



Technical Information Manual

MOD. N 146

**PROGRAMMABLE
DELAY UNIT**

OBJECT: FEATURE MODIFICATION

Due to changes in the components' characteristics, the propagation time of our model N146 has been modified to 6.5 nsec. (previously declared as 6 nsec. in the technical specifications).

Our technicians are at your disposal for any further information.

C.A.E.N. spa

FEATURES

- Delay selectable from **7.0 to 85.5 ns**, step **0.5 ns**.
- One NIM module wide.
- LED display of the programmed delay value (ns).
- Non-volatile storage of the delay value. At restart, the last active delay value is restored.
- The module can be monitored and controlled **locally or remotely**. In remote mode the unit can be programmed with the Manual Controller (Mod. A 119A), or with the CAMAC Controller (Mod. C 117A).
- Remote programming, with a single Controller, of up to 100 Modules is possible by daisy-chaining units with the CAENET serial line link and protocol.

DESCRIPTION

Model N 146 is a programmable delay unit which combines the high precision obtained with coaxial cables, with the flexibility and ease of use of a microprocessor-based system.

2 A three-digit LED display shows the current delay value, given in nanoseconds. This value is also stored in a non-volatile memory and is automatically loaded when the Module is powered up or restarted.

The Module can be programmed locally or remotely, depending on the position of of the MANUAL/REMOTE locking switch. When the locking switch is in the central position the delay value is locked to its current value.

- In local mode (switch in MANUAL position) the delay is set on the incremental switch labeled UP / DOWN.
- In remote programming (switch in REMOTE position), control can be made either with the Manual CAENET Controller A 119A Box) or with the CAENET CAMAC Controller C 117A. *through HS. CAENET line*
- Up to 100 modules can be programmed from a single Controller via the CAENET serial line link and protocol. For that, each module has a two digit thumbwheel switch for the module identification (the station number), connectors for the CAENET serial line coaxial cable, and a plug to power a Manual Controller.

*.copy of from man. N 210 page 1
last two page.*

SPECIFICATIONS

DELAY RANGE	7.0 to 85.5 ns
& RESOLUTION	0.5 ns
ACCURACY	≤ 50 ps (to 16 ns)
	≤ 250 ps (32 ns)
	≤ 400 ps (64 ns)
RISE / FALL TIME	≤ 2.5 ns
TEMPERATURE COEFFICIENT	≤ -500 ps (10 ÷ 60°C)
PULSE ATTENUATION	≤ 12.5% (20 ns pulse)
	≤ 17.5% (5 ns pulse)
	≤ 37.5% (2 ns pulse)
INPUT /OUTPUT IMPEDANCE	50 Ω
REFLECTIONS	≤ 15% worst case

All Connectors are **LEMO 00** type.

POWER REQUIREMENTS:

- + 6 V 580 mA
- + 12 V 190 mA (without Manual Controller)
- + 12 V 640 mA (Manual Controller connected)

REMOTE PROGRAMMING

CAENET MANUAL CONTROLLER (A 119A) OPERATIONS

- Link the Manual Box to the Module with a 50 Ω coaxial cable (either directly or through daisy-chaining). Set the N 146 switch to REMOTE. Power the Manual Controller by connecting its power cord to the Module's power plug.
- At start-up, the A 119A displays a message showing the software version number on the top-line (version 2.3) and, on the bottom line, the message "ROLL TO SELECT", to select device type. Press ROLL key until N 146 appears. Now press the # key to start the dialogue with a programmable Delay Unit.
- Remember that by pressing the # (acknowledge) key the cursor can be moved through the available fields. The # key is also used to activate the comand or control just entered; in this case the # key is pressed at the end of the command / control sequence.
- After device type selection, address the Module by pressing the ENTER key followed the Module two-digit station number, as it appears on the two-digit display (thumbwheel switch) of the front panel of the specific N 146 to be addressed, and the # key.
- If the Module is on, the LEDs on the Manual Box blink rapidly and the delay value active on the N 146 is shown on the bottom row, far right. To change value press # to move the cursor to the SET field at top. Then press ENTER plus the new value, and the # key.
- Pressing RESET stops the dialogue and freezes the current delay value.
- If anything is wrong, the LEDs blink slowly and the Manual Box flags an error code on its display. In Version 2.3, error messages are the following:
ERRGeneric error in a DATA READ operation.
OUT Attempt to select a parameter value out of range.

CAENET CAMAC CONTROLLER (C 117A) OPERATIONS

The supported CAMAC Functions are the following:

- **F(17)** starts the dialogue with the N 146 by selecting device type and the specific module to monitor or control, via its station number:
 - lines W9 to W16 hold the integer 100 (decimal) to address the N 146 modules.
 - lines W1 to W8 hold the station number (0 to 99), to select the specific Module among the other N 146 connected to the CAENET link.

- **F(0)** reads the delay value (ns) multiplied by two and converted to an integer, on lines R1 to R16.

- **F(0)** is also used for **error monitoring**. An error has occurred if the returned value is a negative integer. In Version 2.3, the code is:
 - 1 Generic error in a DATA READ operation,
 - 3 Attempt to select a parameter value out of range.

Any function's call should be followed by an F(0) call to verify that the operation was correctly executed.

- **F(16)** loads into the N 146 the delay value (ns) multiplied by two and converted to an integer, stored on lines W1 to W16.

- **F(9)** performs a general reset. The same effect is obtained by pressing the RESET push button on the C 117A front-panel. The RESET comand stops the connections between the module and the CAENET controller and locks the current delay value.

The subaddress is ignored in all the above functions.

Standard Z, X, and Q signals are also available.