1. DESCRIPTION

1.1 FUNCTIONAL DESCRIPTION

The CAEN Model C 257 16-CHANNEL 100 MHz SCALER is a 1-unit wide CAMAC module provided with 16 independent 24-bit counting channels operating at the guaranteed input frequency of 100 MHz.

Each channel is provided with two internal jumpers by which it is possible:

- to connect the channel itself to the preceding one: each channel adds a 24-bit counting capacity to the previous one. In this way a 24*16 bit multichannel scale is available and various configurations are possible;
- to enable/disable the LAM generation.

Generally a LAM signal (if enabled) is generated whenever the last bit of a channel becomes TRUE.

However it is possible to generate the LAM signal when the 16th bit of a channel becomes TRUE, by simply removing one or both of the internal jumpers labelled "CH 0-7 LAM SEL" and "CH 8-15 LAM SEL".
The front-panel red LED "INT LAM" lights up when the internal LAM signal is TRUE.

The position of all the jumpers is shown in Figure 1 .

Specific CAMAC functions and commands allow the full control of the module and three front-panel connectors (labelled "INH", "CLR", "TST") can be used as follows:

- an INHIBIT input signal (NIM level) sent through the "INH" connector disables the counting. The front-panel green LED "INH" switches off when the INHIBIT signal is present (either from CAMAC or from front panel connector);
- a FAST CLEAR input signal (NIM level) sent through the "CLR" connector resets all the channels;
- a TEST input signal (NIM level) sent through the "TST" connector increases all the channels (if the module is configured with 16 independent channels).

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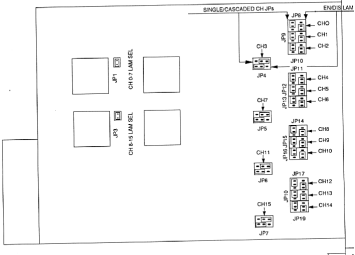
The module is available in three different versions:

- C 257 E, differential ECL inputs;

- C 257 N, NIM inputs;

- C 257 T, TTL inputs.

The functional block diagram of the module is shown in Figure 2.



The module comes from CAEN with the internal jumpers configured as shown in figure above.
In this configuration each channel is an independent 24-digit counting scale and it does not generate LAM.

The jumpers dedicated to the SINGLE/CASCADED channel selection are located in the left column, with regards to CH0-CH1-CH2-CH4-CH5-CH6-CH8-CH9-CH10-CH12-CH13-CH14, and on the upper row with regards to CH3-CH7-CH11-CH15.

SETTING THE JUMPERS:

-by setting the SINGLE/CASCADED channel jumper to the lower position, the relevant channel is cascaded with the preceding one.

- by setting the END/S.LAM jumper to the upper position, the relevant channel generates LAM.

- by removing the jumper "CH 0-7 LAM SEL", the LAM is generated whenever the 16th bit of one of the eight channels CH0-CH1-CH2-CH3-CH4-CH5-CH6-CH7 becomes TRUE, or whenever the 24th bit of one of the remaining channels becomes TRUE.

- by removing the jumper "CH 8-15 LAM SEL", the LAM is generated whenever the 16th bit of one of the eight channels CH8-CH9-CH10-CH11-CH12-CH13-CH14-CH15 becomes TRUE, or whenever the 24th bit of one of the remaining channels becomes TRUE.

Figure 1 Internal Jumpers.

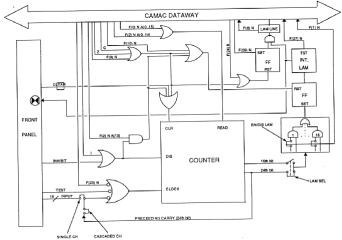


Figure 2 Functional Block Diagram of the Module.

2. SPECIFICATIONS

2.1 PACKAGING

Single width CAMAC module.

2.2 EXTERNAL COMPONENTS

- No. 2 Low profile header connectors "CH0..CH7" "CH8..CH15" (for ECL version) type 3M 7616-5002 8+8; 110 Ω impedance. 16 input channels.

- No. 16 LEMO 00-type connectors "INPUTS 0..15" (for NIM and TTL versions); 50 Ω impedance. One per channel.

- No. 1 LEMO 00-type connector "INH" (ECL, NIM and TTL versions); 50 Ω impedance. INHIBIT input.

- No. 1 LEMO 00-type connector "CLR" (ECL, NIM and TTL versions); 50 Ω impedance. CLEAR input.

- No. 1 LEMO 00-type connector "TST" (ECL, NIM and TTL versions); 50 Ω impedance. TEST input.

- No. 1 green LED "$\overline{\text{INH}}$" (ECL, NIM and TTL versions) signalling, when alight, the absence of the INHIBIT signal.

- No. 1 red LED "INT LAM" (ECL, NIM and TTL versions) signalling, when alight, the presence of the internal LAM.

2.3 INTERNAL COMPONENTS

- No. 2 jumpers "CH 0-7 LAM SEL" (JP1) and "CH 8-15 LAM SEL" (JP3) for setting the LAM generation to the 24th bit (jumper inserted) or to the 16th bit (jumper removed).

- No. 16 jumpers (one per channel) for cascading the channels (see Figure 1).

- No. 16 jumpers (one per channel) for enabling/disabling the LAM signal (see Figure 1).

- No. 1 fuse 5 A, +6 V.

- No. 1 fuse 2 A, -6 V.

2.4 POWER REQUIREMENTS

+ 6 V at 1.4 A.

- 6 V at 230 mA.

2.5 CHARACTERISTICS OF THE SIGNALS

- INPUT CHANNEL SIGNAL:	std. NIM level or std. TTL level 50 Ω impedance std. differential ECL level 110 Ω impedance maximum frequency 100 MHz; minimum width 5 ns; minimum time interval between two pulses: 5 ns.
- INHIBIT:	std. NIM level 50 Ω impedance minimum width 50 ns. It must precede the input channel signal by 35 ns.
- CLEAR:	std. NIM level 50 Ω impedance minimum width 60 ns.
- TEST:	std. NIM level 50 Ω impedance maximum frequency 50 MHz; minimum width 10 ns.

3. CAMAC FUNCTIONS

F(0) N A(0...15)	Reads the value held in the counter addressed by A(0...15). Q is true only if the input is inhibited.
F(1) N	Reads the status of the internal jumpers for LAM enabling/disabling (R(i)= 1 if CH(i)= enabled).
F(2) N A(0...15)	Same as F(0) N A(0...15), but with A(15) reads the 15th channel and, if the input is inhibited, resets all the channels and the LAM line.
F(8) N	Tests the LAM Line. Q is true if LAM is enabled and present.
F(9) N	Resets the module (All the scales and the internal LAM are set to 0. The LAM line is disabled).
F(10) N	Clears LAM.
F(24) N	Disables LAM.
F(25) N	Tests the counters (same as the Test Input signal). At the S2 time all the channels are increased (valid only in single channel configuration).
F(26) N	Enables LAM.
F(27) N	Tests the internal LAM. Q is true if the internal LAM is enabled and present.
C, Z	Same as F(8) N.
I	The inhibit line disables all the inputs.

X response for each valid function.
Q response for each valid function, unless otherwise specified.

4. OPERATING MODE

The module has 16 independent 24-bit channels that can be cascaded by internal jumpers in order to obtain various combinations of multichannel scales with equal or different counting capacity.

For example, a 72-bit scale is obtained by connecting channel 3 with channel 4 and channel 4 with channel 5: in this case the module is configured with;

one 72-bit scale (channel 3, 4, 5):
its MSB is the 24th bit of the channel 5.
Thirteen 24-bit scale (channel 0, 1, 2, 6....15).

In a cascaded channels scale, the reading must begin at the lower channel.

CAUTION: *turn OFF the CAMAC crate before inserting or removing the module.*

4.1 OPERATIONS TO BE PERFORMED TO PREARRANGE THE MODULE.

(a) Remove the component-side cover from the module.
(b) Set the jumpers corresponding to the channel cascading according to the required number and width of the scales (refer to Figure 1).
(c) Set the jumpers labelled "CH 0-7 LAM SEL" and "CH 8-15 LAM SEL" according to when the LAM has to be generated (refer to Figure 1).

If the above mentioned jumpers are inserted, the LAM is generated:
- whenever the 24th bit of a single channel becomes TRUE;
- whenever the 24th bit of the last channel in a multichannel scale becomes TRUE: in this case the LAM generation of the preceding cascaded channels must be DISABLED.
On the contrary, if the jumpers are removed, the LAM is generated when the 16th bit becomes TRUE.

(d) Enable/Disable the LAM generation on each scale by proper settings of the relevant jumpers (refer to Figure 1).
(e) place the module's component-side cover into its housing.

THE MODULE IS NOW READY TO OPERATE AS REQUIRED

4.2. OPERATIONS TO BE PERFORMED TO OPERATE THE MODULE.

(a) Insert the module into a CAMAC station.
(b) Turn ON the CAMAC crate: the green LED "$\overline{INH}$" lights UP if the CAMAC inhibit line is c
(c) Send the input signals to the selected scales through the relevant front-panel connectors.

THE COUNTING BEGINS AND THE MODULE CAN BE CONTROLLED VIA CAMAC.


16 CH NIM
SCALER
INPUTS
0
15
INH
CLR
TST
SER. N.