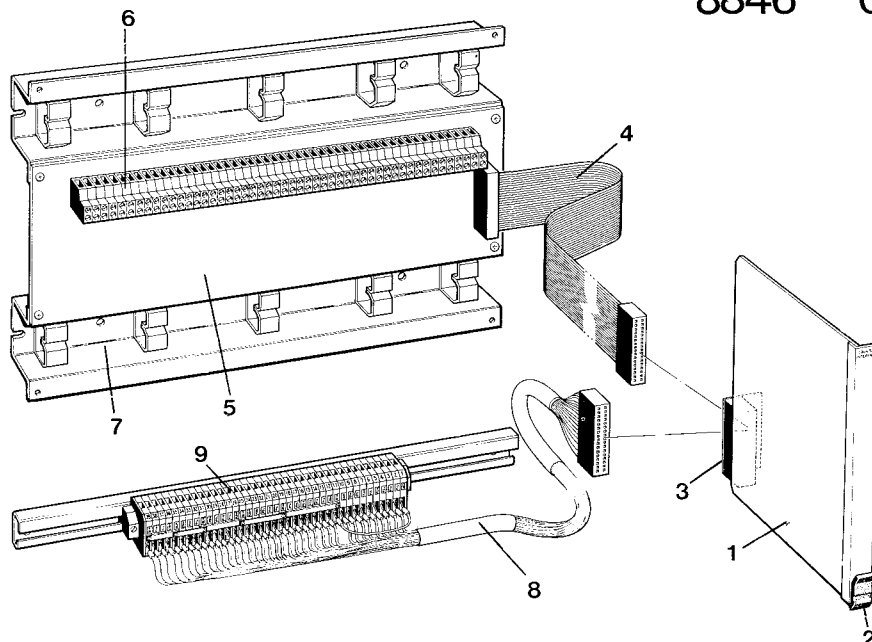




8846 Counter Interface



1. Counter interface module (single slot width in GEM 80 subrack).
2. Withdrawal handle.
3. Backplane.
- Termination Panel Alternative.
4. Ribbon cable.
5. Termination panel.
6. Plant terminals.
7. Mounting kits.
- Terminal Rail Alternative.
8. Wiring harness.
9. Terminal rail with plant terminals.

DESCRIPTION

The 8846 counter interface equipment is intended for use where precise measurement of drive speed ratios is required, for positional measurement and for most general purpose counter applications.

There are six independent counters whose contents may be read by the host GEM 80 controller via the fast I/O highway. The equipment comprises a counter interface module which plugs into the subrack of a GEM 80 controller and connects to the fast I/O highway. Plant wiring can be terminated onto either a termination panel or the more compact terminal rail which in turn connects to the counter interface module.

FEATURES

- Optical isolation of all inputs.
- Multiphase inputs and direction sensing.
- Pulse counting of both rising and falling edges.
- Remote start/stop from plant contacts.
- Programmed start/stop from GEM 80 control bits.
- Simultaneous strobing of all counter outputs.

- Read with clear or continuous counting options.
- On board quadrature phase clock.

SPECIFICATION

- | | | |
|---------------------|---|---|
| Inputs | : | Counter input isolation is specified as +100V between inputs of different counters and between these and the GEM 80 signal ground. Counters with more than one input have a common negative return. |
| Input signal levels | : | There is a choice of input signal levels to cover the range from 4.5V to 32V. |
| Input connections | : | Connections are made via a 34 way female connector which interfaces with the lower connector via a 8062 backplane. |
| Multiphase inputs | : | Counter 1 accepts three phase input pulses or two phase input pulses. Counters 2,3 & 4 accept two phase input pulses. Counters 5 & 6 are single input counters. |

Pulse counting : Both rising and falling edges of all pulse inputs are counted. Thus the count rate is twice the number of pulse inputs times the pulse frequency.

Max. input frequency : Single phase inputs 25KHz
Two phase inputs 12.5KHz
Three phase inputs 8.3KHz
These frequencies assume approximately square wave inputs.

Remote Start/Stop : Counting with this feature may be started or stopped from a plant contact via an on board optical isolator (closed=start, open=stop).

Programmed Start/Stop : Counters with this feature may be started or stopped by a GEM 80 control bit. (1 = Start, 0 = Stop).

Simultaneous strobe : The contents of all counters are strobed simultaneously into output registers on each scan of the fast I/O.

Read with clear : Counters with this feature may be cleared immediately after their contents have been strobed into output registers. This feature is called up by setting a control bit to '1'.

Normal read : Counters count up or down continuously.

On board clock : An on board crystal controlled clock with quadrature phase outputs may be connected to the LV inputs of one of the counters. The pulse frequency is 15.625KHz. (+30 parts per million)

Individual Counter facilities

Counter No.	1	2	3	4	5	6
No. of phase I/Ps	3	2	2	2	1	1
Capacity (No. of binary bits)	16	16	16	16	12	12
Remote Start/Stop			-	-	-	-
Program bit for Start/Stop *	D0.0	D0.1	D0.2	D0.3	-	-
Program bit for Read & Clear *	D0.4	D0.5	D0.6	D0.7		
Counter O/P Address *	C1	C2	C3	C4	C5	C6

* Table addresses shown for module in first slot on fast I/O highway. Addresses are offset by a multiple of 32 in other positions.

Power Supply : +15V at 200mA from Fast I/O.

Mechanical Interlocks : UPPER CONNECTOR 3,4
LOWER CONNECTOR 1,2

Temperature : 0 to 60°C operating.
-20 to 70°C storage.

Humidity : 10 to 90% non-condensing.

Terminal Rail

Dimensions : 40 x 483 x 46mm
(high x wide x depth)

Mounting : 19" (483mm) rack or panel
: Mounting space required is 133mm (3u) between adjacent terminal rail centres

Wiring Harness

Length : 3 metres

Connector : Uniflex UFS-34B-01 with polarising key at pin 2

APPLICATION NOTES

1. INSTALLATION

The module is a single width pcb which plugs into the Fast I/O via the upper 64 way connector. The lower connector plugs into an 8518 backplane on which is mounted a 34 way connector which plugs into a ribbon cable connector which connects to a termination panel, or to a UFS connector carrying a cable harness with faston connectors and terminals. Ribbon/UFS connector numbers are as in the following table.-

Counter No.	1	2	3	4	5	6
Ø1 LV	3	13	19	25	29	33
Ø1 HV	4	14	20	26	30	34
Ø2 LV	5	15	21	27	-	-
Ø2 HV	6	16	22	28	-	-
Ø3 LV	7	-	-	-	-	-
Ø3 HV	8	-	-	-	-	-
Start/Stop LV	9	17	-	-	-	-
Start/Stop HV	10	18	-	-	-	-
Common	11	12	23	24	31	32

2. INPUT SIGNAL LEVELS

	Logical 0	Logical 1
LV & HV in parallel	< 1.5V	+4.5V to 10V
LV	< 1.7V	+6V to 15V
HV	< 3.0V	+12V to 32V

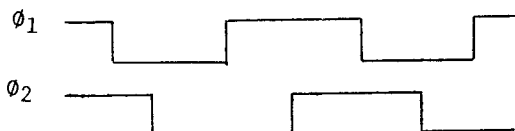
Load current is 10-30mA over voltage ranges shown above.

Maximum voltages are limited by the dissipation of internal resistors. For higher input voltages add external resistors in series with the HV inputs of value 50 ohms per volt above 20V and rated to carry 20mA.

Note that all inputs are positive with respect to the appropriate common for each counter.

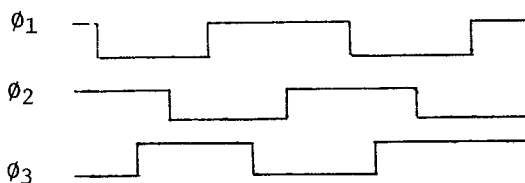
3. MULTIPHASE INPUTS

Two phase : COUNT UP ϕ_1 leads ϕ_2 by 90°
 inputs COUNT DOWN ϕ_2 leads ϕ_1 by 90°



Three phase : COUNT UP ϕ_1 leads ϕ_2 by 120°
 inputs ϕ_2 leads ϕ_3 by 120°

COUNT DOWN ϕ_3 leads ϕ_2 by 120°
 ϕ_2 leads ϕ_1 by 120°



Note that both rising and falling edges of all pulses are counted.

Multiphase input counters will not count any pulses if only one phase is applied.

The three phase input counter will operate as for a two phase input counter if ϕ_3 is not connected.

4. PULSE COUNTING AND MAXIMUM COUNT RATE

Counter inputs are strobed once every 16/us. Detection of a change of state in either direction causes the counter to increment or decrement by one count as determined by the forward reverse logic. This gives a maximum counting rate of 1 pulse every 16/us or 62.5KHz with perfectly even timing between pulse edges. The recommended maximum rate is 50KHz giving 25KHz for single input counters 12.5KHz for 2 phase input counters and 8.3KHz for 3 phase input counters.

5. USE OF ON BOARD CLOCK

The on board clock has the following outputs:

ϕ_1 a3L
 ϕ_2 all
 $\phi_1/a5L$ (ϕ_1 inverted)

Note: ϕ_1 leads ϕ_2 by 90°

0V common returns at signal ground potential are provided at C1L, C3L & C5L. The signal level is approximately -15V via 500 ohms and is suitable for applying to the LV inputs of the counters.

The pulse frequency of 15.625KHz gives the maximum counting rate of 62.5KHz when applied to a two phase input counter, or 31.25KHz for a single phase input counter. The maximum rate of 62.5KHz is feasible in this case because the pulse outputs are derived from the same crystal controlled clock which drives the pulse input strobing logic.

This facility effectively gives an accurate measurement of the time between scans of the Fast I/O and can be used to calculate accurate positional information of drives connected to pulse generators on other counter inputs.

6. SIMULTANEOUS STROBING OF COUNTER OUTPUTS

Each time the address C0 is decoded from the Fast I/O, all the counter outputs are strobed into output registers to be subsequently read by addresses C1 to C6 for counters 1 to 6. Thus the numbers read from each counter have been incremented over identical time intervals.

7. READ WITH CLEAR

If the read with clear bit is set (bits D0.4 to D0.7 for counters 1-4) the counter will be cleared immediately after its output has been strobed into the output latch. In this case the positive or negative value read from the counter on each scan might be added to a GEM 80 register, thus allowing features such as datum set or overflow to zero at a pre-determined value to be carried out simply in the GEM 80 user language.

When this feature is not used, the counter will count up/down continuously from its pulse inputs and may give large counts which would be interpreted as negative values or overflow through zero.

8. START STOP FACILITIES

Counters 1-4 may be started by a GEM 80 control bit (D0.0 - 0.3 respectively). A logical '1' will allow the appropriate counter to count.

Counters 1 & 2 also have the facility to be started by an opto isolated remote plant contact with signal levels as for the pulse inputs and using the same common return as the pulse inputs.

If the start/stop control bit is set to zero the counter will start for a high input from the remote contact.

If the remote start/stop input is unconnected the counter will start or stop from the control bit i.e. the two start stop functions are logically OR'ed to start.

9. FAST I/O CONFIGURATION

The P table for the slot in which the board is fitted should be set to the value for 8 inputs and 8 outputs. The base address for that slot must be added to the board addresses D0 and C1 to C7 when programming the GEM 80.

10. USER CONNECTIONS

The 8033 termination panel markings are as shown in figure 1.

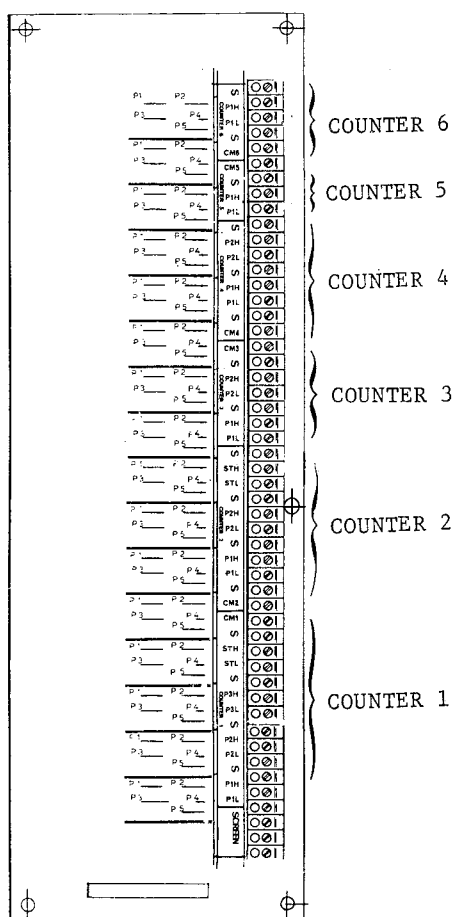


Figure 1 Termination Panel Layout

The legend against the terminals on the termination panel corresponds to the second column of table 1, but with "S" instead of "SCN" and "CM1" to "CM6" instead of "COM".

Terminal rail markings are connected as shown in Table 1.

Table 1.

COUNTER SIGNAL	TERMINAL MARKER	COUNTER					
		1	2	3	4	5	6
		TERMINAL NUMBER					
$\emptyset_1L$	P ₁ L	2	13	20	27	32	37
$\emptyset_1H$	P ₁ H	3	14	21	28	33	38
$\emptyset_2L$	P ₂ L	4	15	22	29	-	-
$\emptyset_2H$	P ₂ H	5	16	23	30	-	-
$\emptyset_3L$	P ₃ L	6	-	-	-	-	-
$\emptyset_3H$	P ₃ H	7	-	-	-	-	-
START/STOP LV	STL	8	17	-	-	-	-
START STOP HV	STH	9	18	-	-	-	-
COMMON	COM	10	12	24	26	34	36
SCREEN	SCN	11	19	25	31	35	39

ORDERING CODES

1. Equipment

(a) Termination Panel Option:-

Two order codes are required.

- (i) Counter Interface module, backplane assembly, 2 metre ribbon cable and hardware for mounting termination panel.

8846-4001

- (ii) Termination Panel with scaling for counter interface and contractual scaling

8033-XXXX

(b) Terminal Rail Option:-

Counter Interface module, backplane assembly, 3 metre wiring harness and terminal rail.

8846-4002

2. Spares

Counter Interface Module	8332-4001
Backplane Connector Assembly	8891-4118
Terminal Rail	8891-4009

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