

FEATURES

- CMOS process, lower power consumption, high noise immunity, 16 pin DIP SIMPLE FAN CONTROLLER.
- Electronic controlled switches and timer.
- 4 steps timer scale.
- 3 levels of wind blowing (light, moderate, strong).
- 2 sec. moderate wind start-up.
- Electronic controlled swing head function.
- LED display for function indication (option).
- 32KHz crystal oscillator or power line 50/60 Hz time base clock versions.
- Highly integration for low production cost.

GENERAL DESCRIPTION

The PT2124 high performance CMOS structured simple FAN controller is designed to replace traditional mechanical FAN timer and switches by electronic timer and switches, which can greatly improve outstanding appearance, soft key sensation and lower cost for longer timer.

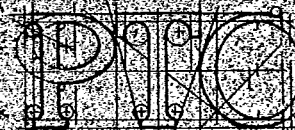
In order to reach stream line appearance, soft touch sensation and energy saving, the COMS process low power PT2124 offers 4 electronic key inputs to maintain light, moderate, strong wind blowing, swing head function, timer setting function, and switch off function; 4 LEDs are optionally connected to display the function which has been selected; 4 LEDs to display 4 different time levels been slected respectively.

For simple structure and exact time basis. Princeton Technology Corporation offers two versions of SIMPLE FAN CONTROLLER.

The low production cost version PT-2124-F4 / PT-2124-F8, which uses power line frequency as internal clocking, while the PT-2124-C4 / PT-2124-C8 uses external 32768Hz crystal for internal clocking, thus offering a full compatibility throughout the world.

The difference between C4, F4 and C8, F8 is timer level, see the table below.

March 27, 1988

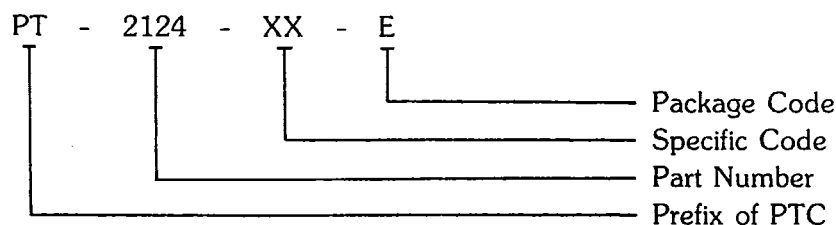


ORDERING INFORMATION

| PART NUMBER | OSCILLATION / TIMER LEVEL | PACKAGE |
|-------------|------------------------------------|------------|
| PT-2124-F4 | AC line / 0.5hr., 1hr., 2hr., 4hr. | 16 PIN DIP |
| PT-2124-F8 | AC line / 1hr., 2hr., 4hr., 8hr. | 16 PIN DIP |
| PT-2124-C4 | Crystal / 0.5hr., 1hr., 2hr., 4hr. | 16 PIN DIP |
| PT-2124-C8 | Crystal / 1hr., 2hr., 4hr., 8hr. | 16 PIN DIP |

The PTC standard product code system shown as follows:

Example:



Part Number: 4 digits for various product

Specific Code: One or two digits, letters, defining specific device performance characteristics.

This code will be omitted if only one version is available.

F - AC line as internal clocking.

C - Crystal as internal clocking.

4 - 0.5hr., 1hr., 2hr., 4hr. timer level.

8 - 1hr., 2hr., 4hr., 8hr. timer level.

Packing Code: - : For Plastic DIP, this code will be omitted.

C : Ceramic DIP

F : Flat Package

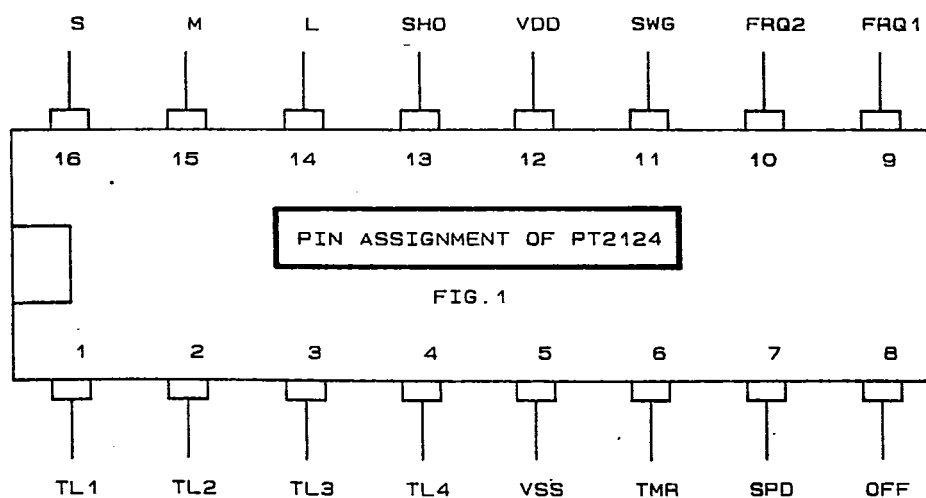
H : Chip Form

L : Plastic Leadless Chip Carrier

P : Pin Grid Array

S : Small Outline

PIN ASSIGNMENT



PIN DESCRIPTION

| PIN NO. | TYPE | NAME | FUNCTION |
|---------|------|-----------|---|
| 12 | | VDD | Positive power pin. |
| 5 | | VSS | Negative power pin. |
| 6 | I | TMR | Advance one timer stage each time when push this pin's button, high active. |
| 1,2,3,4 | O | TL1 - TL4 | LED outputs to display time stage selected. |
| 11 | I | SWG | Toggle function, enable or disable swing head. |
| 13 | O | SHO * | Perform swing head's ON or OFF, which is defined by the status of SWG. |
| 8 | I | OFF | Switch "OFF", high active. |
| 14 | O | L * | Output trigger pin for light wind blowing, low active. |
| 15 | O | M * | Output trigger pin for moderate wind blowing, low active. (When start-up from initial, this O/P will active for 2 sec. to spin the motor in proper momentum.) |
| 16 | O | S * | Output trigger pin for strong wind blowing, low active. |
| 7 | I | SPD | Wind speed selector, high active, light, moderate, strong wind in cyclic order. |



PIN DESCRIPTION

| PIN NO. | TYPE | NAME | FUNCTION |
|---------|------|------|--|
| 9 | I | FRQ1 | In PT-2124-F4 / PT-2124-F8 version, this pin is used as 50Hz or 60Hz selectin. 50Hz when pull high, 60Hz when floating. |
| | I | | In PT-2124-C4 / PT-2124-C8 version, this pin is used as external 32768Hz crystal input. |
| 10 | I | FRQ2 | In PT-2124-F4 / PT-2124-F8 version, this pin is used as AC line input, which is connected directly to the AC line with a 2M Ω resistor. |
| | O | | In PT-2124-C4 / PT-2124-C8 version, this pin is used as external 32768Hz crystal output. |

* Note: Output can directly connected to gate pin of triac via a resistor or in series with an LED and a resistor in between to notify this function. See application circuit.

FUNCTIONAL DESCRIPTION

The aim for PT2124 is designed to take over SIMPLE FAN CONTROLLER market in the way to replace mechanical profile by electronic devices in an extremely reasonable cost. Fig.2 shows the idea, which only concerns with 4 soft keys and 4 to 8 LEDS.

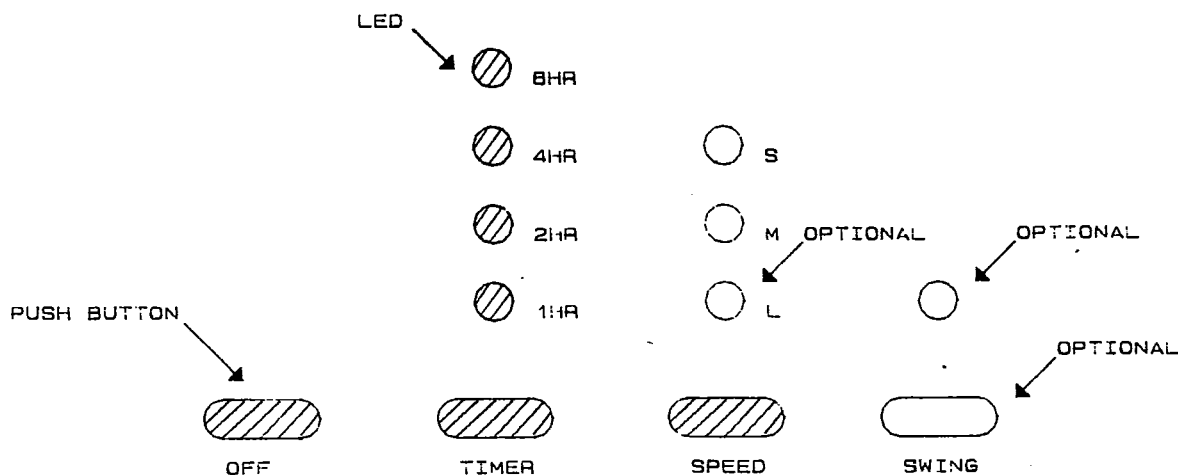


FIG. 2

To operate the FAN, simply press SPEED button will select the strength of wind blowing in cyclic order. In the Princeton Technology Corporation design, a 2 sec. moderate wind start-up is implanted, that is to say a single press of the SPEED button will automatically start blowing in moderate wind for 2 sec. and back to light wind blowing or to the level where user excessively selected.*

LEDs are optionally connected between L, M, S outputs and gate pin of triacs via a resistor to indicate level of wind blowing selected.

Pressing the TIMER button will set the timer to one of the 4 predefined different time stage and setting the LED of the stage. Once the selected time stage be run out, the FAN will autoamtically turn OFF. The four different predefined time stage are 1hr., 2hr., 4hr., 8hr., in PT-2124-F8 / PT-2124-C8 version and 0.5hr., 1hr., 2hr., 4hr., in PT-2124-F4 / PT-2124-C4 version. Excessive pressing of the TIMER key will select time stage in cyclic order, return to 0 and restart. Pressing the TIMER and SPEED button are two independent events, thus the FAN will not turn OFF if excessively pressing the TIMER to 0.

Optionally, there are a SWG pin and SHO pin that can be configured to electronic swing head function. (Refer to application CKT. in Fig.3,4). Also an LED is optionally connected between SHO pin and gate pin of triac for indication. Be kept in mid that, pressing SWG button will not function if the FAN is OFF.



DC SPECIFICATION

Commercial operating range: $T_A = 0^\circ$ to $+70^\circ\text{C}$, $V_{DD} - V_{SS} = 5\text{V} \pm 10\%$

| Parameter | Symbol | Min | Typ | Max | Units | Test Condition |
|---|-------------------------|------|------|------|---------------|--|
| Stand-by Supply Current | I_{CCS} | — | — | 100 | μA | |
| Operating Voltage | V_{SS} | -3 | -5 | -6 | V | |
| Input High Voltage (TMR, SPD, SWG) | V_{IH} | -1.5 | — | — | V | |
| Input Low Voltage (TMR, SPD, SWG) | V_{IL} | — | — | -3.5 | V | |
| Output Low Voltage | V_{OL} (TL1-TL4) | — | -1.6 | — | V | In series an LED to ground |
| Sink Current ($V_{OL} = -1.6\text{V}$) | I_{OL} (TL1-TL4) | 9 | 10 | — | mA | In series an LED to ground |
| Sink Current ($V_{OL} = -4.6\text{V}$) | I_{OL} (L,M,S,SHO) | 6.5 | 7.6 | — | mA | In series a 300 Ω resistor and an LED and a triac |

ABSOLUTE MAXIMUM RATING

| | | |
|--------------------------------|-------|---|
| Ambient temperature under Bias | ----- | 0°C to $+70^\circ\text{C}$ |
| Storage temperature | ----- | -65°C to $+150^\circ\text{C}$ |
| Supply Voltage (w.r.t. ground) | ----- | $V_{DD} - V_{SS} = 7\text{V}$ |
| Input Voltage (w.r.t. ground) | ----- | $V_{SS} - 0.5\text{V}_{DC}$, $V_{DD} + 0.5\text{V}_{DC}$ |
| Output Voltage (w.r.t. ground) | ----- | $V_{SS} - 0.5\text{V}_{DC}$ $V_{DD} + 0.5\text{V}_{DC}$ |
| Power Dissipation | ----- | 500mw |

APPLICATION CIRCUIT

• PT-2124-C4/PT-2124-C8 APPLICATION CKT

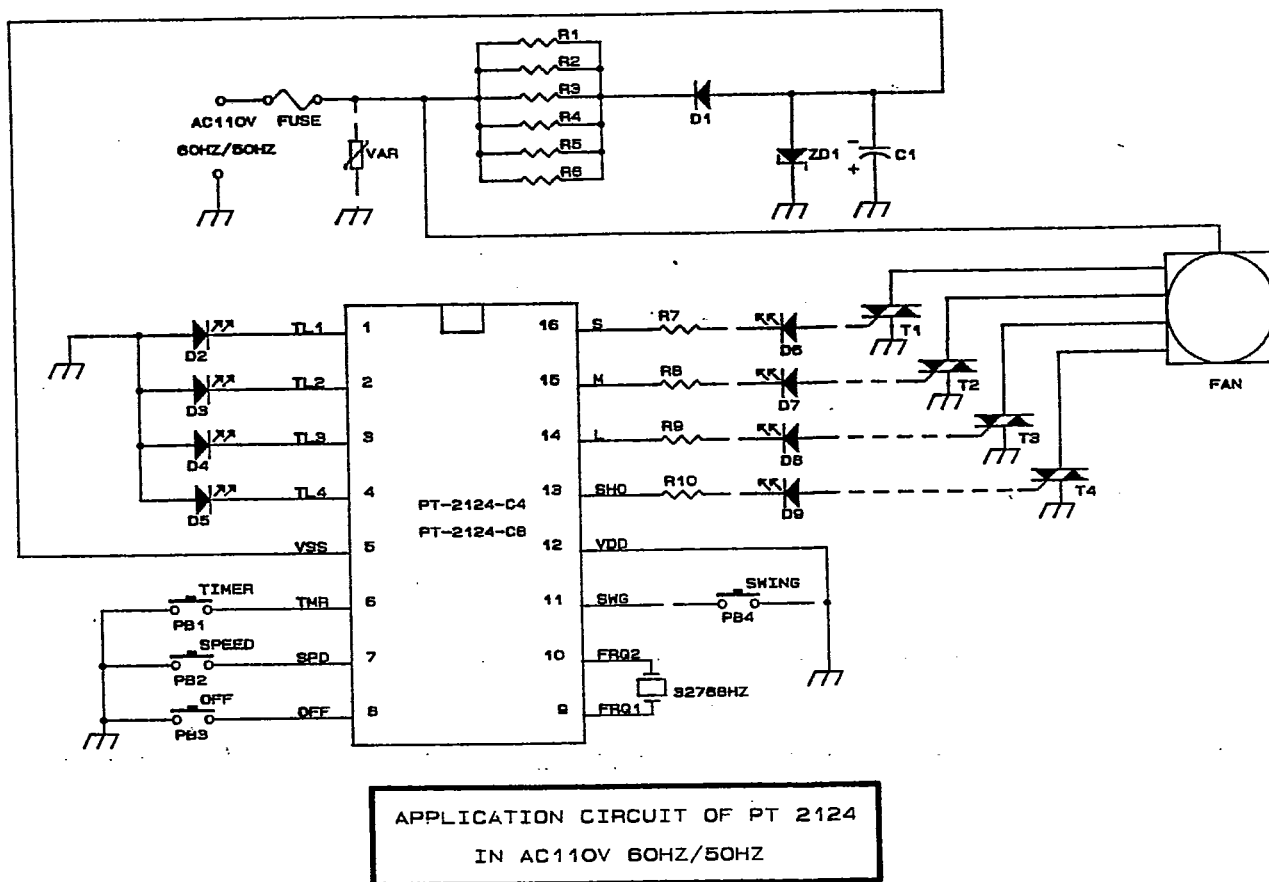


FIG. 4

Note 1 : Led dash line : Direct connection without in series with an led is also supported.

Note 2 : Push button dash line : Floating that pin will disable that function.

| PARTS | VALUE | UNIT | TOLERANCE |
|--------|-----------|------|-----------|
| R1-R6 | 15K/0.5W | OHM | ± 10% |
| D2-D9 | LED | | |
| T1-T4 | ZO102MA | | |
| ZD1 | 5.1/0.5W | V | |
| R7-R10 | 300/0.25W | OHM | ± 10% |
| D1 | 1N4006 | | |
| C1 | 470/16V | uF | ± 20% |
| FUSE | 1 | A | |

POWER SUPPLY APPLICATION CIRCUIT

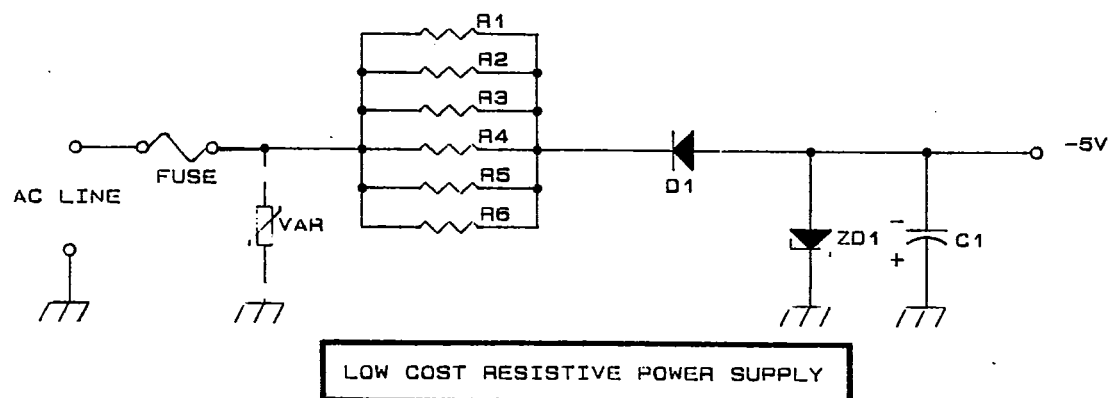
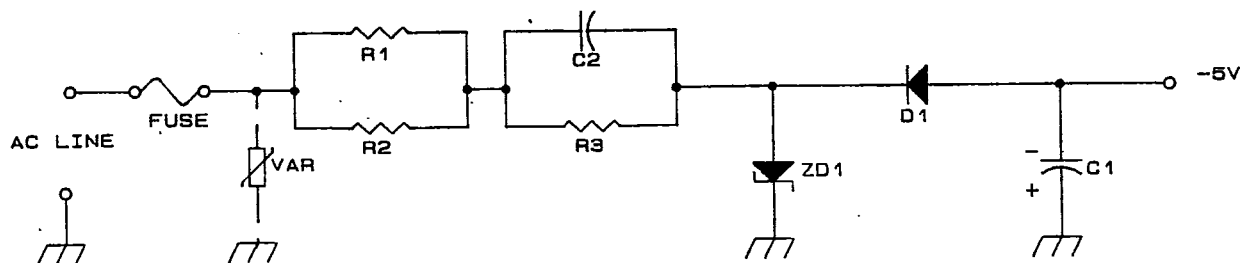


FIG. 5

| AC LINE 110V 50/60HZ | | | | |
|-------------------------|----------|------|-----------|------------|
| PARTS | VALUE | UNIT | TOLERANCE | REMARK |
| VAR | 200 | V | | OPTIONAL * |
| ZD1 | 5.1/0.5W | V | | |
| R1-R6 | 15K/0.5W | OHM | ± 10% | |
| D1 | 1N4006 | | | |
| C1 | 470/16V | uF | ± 20% | |
| FUSE | 1 | A | | OPTIONAL * |

*Note : More safety for connection

POWER SUPPLY APPLICATION CIRCUIT



LOW COST CAPACITIVE POWER SUPPLY

FIG. 6

| AC LINE | | | | | | | |
|--------------|------------|------|-----------|--------------|------|-----------|------------|
| 110V 50/60HZ | | | | 220V 50/60HZ | | | |
| PARTS | VALUE | UNIT | TOLERANCE | VALUE | UNIT | TOLERANCE | REMARK |
| VAR | 200 | V | | 400 | V | | OPTIONAL * |
| ZD1 | 5.6/0.5W | V | | 5.1/0.5W | V | | |
| R1 | 100/0.25W | OHM | ± 10% | 100/0.25W | OHM | ± 10% | |
| R2 | 100/0.25W | OHM | ± 10% | 100/0.25W | OHM | ± 10% | |
| R3 | 100K/0.25W | OHM | ± 10% | 100K/0.25W | OHM | ± 10% | |
| D1 | 1N4006 | | | 1N4006 | | | |
| C1 | 470/16V | uF | ± 20% | 470/16V | uF | ± 20% | |
| C2 | 1.5/250V | uF | ± 20% | 1.0/400V | uF | ± 20% | |
| FUSE | 1 | A | | 1 | A | | OPTIONAL * |

*Note : More safety for connection