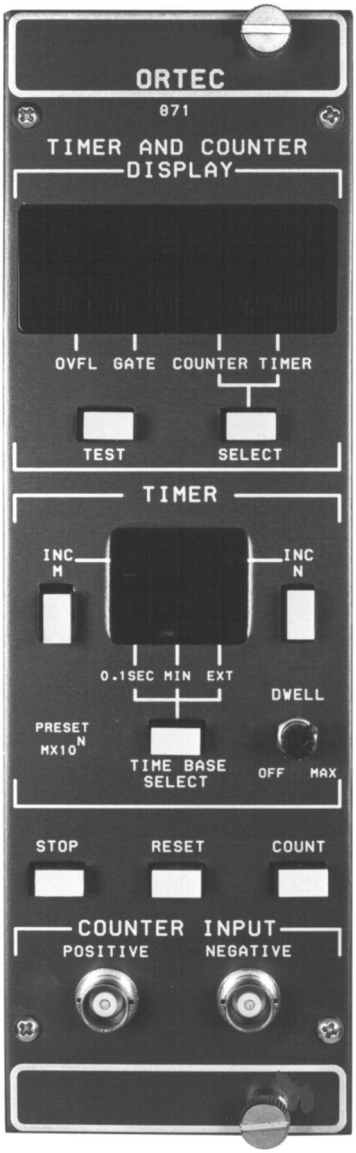
ORTEC®

871

Timer and Counter

- **8-decade presettable timer and counter**
- **25-MHz positive or negative input count rate**
- **Crystal-controlled time base**
- **Auto recycle dwell time control**



The ORTEC Model 871 is a non-printing timer and counter and may be used in any system as a counter and presettable timer, timer and presettable counter, or as two counters. Integrated and hybrid circuitry, combined with an 8-decade light-emitting diode (LED) display, give excellent operational reliability at a very economical cost. A 1-MHz crystal-controlled oscillator, which serves as the standard time base for the unit, provides substantially improved timing accuracy over timers using a line frequency time base. The 8-decade LED display is a highly legible count or time indicator, further enhanced by suppression of the leading zeros, which minimizes the possibility of errors in readout. An LED below the 8-digit display indicates if the reading is for the counter or the timer, and a push-button below the display allows the user to alternate reading the counter or the timer. LED digits are also used to indicate the presets in an M X 10^N format.

The display test is activated by pressing the front-panel Display Test switch, which illuminates all "8s," thereby providing a test for all segments of each display.

The two sections of the Model 871 accept NIM-standard slow positive logic signals. The counter section also accepts NIM-standard fast negative input logic pulses. The input count rate is guaranteed to 25-MHz with a 40-ns pulse pair resolution. An overflow output pulse is available from each of the counters, which indicates that the 8-decade capacity of either counter has been exceeded.

Preset is accomplished by two front-panel push-buttons labeled INC M and INC N. The displayed information includes two digital characters to indicate the current selection of the values for M and N. Any value from 0 through 9 can be selected for M, and any value from 0 through 7 can be selected for N, thus giving preset capability from 1 through 9 X 10^7. The Time Base Select push-button allows the operator to choose whether the time base is set for 0.1-s intervals, 1-min intervals, or whether the time base is to be derived from an external source. A decimal point is included in the Time Display to facilitate ease of reading directly in seconds or minutes.

For applications where a number of counts are to be preset and the time required to reach the preset count is of interest, it is possible to furnish pulses at 0.1-s intervals from the internal time base into the nonpresettable portion of the instrument and use the presettable portion as a counter.

Other applications include using the Model 871 as a ratio counter by furnishing pulses from external sources to the presettable portion as well as the nonpresettable counter and setting the preset portion for 100 to get the ratio relationship between the two external sources.

The Dwell control can be rotated to select a delay of <1 s to about 15 s following a preset condition. During the delay period, the contents of the counter can be read. At the end of the dwell interval, the instrument is reset and another counting interval is started immediately.

Specifications

PERFORMANCE

COUNT CAPACITY Eight decades in each of the two sections.

COUNTING RATE 25 MHz guaranteed, both sections.

TIME BASE 0.1-s and 1-min increments derived from a 1-MHz crystal-controlled oscillator; instability <±2 ppm/°C, 0 to 50°C; inaccuracy <±5 ppm; time base register controlled by counting gate.

PULSE PAIR RESOLUTION 40 ns minimum.

AUTOMATIC RESET Generated when power is applied.

INDICATORS AND CONTROLS

COUNTER/TIMER DISPLAY 8 characters, 7-segment LED per character, plus decimal point.

TIMER PRESET 2 characters, 7-segment LED per character.

GATE LED illuminates when the unit is in the counting condition.

OVFL LED illuminates from the first overflow of the counter or timer that is currently being displayed.

COUNTER LED illuminates when counter data are being displayed.

TIMER LED illuminates when timer data are being displayed.

0.1 SEC LED illuminates when the time base is 0.1 second.

MIN LED illuminates when the time base is 1 minute.

EXT LED illuminates when the timer section counts pulses that are input through a rear-panel connector.

871
Timer and Counter

TEST Push-button switch illuminates all 7 segments in each of the 10 digital characters in the displays; a character reads 8 when the push-button is pressed.

SELECT Push-button switch in the Display portion of the front panel permits alternate selection of the register whose counts are displayed, either Counter or Timer.

INC M Push-button used to select the significant digit of a preset value where preset = M X 10^N X Time Base. This switch increments the value of M, indicated in the adjacent display, each time it is pressed. M = 0 is preset Off; M = 9 is maximum value.

INC N Push-button used to select the power of 10 for the value of N in the preset formula. This switch increments the value of N, as indicated in the adjacent display, each time it is pressed. N can be any digit, 0 through 7.

TIME BASE SELECT Push-button switch in the Timer portion of the front panel permits selection of the source of counts for the timer portion of the instrument and selection of the source of output through the rear-panel Time Base connector; selection of the three possible choices is made when this switch is pressed.

DWELL Single-turn control with switch at full counterclockwise setting for Off. Off inhibits recycled operation of a preset counting interval. With the control turned clockwise, recycling is permitted with a dwell time between counting intervals that can be adjusted from about 0.3 to 15 s.

STOP Push-button switch stops counting in both portions of the instrument.

RESET Push-button switch resets the internal registers for both counting portions of the instrument and for the time base register, and turns off the OVFL indicator.

COUNT Push-button switch enables counting conditions for both portions of the instrument, provided the timer is not at its preset level and the Gate input is not held below +1.5 V.

INPUTS

COUNTER POSITIVE Front- and rear-panel BNC connectors; either accepts positive unipolar or bipolar signals to ±10 V linear, ±25 V maximum; threshold set at +1.5 V; minimum pulse width above threshold 20 ns. Z_{in} = 1 kΩ to ground, dc-coupled.

COUNTER NEGATIVE Front-panel BNC connector accepts NIM-standard fast negative logic pulses, 16 mA into 50 Ω; threshold set at –250 mV; minimum pulse width over threshold 4 ns; input protected to ±25 V at 10% duty cycle.

EXT TIMER Rear-panel BNC connector; accepts positive unipolar or bipolar signals to ±10 V linear, ±25 V maximum, and counts these pulses in the timer portion of the instrument if the Time Base Select is set at EXT; threshold set at +1.5 V; minimum pulse width above threshold 20 ns. Z_{in} = 1 kΩ to ground, dc-coupled. When using the Ext Timer input and Preset operation, the minimum setting is M = 1 and N = 1 for 25-MHz operation.

GATE Rear-panel BNC accepts NIM-standard slow positive logic or dc level to control the input gate for both counting sections; >+3 V or open circuit allows counting; <+1.5 V inhibits counting; 25 V maximum; driving source must be capable of sinking 0.5 mA positive current during inhibit.

COUNT Rear-panel BNC accepts NIM-standard slow positive logic signal to remotely initiate a counting condition; >+3 V for >100 ns to start the counting condition; 25 V maximum. Z_{in} = 6 kΩ to ground, dc-coupled.

RESET Rear-panel BNC accepts NIM-standard slow positive logic signals to remotely reset both counting sections and the time base register to zero; >+3 V to reset; <+1.5 V or open to not reset; 25 V maximum; pulse width >100 ns. Z_{in} = 6 kΩ to ground, dc-coupled.

OUTPUTS

Note: All outputs are through rear-panel BNC connectors and are short-circuit protected.

END OF PRESET Provides a NIM-standard slow positive logic pulse at the end of each preset interval; nominally +5 V, 5 µs wide, through <10 Ω, dc-coupled.

END OF DWELL Provides a NIM-standard slow positive logic pulse at the end of each dwell interval; nominally +5 V, 500 ns wide, through <10 Ω, dc-coupled.

INTERVAL Provides a positive level signal through the duration of each counting condition interval; nominally +5 V through <30 Ω, dc-coupled.

TIME BASE Provides NIM-standard slow positive logic pulses at intervals that are determined by the Time Base Select function on the front panel. For 0.1 SEC or MIN selections, the signals through the connector are the same as those that are furnished to the Timer section, and these are present only when the Gate input is not held below +1.5 V and the preset condition has not been reached. For the EXT selection, the signals through the rear panel connector are at 0.1-s intervals and are furnished from a free-running oscillator and countdown circuit. Nominally +5 V, 500 ns wide, through <10 Ω, dc-coupled.

TIMER OVERFLOW Provides a NIM-standard slow positive logic pulse at each overflow of the Timer section from 99,999,999 to 0. Nominally +5 V, 500 ns wide, through <10 Ω, dc-coupled.

COUNTER OVERFLOW Provides a NIM- standard slow positive logic pulse at each overflow of the Counter section from 99,999,999 to 0. Nominally +5 V, 500 ns wide, through <10 Ω, dc-coupled.

ELECTRICAL AND MECHANICAL

POWER REQUIRED +12 V, 280 mA; –12 V, 117 mA; +24 V, 161 mA; 110 V, 40 mA.

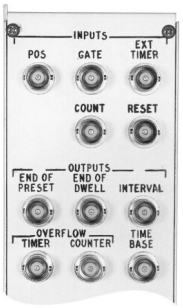
WEIGHT
Net 1.5 kg (3.5 lb).
Shipping 2.7 kg (6.0 lb).

DIMENSIONS NIM-standard double-width module, 6.90 X 22.13 cm (2.70 X 8.714 in.) front panel, per DOE/ER-0457T.

Ordering Information

To order, specify:

Model	Description
871	Timer and Counter (nonprinting)



Specifications subject to change
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