	160mA (+pulse gen supply) @ +15V 35mA @ -15V
Input from Pulse Generators	:	50 kHz maximum 10 μ s minimum pulse width
Pulse Output	:	20mA switched current. Frequency user configured.
Internal response time	:	20 μ s maximum
Number of control inputs	:	3 via Logic Input block (1 ms response time) positive or negative edge triggers
Number of control outputs	:	3 via Logic Output block (0.5 ms response for D.C. output block)
Counter 1	:	16 bit bi-directional
Counter 2	:	12 bit bi-directional, with overflow indication
Internal Oscillator	:	50 kHz +30ppm per $^{\circ}$ C
Frequency Multiplier	:	16 bit. Pulses are multiplied by a factor of $\frac{N}{65536}$ where N is user defined
Clutch Engage Delay	:	User settable in 4 ms steps from 1 ms to 129 ms
Brake Disengage Delay	:	User settable in 40 ms steps from 10 ms to 290 ms
Temperature	:	0 to 60 $^{\circ}$ C operating -20 to +70 $^{\circ}$ C storage
Humidity	:	10 to 90% non condensing
Module Dimensions	:	0.8" (20mm) width (plugs into 6U high GEM 80 subrack)
Monitor Sockets	:	Single pole, 2mm diameter plug
Mechanical coding module	:	Upper 2,9 Lower 1,2
delay block	:	U6,L2

Dimensions of Termination panel (including blocks)	:	156 x 238 x 200 mm (high x wide x deep)
	:	rack mounting, $\frac{1}{2}$ rack width on two mounting channels at 222 mm centres

APPLICATION NOTES

1. Data table locations

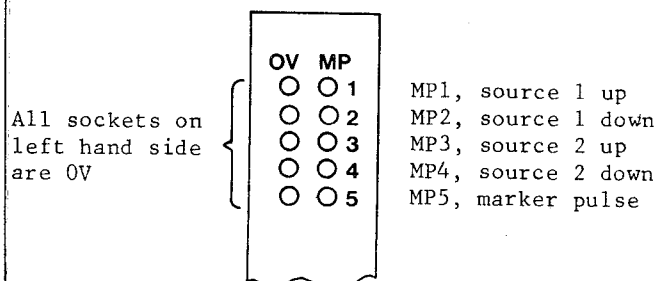
Fast I/O input data is assigned to data table C whilst output data is located in table D. The data concerning this module occupies 8 adjacent table locations starting from a base location determined by the position of the module in the subrack.

Assuming the module occupies the first slot.

D0.0 to D0.4	:	Clear counter 1 Clear counter 2 Load register 1 with counter 1 contents Load register 3 with counter 2 contents Inhibit shear
D1.0 to D1.15	:	Pulse trains routing selection
D2.0 to D2.15	:	Control signals to counters and registers configuration
D3.0 to D3.15	:	Rate multipliers factor
D4.0 to D4.15	:	Counter 1 limit
D5.0 to D5.11	:	Counter 2 limit
D6.0 to D6.5	:	Clutch Engage Delay
D7.0 to D7.2	:	Brake Disengage Delay
D7.3 to D7.5	:	Inversion of Control Inputs
C0.0 to C0.8	:	Inputs 1, 2, 3 and Marker Pulse Counter 1 in limit Counter 2 in limit Counter 2 overflowed Shear initiated All basic I/O blocks present
C0.9 to C0.15	:	Not used
C1.0 to C1.15	:	Register 1 contents
C2.0 to C2.15	:	Register 2 contents
C3.0 to C3.11	:	Register 3 contents
C4 to C7	:	Not used

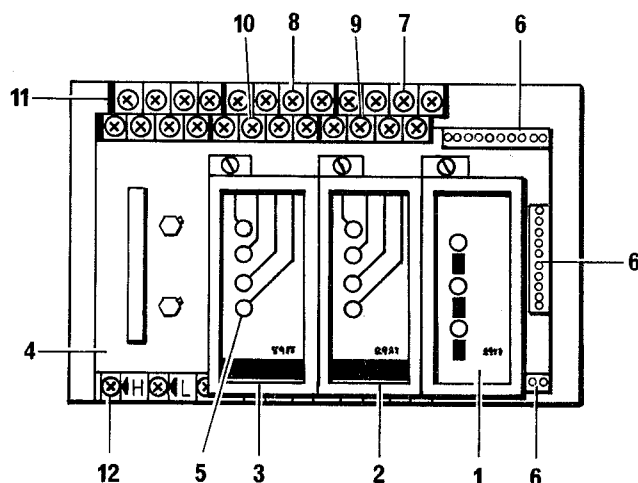
2. MONITOR POINTS

Five monitor points are available on the front panel of the module. These sockets enable the monitoring of the 4 input pulses and the marker pulse at 5V logic levels.



There is optical isolation (giving logic inversion) on the Delay Block between the plant terminals and the module monitoring points.

3. TERMINATION PANEL LAYOUT



TERMINATION PANEL.

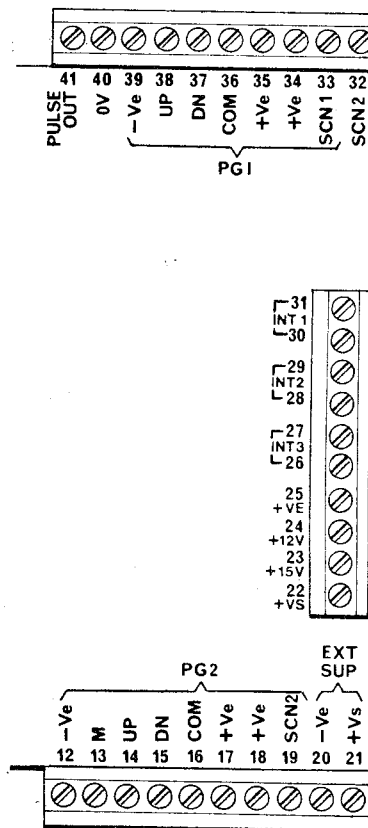
1. Delay Block
2. Input Block
3. Output Block
4. Termination Panel
5. L.E.D. for Input or Output Energised
6. Terminals for Pulse Generators
7. Common Terminals for Input Block
8. Common Terminals for Output Block
9. Input Terminal
10. Output Terminal
11. Raised Barrier between Terminal Groups
12. Power Supply Terminal

NOTE

There is unused spare space on left side of panel.

4. PLANT TERMINATIONS

a) Pulse generators



+ve can either be +15V, +12V or any voltage feed from an external power supply (Vs).

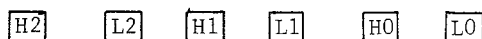
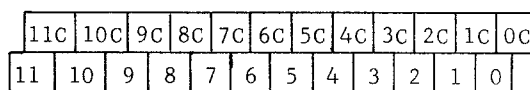
+15V is supplied from the GEM 80 supply via a 2 amp fuse mounted in the Delay Block.

+12V is the Output from a Voltage Regulator which is in turn supplied from the GEM 80 +15V.

-ve is the negative input from an external power supply.

0V is the GEM 80 0V.

b) I/O blocks

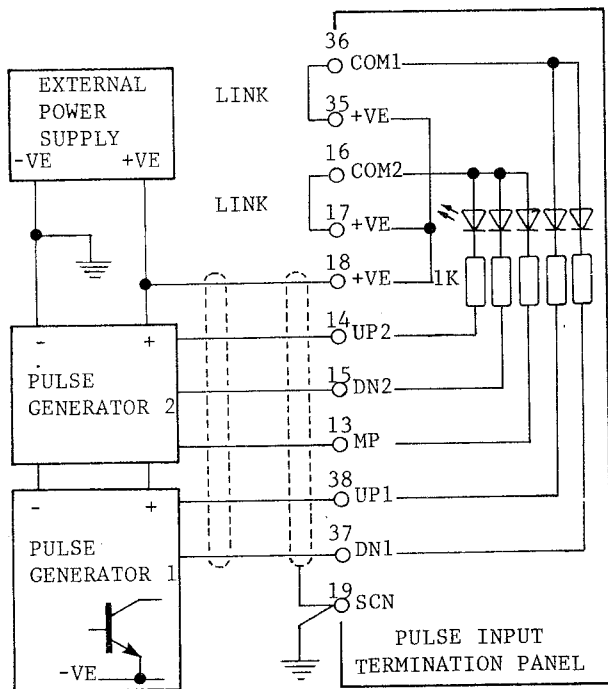


Legend	Function,	Legend	Function
0	Not Used	4,8	Output 3B
1	Input 3	5,9	Output 3A
2	Input 2	6,10	Output 2
3	Input 1	7,11	Output 1
0C-3C	Input common	4C-11C	Output common
H0,L0	Power for I/P	H1-2,L1-2	Power for O/P

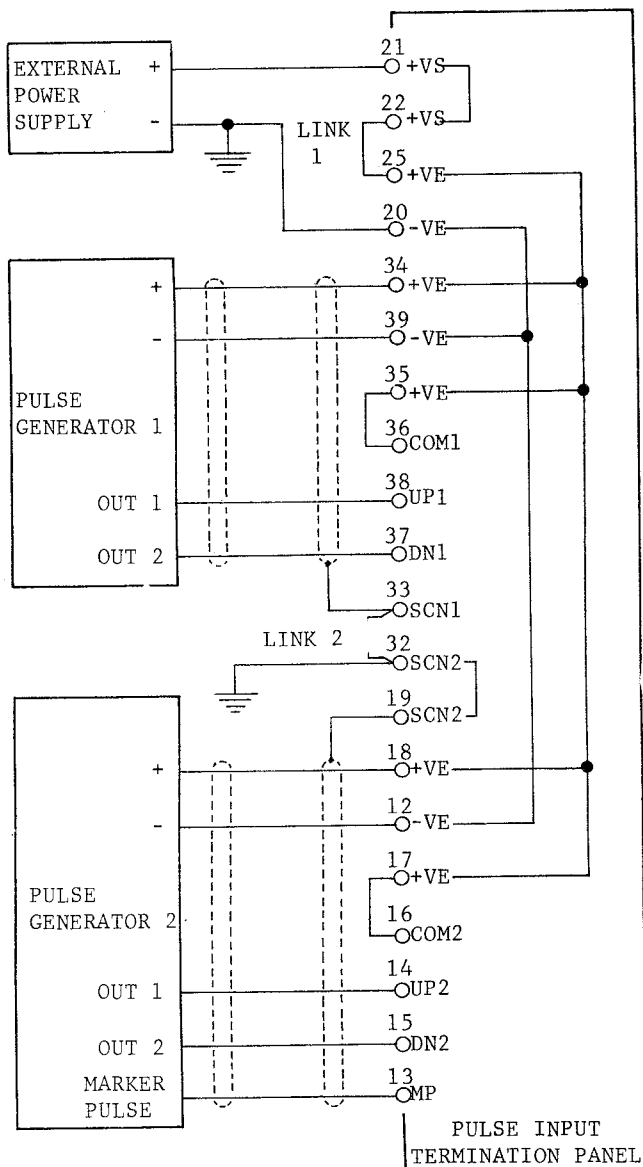
NOTES

- a) All the external connections for the left hand pair of I/O block positions are paralleled internally. Only one more block must be fitted, normally in the right hand position.
- b) The numbering of I/O signals does NOT correspond to the legend on the front of the I/O blocks.
- c) Outputs 3A and 3B are separate output ways which switch together.

4.1 USING A REMOTE POWER SUPPLY



4.2 USING LOCAL POWER SUPPLY



To use the onboard +15V make link 1 connect terminals 23 and 25. Connect terminal 20 to Signal Ground.

To use the onboard +12V make link 1 connect terminals 24 and 25. Connect terminal 20 to Signal Ground.

4.3 INTERLOCKS

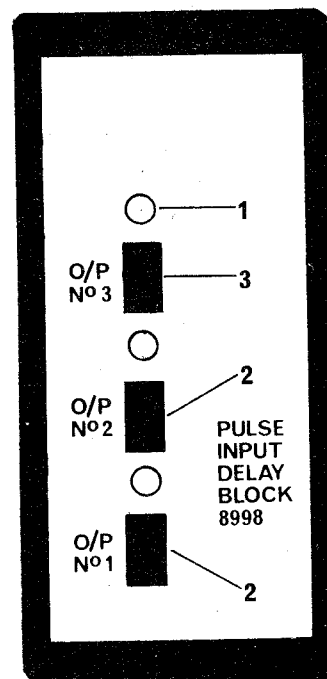
When bit 8 of the first C table location for this module is logic 1 this indicates that all basic I/O blocks are present and that power is available at terminal 25. If an I/O block or blocks are not required the following links must be made.

Always link terminals 31 & 30

Output block missing, link terminals 29 & 28

Input block missing, link terminals 27 & 26

5. DELAY BLOCK



1. LED, activated when output is energised.
2. Thumbwheel switch to determine which out of a possible 8 outputs is used to energise one output on output block.
3. Thumbwheel switch. As for 2 above except that this switch drives two outputs on the output block.

Front panel colour code is silver

ORDERING CODES

1. Equipment

Pulse Trains Input 8843 - 4001

which consists of;

Pulse Input Module
Backplane connector assembly (8079 4001)
Pulse input termination panel

Input block
Delay block
Ribbon cable with connectors

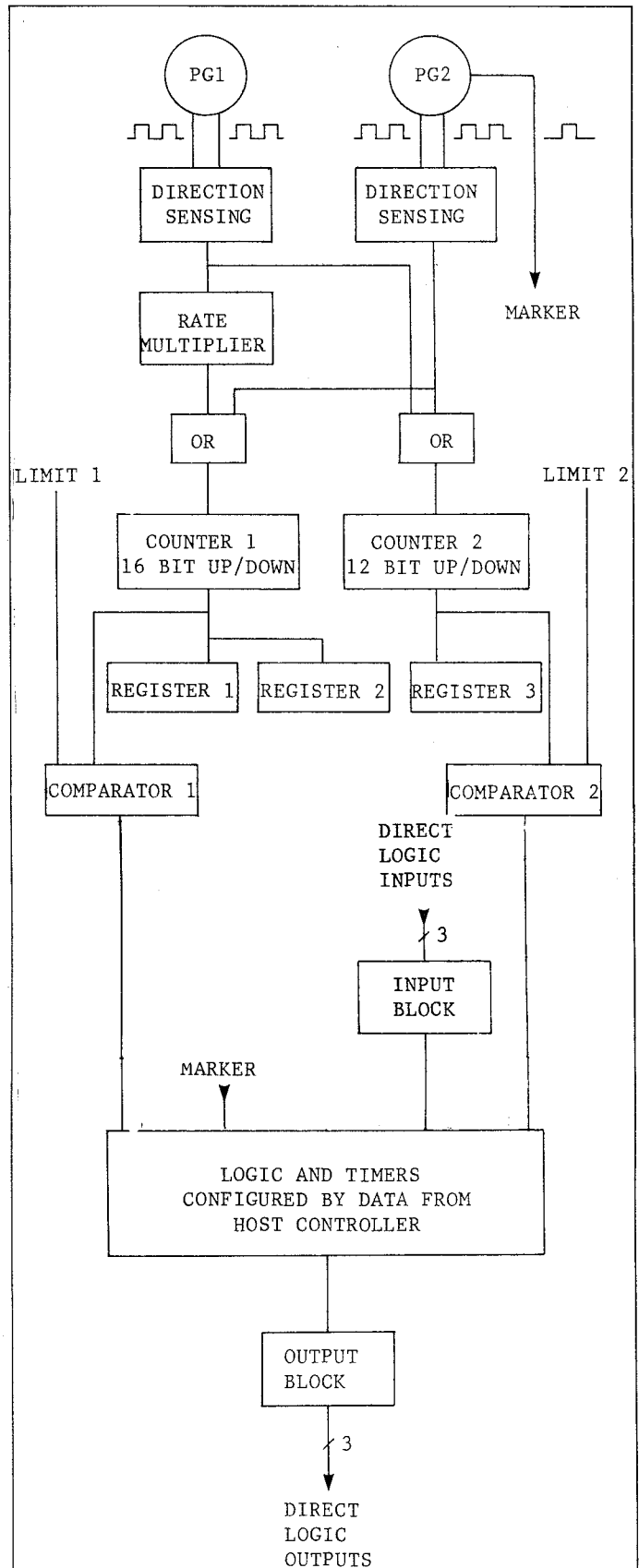
2. Optional extras

AC or DC output block to suit applications
(Note - AC output blocks have slower response)

3. Spares

Pulse Input Module 8330 - 4001

Pulse Input Termination Panel 8955
Delay Block 8998
Input Block 8966



SIMPLIFIED BLOCK DIAGRAM

Note The Company's policy is one of continuous development and improvement and therefore the right is reserved to supply products which may differ in detail from those described and illustrated in this publication. All our products and materials are sold subject to Conditions of Sale available from us on request

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