



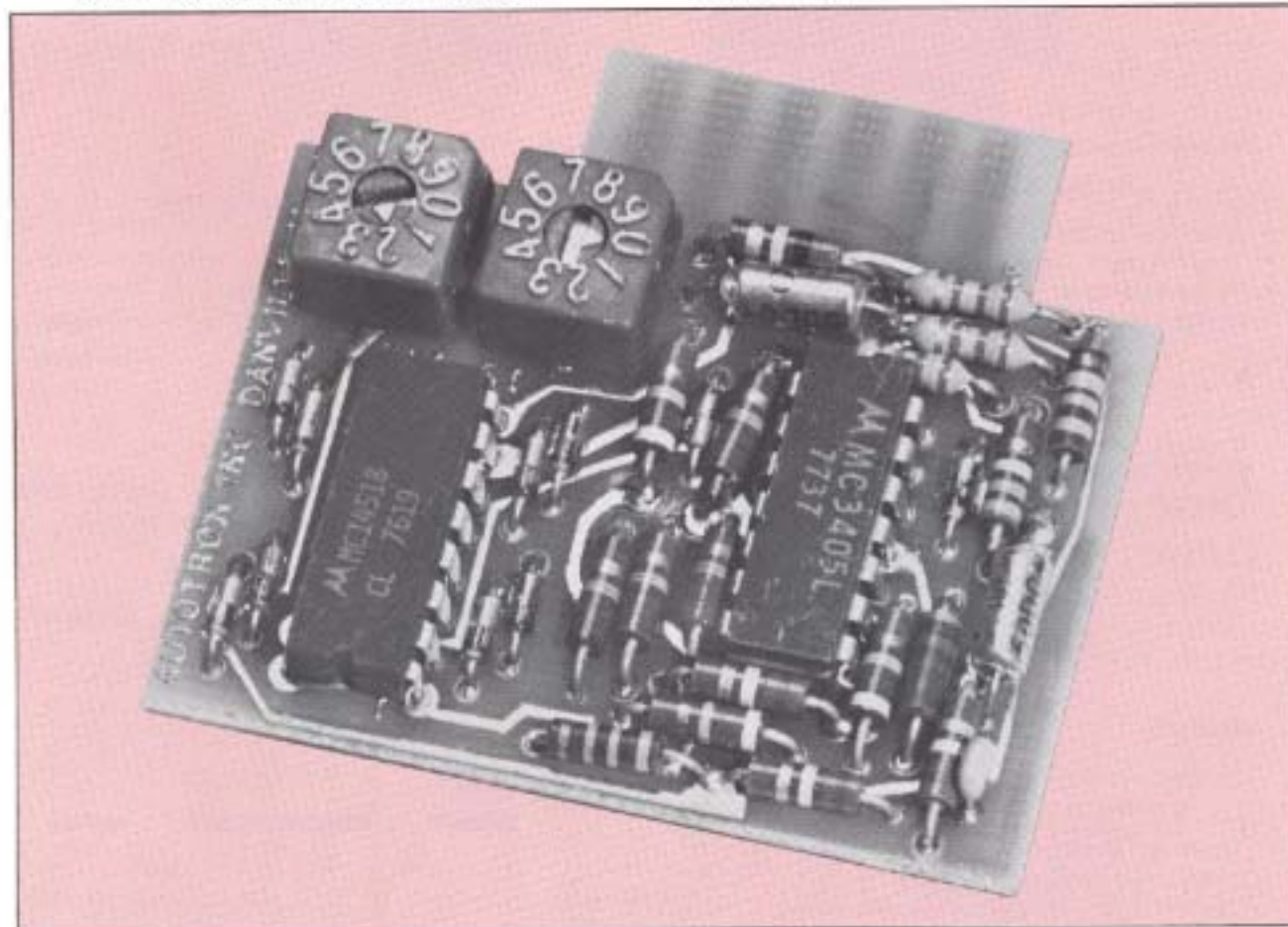
# Plug-in Function Cards and Outputs

Compatible with the following series:

- |        |     |          |       |
|--------|-----|----------|-------|
| •R     | •RC | •CM      | •A936 |
| •RX/RV | •C  | •BLF 303 | •A941 |

Autotron offers a complete line of plug-in function cards and outputs. These allow the customer to adapt any compatible Autotron ON/OFF control to accomplish a variety of different functions, from simple jobs such as single time delays to tasks as complex as batch counting. All controls operate in the ON/OFF mode with no card installed. Cards and outputs are easily installed in the field so last minute relay logic changes can be performed after the equipment is installed.

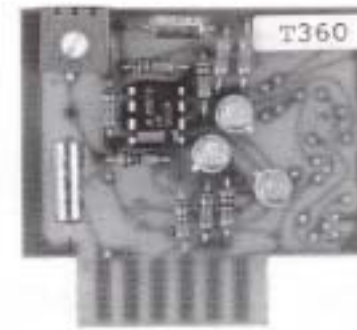
Function cards and outputs also reduce inventory requirements. A multitude of possible control configurations can be made up from a basic stock of compatible ON/OFF control units along with a selection of function cards and outputs. Any one will work in any compatible control. All adjustments on the cards are easy to make when the card is installed. Quality gold-over-nickel fingers mate with gold contacts in the control connector.



**Versatile • Reliable**

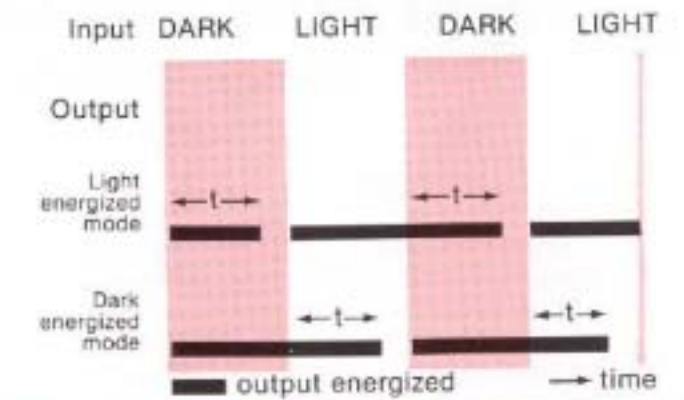
## T360 Single Timer (Off Delay)

Actual size



### OUTPUT SEQUENCE

Light energized — time out Dark OR  
Dark energized — time out Light. Time delay (t) adjustable.

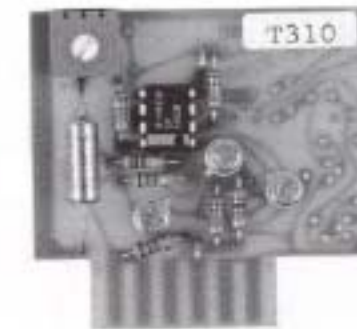


### APPLICATIONS

- "Jam-up" indication
- "No Product" indication
- Pulse stretcher
- Sheet stacker control

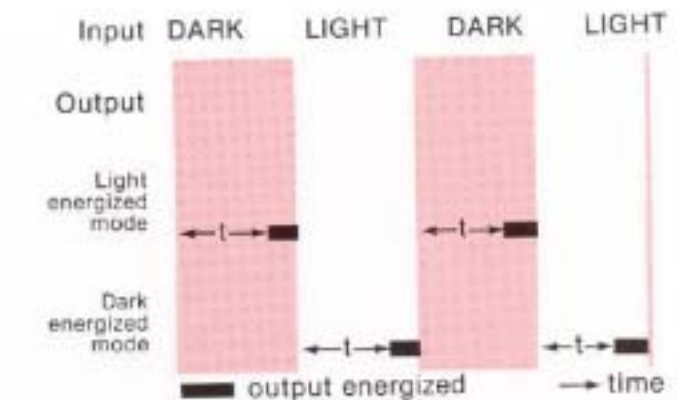
## T310 Single Timer (On Delay)

Actual size



### OUTPUT SEQUENCE

Light energized — time out Light OR  
Dark energized — time out Dark. Time delay (t) adjustable.

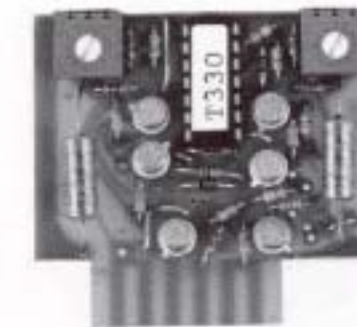


### APPLICATIONS

- "Jam-up" indications
- "No Product" indication
- Pulse stretcher
- Sheet stacker control

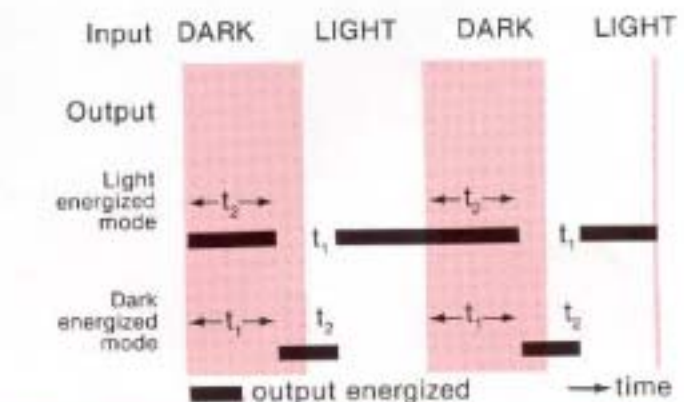
## T330 Dual Timer (Off Delay and On Delay)

Actual size



### OUTPUT SEQUENCE

Times out Light AND times out Dark. Light or Dark energized. Both time delays (t<sub>1</sub>, t<sub>2</sub>) adjustable.



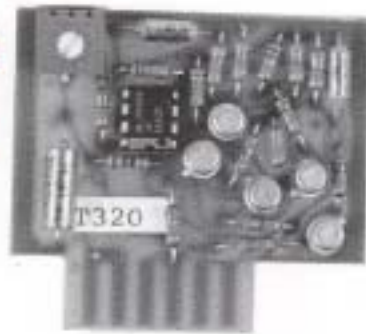
### APPLICATIONS

- "Jam-up" indication where delay is required before restarting
- "No Product" indication where delay is required before restarting



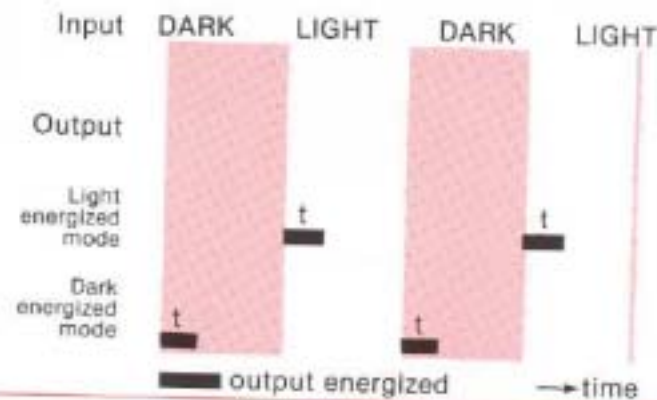
### T320 One-Shot Timer (Off Delay)

Actual size



### OUTPUT SEQUENCE

"One shot" actuation. Light or Dark energized. Time delay (t) adjustable. Output energizes on selected input transition and begins time delay at same time.

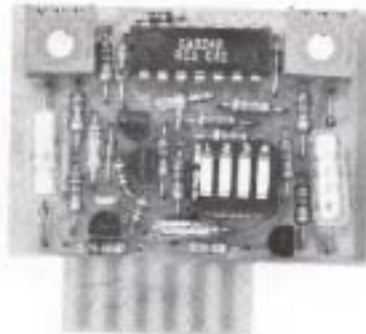


### APPLICATIONS

- Cut-to-length control
- Pulse stretching or shortening
- Stop motion indicator

### T300 Five Function Timer

Actual size



### OUTPUT SEQUENCE

The T300 Five Function Timer allows a user to select by means of a 4-position DIP switch, any of five most commonly used functions now offered on separate cards.

These functions are:

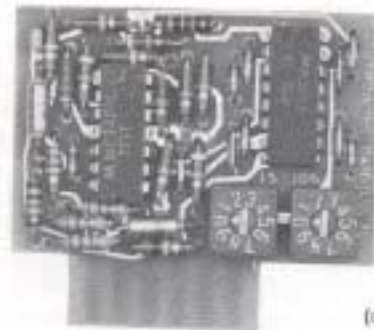
- T360 Single Timer (OFF Delay)
- T310 Single Timer (ON Delay)
- T330 Dual Timer (ON and OFF Delay)
- T320 One-Shot (OFF Delay)
- One-Shot (ON Delay)

### APPLICATIONS

- Function card inventory reduction
- User uncertain what function will eventually be needed

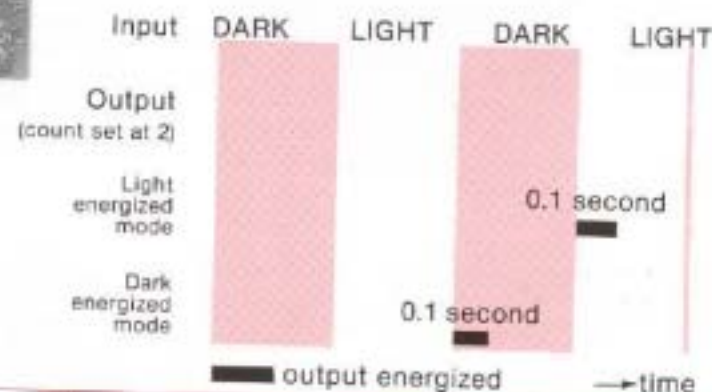
### T342 Batch Counter

Actual size



### OUTPUT SEQUENCE

Two-digit batch counter. Output energizes for 0.1 second once pre-set count is reached. Circuit resets in 2.5 ms.

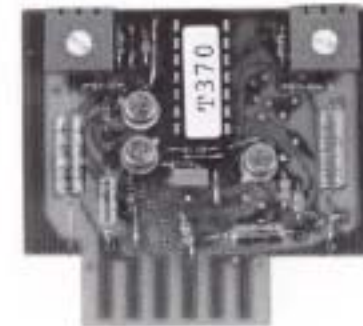


### APPLICATIONS

- Batch counting
- N-to-1 counter

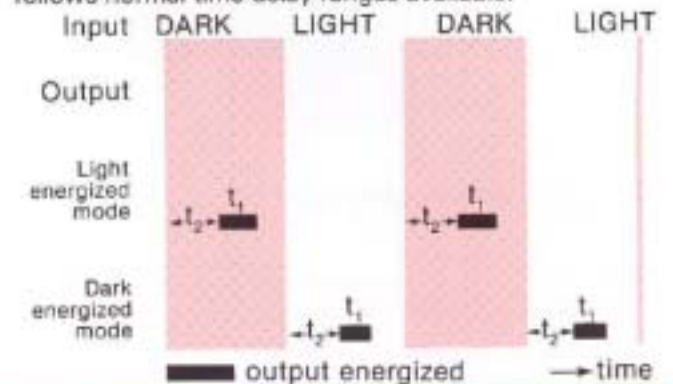
### T370 Delayed One-Shot Timer

Actual size



### OUTPUT SEQUENCE

Output energizes for an adjustable time ( $t_1$ ) beginning an adjustable time ( $t_2$ ) after the completion of an appropriate signal. Should another signal be completed before ( $t_2$ ) expires, no pulse occurs and the time delay begins again. Time ( $t_1$ ) is adjustable from .02 to 2.5 seconds. Delay ( $t_2$ ) follows normal time delay ranges available.

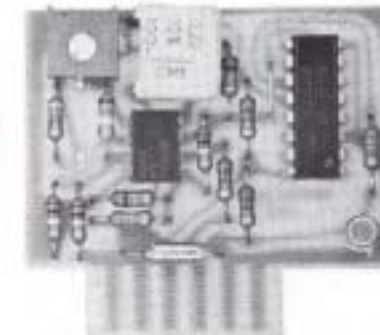


### APPLICATIONS

- Delayed reject on conveyor line

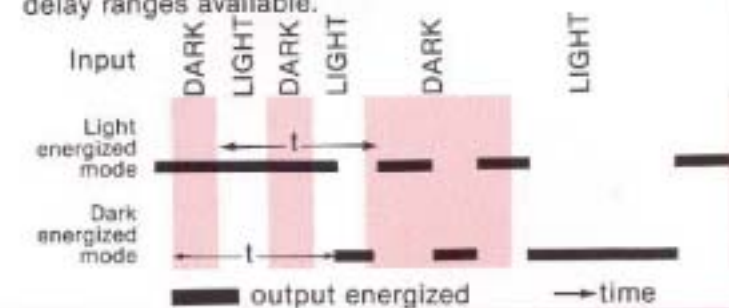
### T380 Shift Register (Delay Line)

Actual size



### OUTPUT SEQUENCE

One or a sequence of events is received at the input, then delayed (shifted) by the amount of time (t). This sequence then occurs at the output in the same pattern as it was received. A 128-bit CMOS shift register integrated circuit is used. It is clocked by an on-board pulse generator. Time delay (t) is adjustable and follows normal time delay ranges available.

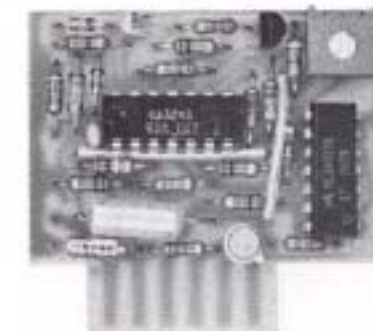


### APPLICATIONS

- Gluing on packaging machines
- Automatic paint spraying
- Delayed reject on conveyor line

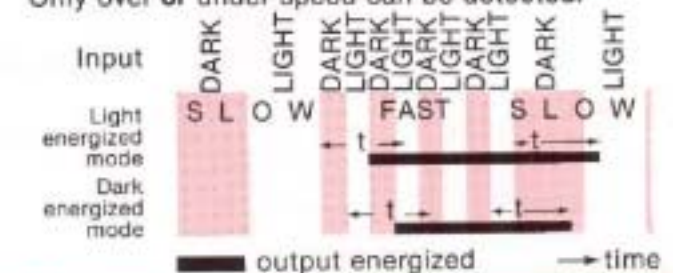
### T390 Over or Under Speed Detector

Actual size



### OUTPUT SEQUENCE

Output energizes in the over speed condition and de-energizes in the under speed condition. If the time between input pulses is longer than the set time (t), or if pulses stop, under speed is indicated. If the time between pulses is shorter than the set time (t), over speed is indicated. The time (t) is adjustable. LIGHT time and DARK time is limited by the control's response time. Only over or under speed can be detected.



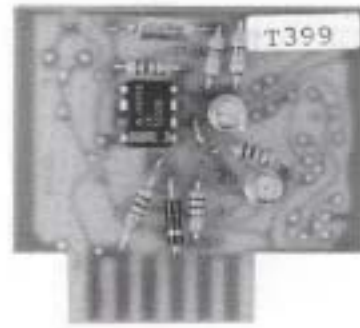
### APPLICATIONS

- Detect excessive rate of container flow on conveyor line
- Detect if shaft RPM is too slow



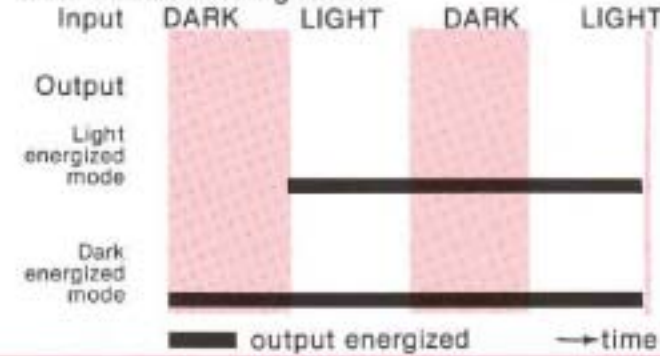
## T399 Output Latch

Actual size



### OUTPUT SEQUENCE

Output turns ON (latches) at the instant the input signal changes and stays on. The latch is released by momentarily interrupting input power to the control. When power is reapplied to the control, the output is inhibited for 0.1 second while the latch circuit is being reset.



### APPLICATIONS

- Tear detection on web process
- Surveillance

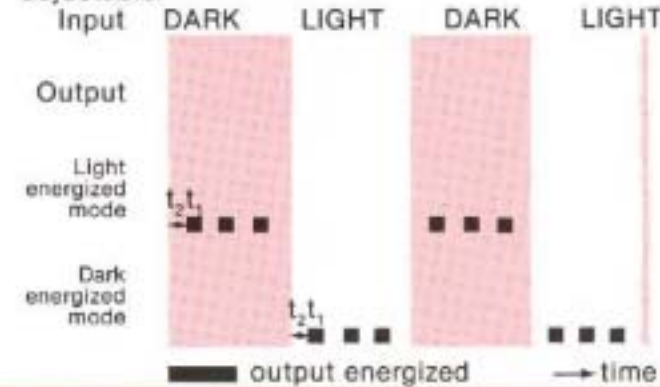
## T1330 Repeat Cycle Timer

Actual size



### OUTPUT SEQUENCE

Output cycles on and off as long as an input is present. When the input is absent, the cycling stops and the relay is de-energized. The ON and OFF times ( $t_1$  and  $t_2$ ) are each independently adjustable.

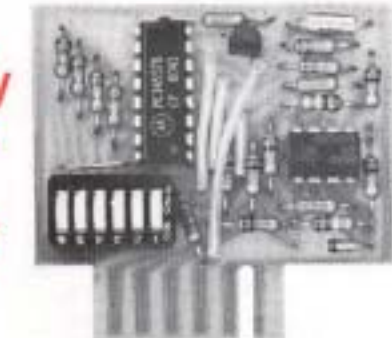


### APPLICATIONS

- Spacing of glue spots on carton flaps
- Sounding pulsed alarm for a fault condition

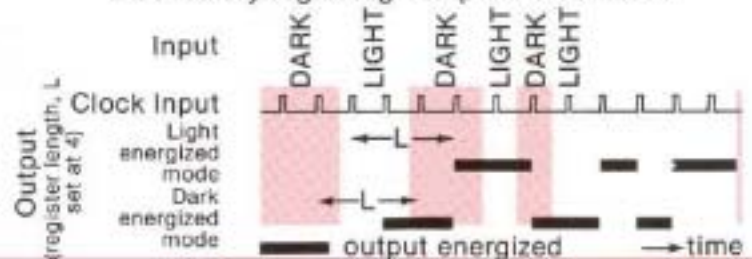
## T348 Externally Clocked Shift Register

Actual size



### OUTPUT SEQUENCE

Works like the T380, except that the delay is determined by external pulses which provide the "clock" rather than seconds of time. The "clock" which controls the progression of data from the input to the output is advanced by means of external pulses. The pulses may be in the form of a cam, proximity or photoelectric switch. The length of the shift register is adjustable between 1 and 64 steps by means of a DIP switch. Consult factory regarding compatible controls.

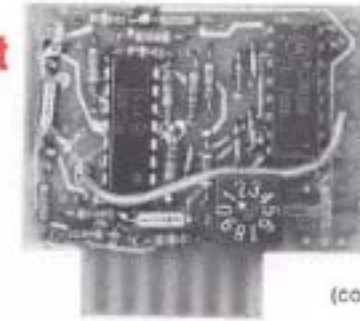


### APPLICATIONS

- Missing container on filling machines
- Delayed reject on varying speed conveyor
- Rotary index table assembly inspection

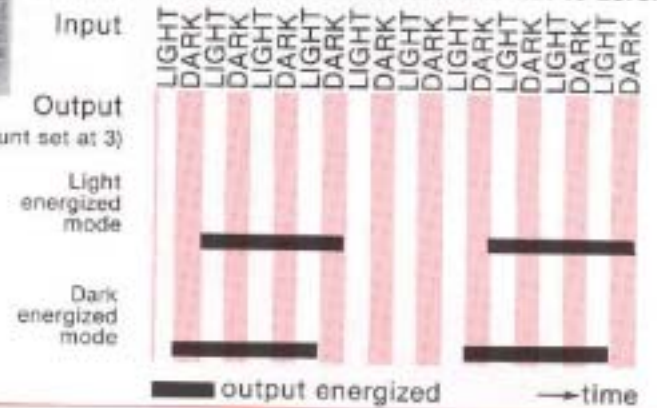
## T349 Single-Digit Toggle Batch Counter

Actual size



### OUTPUT SEQUENCE

Counts input pulses and switches the output when the predetermined number (1 to 9) of counts is reached. When first powered up, the output is energized and the count is set to zero.

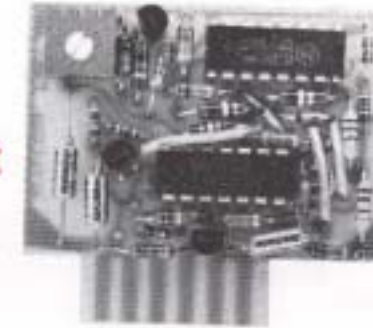


### APPLICATIONS

- Diverting equal batches of containers onto two lines
- Prescaling counters for longer counter life and higher speed

## T3200 Long Delay One-Shot Timer (Off Delay)

Actual size



### OUTPUT SEQUENCE

Sequence identical to T320 but time delays can be obtained to 40 hours. Time delay is adjustable on linear pot.

The time ranges are as follows:

Range No. 0	30 sec. to 13 min. (standard)
No. 2	7 sec. to 3 min.
No. 3	1 min. to 26 min.
No. 4	2.5 min. to 1 hr.
No. 5	6 min. to 2.2 hrs.
No. 6	10 min. to 4.4 hrs.
No. 7	15 min. to 10 hrs.
No. 8	90 min. to 40 hrs.

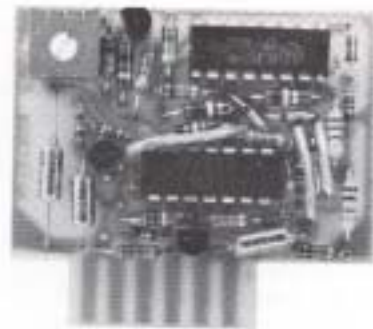
### APPLICATIONS

- Yard light control upon entry
- Timing industrial processes

Example: T3203 is a 1-26 minute one-shot timer.

## T3600 Long Delay Single Timer (Off Delay)

Actual size



### OUTPUT SEQUENCE

Sequence identical to T360, but time delays can be obtained up to 40 hours. Time delay is adjustable on linear pot.

The time ranges are as follows:

Range No. 0	30 sec. to 13 min. (standard)
No. 2	7 sec. to 3 min.
No. 3	1 min. to 26 min.
No. 4	2.5 min. to 1 hr.
No. 5	6 min. to 2.2 hrs.
No. 6	10 min. to 4.4 hrs.
No. 7	15 min. to 10 hrs.
No. 8	90 min. to 40 hrs.

### APPLICATIONS

- Intrusion detection alarm
- Timing industrial processes

Example: T3603 is a 1-26 minute single timer.



## PLUG-IN OUTPUTS

All models that accept plug-in function cards also will accept any of these outputs. These outputs allow AUTOTRON controls to be compatible with practically any type and style of load. Output types can be changed in the field.

### Standard Relay

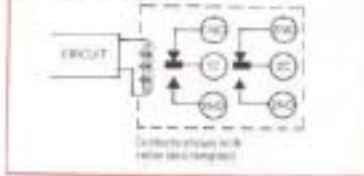
- Used for conventional general-purpose switching



### P846 Relay

- DPDT contact arrangement
- Maximum contact rating: 10 Amps (resistive) at 120 VAC or 28VDC
- Contact life:
  - 10,000,000 cycles mechanical
  - 100,000 cycles at maximum contact rating
- Response time (add to control's circuit response): 20 ms.
- Relay coil: 12VDC, 160 ohms resistance
- All models supplied with P846 relay output unless otherwise specified

Output Diagram



### Optional Solid-State AC Switch

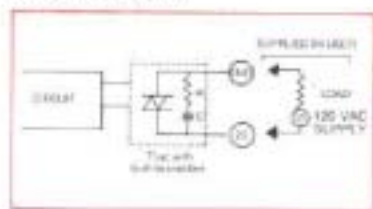
- Used for highly repetitive, long life or electrically "quiet" switching



### P970 AC Switch

- Simulates SPNO or SPNC contact arrangement depending on control phase setting or function card used
- Switch rating: .1 Amp minimum, 2 Amps maximum to 40°C, derate linearly to 1 Amp at 55°C
- Response time (add to control's circuit response): 9 ms.
- Maximum inrush current:
  - 30 Amps for .0083 sec.
  - 8 Amps for 1.0 sec.
- ON state voltage drop: 0.8 to 1.6 VAC (RMS)
- OFF state leakage current: .006 Amps maximum
- Load voltage: 75 to 140 VAC @ 45 to 70 Hz
- Features opto-isolated triac with zero-crossing and built-in snubber
- Specify by adding "K" suffix to control model

Output Diagram



### Optional Logic

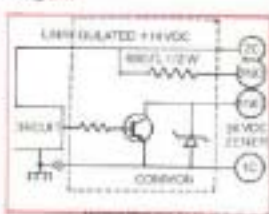
- Used to interface control to logic devices such as programmable controllers, computers and electronic counters.



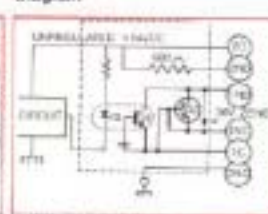
### P971 Logic

- Open-collector NPN transistor switch
- Visible red LED output status indicator
- Switching transistor characteristics at 25°C:
  - Switching current (sinking): 100 mA maximum
  - Leakage current: 1  $\mu$ A maximum
  - ON-state voltage:
    - $V_{CE} = 1.5VDC$  max. @ 100 mA
    - $V_{CE} = 3.5VDC$  max. @ 10 mA
  - OFF-state voltage: 30VDC maximum
  - Maximum short circuit duration:
    - continuous at  $V_{CE} = 5VDC$
    - 10 seconds at  $V_{CE} = 12VDC$
    - 1 second at  $V_{CE} = 24VDC$
- Maximum current from control's +14VDC supply (terminal 2C): 75 mADC
- Response time (add to control's circuit response): virtually instantaneous
- COMMON connected to chassis using grounding pigtail provided (see output diagram)
- Specify by adding "G" suffix to control model

P971 Output Diagram



P991A Output Diagram



### P991A Logic

- Both opto-isolated NPN transistor switch and a Darlington transistor switch are provided
- Transistor can be used as current sink or current source
- Visible red LED output status indicator
- Maximum current from control's +14VDC supply (terminal 2C): 75 mADC
- Phototransistor (O2) characteristics at 25°C:
  - Switching current: 4 mA maximum
  - Leakage current: 1  $\mu$ A maximum
  - ON-state voltage:  $V_{CE} = 1.0VDC$  maximum @ 4 mA
  - OFF-state voltage: 30VDC maximum
- Output transistor (O2) characteristics at 25°C:
  - Switching current: 100 mA maximum
  - Leakage current: 1  $\mu$ A maximum
  - ON-state voltage:  $V_{CE} = 1.7VDC$  maximum @ 100 mA
  - OFF-state voltage: 30VDC maximum
- Response time (add to control's circuit response): 1 ms.
- Not short-circuit protected
- Specify by adding "GA" suffix to control model

## GENERAL FEATURES

1. Cards plug into any one of many compatible controls.
2. Controls easily convert from ON/OFF to simple timers or to more complex functions.
3. Controls automatically revert to ON/OFF when card is unplugged – no ON/OFF card required.
4. Many combinations can be made from a few controls and cards – reduces inventory requirements for different equipment for different functions.
5. Adjustments on card easy to set after card is installed.
6. Finger contacts on cards contain gold over nickel.
7. Light energized or Dark energized mode selection is made on control by means of convenient pigtail connector or switch.
8. Cards plug into rugged edge connectors on controls.
9. False trip protection when power is turned on.

## GLOSSARY OF TERMS

**Signal** represented by proper modulated LED light for photoelectric controls or metal presence for proximity controls.

**Light energized** output turns ON when signal received by sensor.

**Dark energized** output turns ON when signal removed from sensor.

## ORDERING INFORMATION

Plug-in Function Cards and Outputs can be purchased separately to be installed in an Autotron control later – or can be included in a complete control package at the time of purchase.

### CARDS (SEPARATE)

To order, simply specify the card number desired.

### CARDS (PACKAGE)

To order a complete control with a function card installed, substitute the card number for "F303" in the control model and add the control and card prices. For example, the RPF303 ON/OFF Control with the T360 Single Timer Card installed is ordered as:

RPT360 Timing Control

### OUTPUTS (SEPARATE)

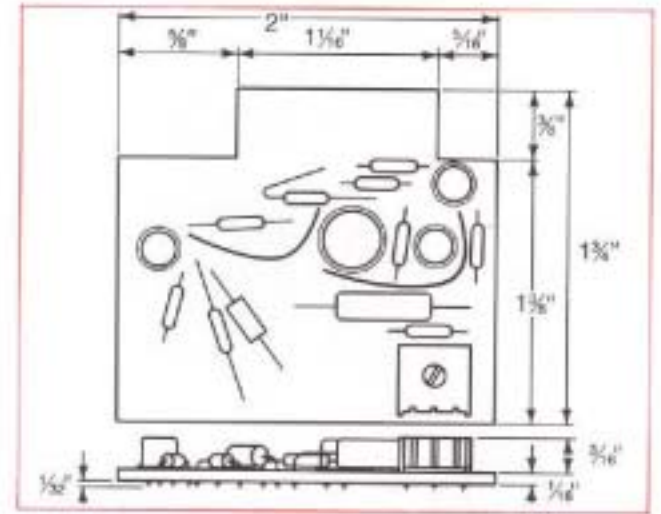
To order, simply specify the part number desired among those shown below:

Part No.	Description	Suffix Code
P846 (standard)	Relay	None
P970	AC Switch	K
P971	Open-collector logic	G
P991A	Opto-isolated logic	GA

### OUTPUTS (PACKAGE)

To order a complete control with a plug-in output installed, add the suffix code to the end of the control model and add the control price and output price adder (all control prices include the relay). For example, the RPF303 Control with the P970 AC Switch installed is ordered as:

RPF303K Control



**Time out Light** refers to time delay function where delay begins when signal received by sensor. Output reverses at the end of time delay. Signal removal resets time delay.

**Time out Dark** refers to time delay function where delay begins when signal is removed from sensor. Output reverses at end of time delay. Signal restoration resets time delay.

### TIMING RANGES

Timing function card time ranges are specified in the last digit of the card number. The standard range is shown.

Range No.	Time Range
0:	.1-10 seconds (standard)
2:	.005-.5
3:	.01-1
5:	.02-2.5
6:	.04-5
7:	2-23
8:	.9-90 (additional charge)

Others available upon request.

Notes: 1. On timer cards where two separate time delay adjustments are provided, it is assumed that both delay ranges are the same, and are specified in the last digit of the card number. Two different ranges can be supplied on request at no extra charge.

2. If card is to be used in the BLF303, A941B, or A936, please specify so a polarity notch can be added.

For current pricing, please call the factory at 800-637-2648 or your local AUTOTRON sales representative or authorized distributor.



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