GEC-Elliott Process Automation Limited

Instruction Manual
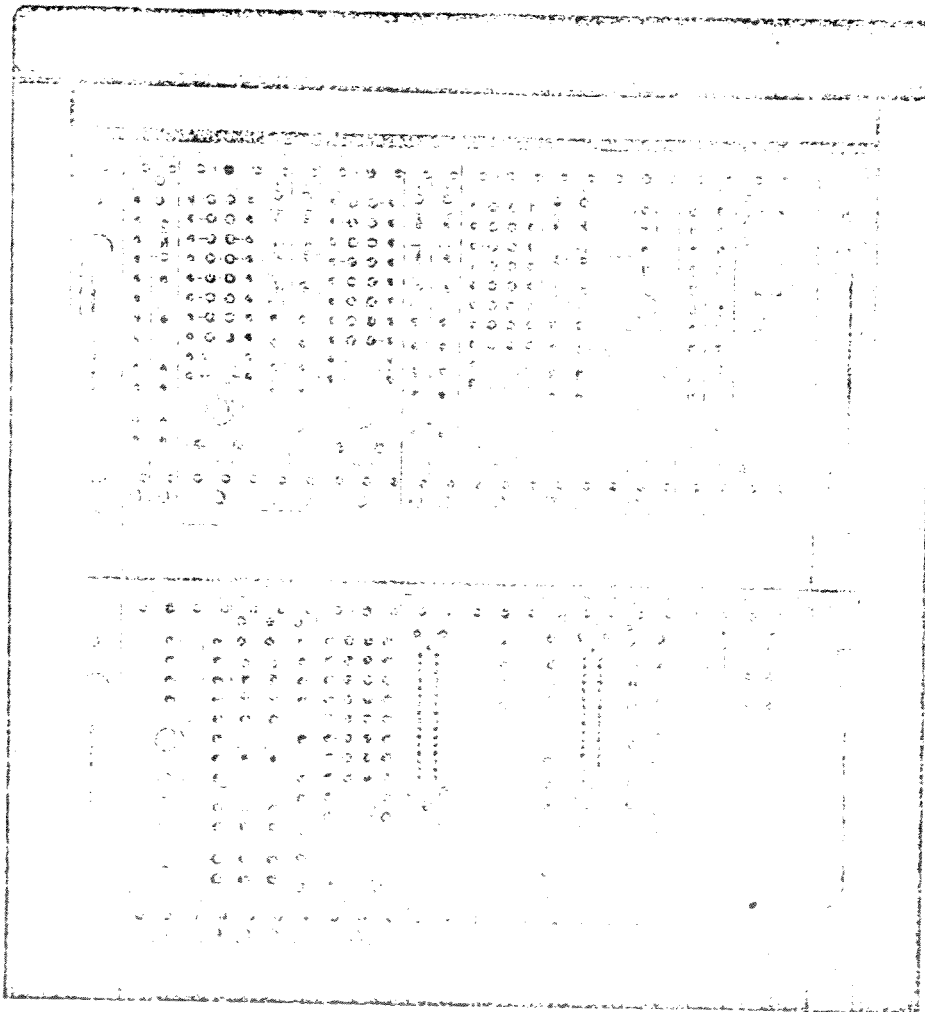
CAMAC

PRESET SCALER

PSR 0801

F3

CAMAC
PRESET SCALER
TYPE PSR 0801

.... GENERAL DESCRIPTION

The GEC-Elliott Preset Scaler Type PSR 0801 is a single-width module containing one 8-decade B.C.D. count down scaler. This unit may be preset manually from front panel controls or from the CAMAC dataway.

Selected by a rear panel switch the output from the socket on the front panel is one of three modes, level, pulse or serial.

Level Output - in this mode the unit generates a logical '1' output on reaching zero and remains in this state until reloaded with a preset number.

Pulse Output - the unit generates a logical '1' output on reaching zero. The width of this pulse is variable by means of a potentiometer and is preset at the factory to $1\,\mu s$.

Serial Output - input pulses are transferred to the output until the unit reaches zero.

Scaler contents and preset number are displayed on miniature 7-segment light-emitting

diodes in floating point form i.e. $A.B \times 10^E$

Type PSR 0801 scaler also has the ability to automatically reload the preset number.

Front Panel Displays
N Lamp - indicates module has been selected. ◁
L Lamp - indicates LAM memory is set.
System Load Lamp - indicates that the unit is under dataway control and that the preset number displayed was loaded via the dataway.
Scaler Contents Display - the three light-emitting diodes present the instantaneous contents of the scaler as it counts down.
Preset Number Display - presented exactly as Scaler Contents display to indicate the preset number from which the unit is counting down.

Front Panel Switches
Mode Switch - Three position, System (SYS) Controlled (CONTR) and External (EXT).
Recycle Switch - Two position, Recycle (CONT) and Single Shot (SS).

.... SPECIFICATION

COMMAND STRUCTURE

Addressed Commands

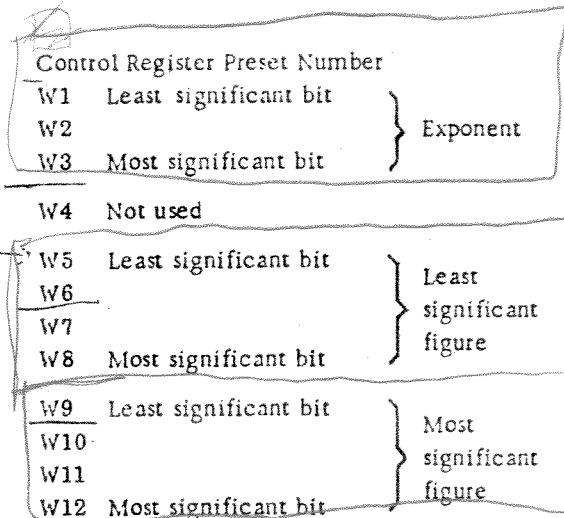| Command	Description	Remarks
N.A(0).F(0)	Read Scaler	X = 1, Q = 1
N.A(0).F(6)	Read module characteristics	X = 1, Q = 1, (000025 10g onto Dataway
N.A(0).F(8)	Test LAM	X = 1, Q = 1 if LAM is generated
N.A(0).F(9)	Reload scaler, Clear LAM	X = 1
N.A(0).F(10)	Clear LAM and Reload preset number if LAM is enabled	
N.A(0).F(16)	Overwrite scaler	X = 1, Q = 1
N.A(0).F(24)	Disable system preset	X = 1
N.A(1).F(24)	Disable LAM	X = 1
N.A(0).F(25)	Increment scaler	X = 1
N.A(0).F(26)	Enable system preset	X = 1
N.A(1).F(26)	Enable LAM	X = 1
N.A(0).F(27)	Test status	X = 1, Q = 1 if scaler contents are zero
N.A(1).F(27)	Test status	X = 1, Q = 1 if in system preset mode
N.A(2).F(27)	Test status	X = 1, Q = 1 if LAM is enabled

CAMAC
PRESET SCALER
TYPE PSR 0801

Non-addressed Commands

Clear (C)   - Sets scaler to preset number in manual preset mode and clears the dataway preset register and L flag

Inhibit (I)   - Inhibits counting of external pulses

Initialise (Z) - Resets scaler to preset number in manual preset mode, clears the dataway preset register and disables all features

Control Register Preset Number

W1	Least significant bit	} Exponent	E
W2		
W3	Most significant bit	

W4   Not used

W5	Least significant bit	} Least significant figure	B
W6		
W7		
W8	Most significant bit	

W9	Least significant bit	} Most significant figure	A
W10		
W11		
W12	Most significant bit	

FACILITIES

Input
Number of Inputs: 1
Signal Standard: Camac (EUR 4100) for terminated signals
Pulse Width: 25 ns minimum at -12 mA
Impedance: 50 ohms
Pulse Repetition Frequency: 20 MHz maximum

Reflections: Less than $\pm 15\%$ on a 1 ns (10-90%) rise or fall time with a -18 mA pulse
Duty Rate: 50% at 20 MHz
Coupling: D.C. coupled
Connector: Lemo RA 000250 coaxial on front panel

Output
Number of Outputs: 1 (conditioned by rear panel switch)
Signal Standard: (a) Logical '1' -14 mA to -18 mA into 50 ohms
(b) Logical '0' -2 mA to 0 mA into 50 ohms

(c) Pulse output in serial form: the unit stretches input pulses by approx. 30 ns and feeds them to the output socket

Indication
Scaler Contents: Three miniature 7-segment light-emitting diodes show instantaneous contents in floating point form

Preset Number: Three miniature 7-segment light-emitting diodes show number in floating point form

N Lamp: Single light-emitting diode illuminated when module is addressed
L Lamp: Single light-emitting diode illuminated when scaler contents reach zero
SYS LOAD Lamp: Single light-emitting diode illuminated while scaler is under dataway control

Controls
Mode Selector Switch. Front panel, 3-position toggle:
(a) System (SYS)
(b) Controlled (CONTR)
(c) External (EXT)

Recycle Switch Front Panel, 2-position toggle:
(a) Recycle (CONT)
(b) Single shot (SS)

[handwritten annotations at top:] SYS LAM ... ENABLED / CONTR LAM ... DISABLED / EXT complement ... (no LAM)

CAMAC
PRESET SCALER
TYPE PSR 0801

A.B.E. Switch Front panel 3-position toggle:	(a) Most significant figure (b) Least significant figure (c) Exponent of the number	Preset Push Button Front Panel:	Transfers the three nos. from the loaded register to the 8-decade B.C.D. count down register
Load Push Button Front panel:	Increments the register selected by the A.B.E. switch	Output Conditioning Switch. Rear Panel 3-position toggle:	(a) Level output (b) Pulse output (c) Serial output

Size and Dissipation
Single width CAMAC module

Dissipation 12.6 W, +6 V 2.0 A, -6 V 100 mA

. . . . DETAILS OF OPERATION

The Mode Selector Switch has three positions:
(a) System (SYS)
(b) Controlled (CONTR)
(c) External (EXT)

The Recycle Switch has two positions:
(a) Recycle (CONT)
(b) Single Shot (SS)

Functions obtainable from combinations of the above switches are:
1. SYS-SS
In the system mode the LAM cannot be disabled
(a) Generates LAM
(b) F(10) clears LAM
2. SYS-CONT
(a) Generates LAM
(b) F(10) clears LAM, reloads preset number
        Note: No automatic recycle
3. CONTR (LAM enabled) - SS
In the controlled mode the LAM can be enabled and disabled via the dataway
(a) Generates LAM
(b) F(10) clears LAM
4. CONTR (LAM disabled) - SS
(a) No LAM generated
(b) F(10) clears LAM
5. CONTR (LAM enabled) - CONT
(a) Generates LAM
(b) F(10) clears LAM and reloads preset number
        Note: No automatic recycle
6. CONTR (LAM disabled) - CONT
(a) No LAM generated

(b) F(10) clears LAM
        Note: No automatic recycle
7. EXT-SS
In the external mode no LAM can be generated
(a) No LAM generated
(b) F(10) clears LAM
8. EXT-CONT
(a) No LAM generated
(b) F(10) clears LAM
(c) Module automatically reloads the preset number and enables further cycles

A.B.E. Switch and Load Push Button
The Manual preset number is set by selecting one of three decade counters in turn with the A.B.E. Switch and loading the counter with the required number. The number is incremented by means of the load push button.
Note: To view the manual preset number the unit must be set to Manual Control.

Preset Push Button
This push button has a dual purpose: it sets the module into the Manual Preset Mode, overriding the mode selected via the dataway and loads the manual preset number into the Scaler.

Rear Panel Switch
This three position switch conditions the output as follows:
(a) Level Output
(b) Pulse Output
(c) Serial Output

This description should be read in conjunction with the Circuit Diagrams NU695D4 and NU695D5 together with the data sheets of the relevant Integrated Circuits.

The counting section consists of eight, parallel load, decade down counters. These are connected in a ripple through mode with the input clock pulse injection point being determined by the Exponent setting.

It can be seen that only the two most significant decades are loaded with variable digits the remainder are loaded with zeros, and the starting point of the countdown is determined by the Exponent.

The Exponent display of the counting section is obtained by adding the number of the highest decade containing non zero to the Exponent Loaded plus one. For example assume E=7 and the counting section has a number in the 8th decade:- Displayed Exponent = 7+7+1 = 15.

If on the decode from the binary adder only the first 3 bits are decoded 15 will be displayed as 7.

This means the number displayed at zero would be equal to Exponent loaded + 1. Therefore, when the counter is at zero the output of the adder is gated off forcing the display to zero.

The contents of the counter are always presented to the Dataway in the form $A.B. \times 10^E$. It is, therefore, necessary to multiplex the output of the decade counters to the respective read lines according to the output of the priority encoder (9318). As the higher decades reach zero this is detected by the 9318 and lower decade multiplexers are enabled. The outputs of the multiplexers are gated onto the Dataway Read Lines and fed into the Seven Segment decoders for the L.E.D. displays.

The preset number is stored in a latch when loaded from the dataway or in a decade counter when loaded from the front panel push button.

These two numbers are multiplexed via the 74157 devices depending on the mode selected.

The output of the multiplexers are used to load the preset number

into the counter section and to drive the Preset Number display.

On reaching zero the output GS of the 9318 goes high triggering the monostable and clocks the input gate lock out bistable. The output of the monostable is used to dissable the two counter input multiplexers and is differentiated to form a load pulse for the counter section. This ensures that the counter contains zero, as at max. P.R.F. the propogation delay from input to input gate disable is sufficient to allow another pulse into the counting section.

A three position switch allows 3 output modes:-

1) Pulse

2) Level

3) Serial

The width of the pulse is adjustable by means of the potentiometer R.V.1.