

MOS/LSI DIGITAL
ALARM CLOCK
276-1751

ARCHER® TECHNICAL DATA

AN EXCLUSIVE RADIO SHACK SERVICE TO THE EXPERIMENTER

This device is a versatile MOS/LSI clock circuit. To construct a digital alarm clock, you need only a simple power supply, display and standard interface components. It is compatible with 4 or 6 digit, 7 segment multiplexed displays. The scanning oscillator is completely internal and requires no external components. It features an AM/PM and circuit activity signal, intensity control, 12 hr/60Hz or 24 hr./50Hz capability. The alarm operates in a 24 hour mode, which allows the alarm to be disabled and immediately reenabled to activate 24 hours later. The snooze inhibits an activated alarm for 10 minutes. The alarm output is a tone, thus eliminating an external oscillator.

MAXIMUM RATINGS:

Voltage on any Pin Relative to V_{SS} +0.3V to -18V

Output Voltage Breakdown on any Output Relative to V_{SS} -18V @ 10 μ A

Operating Free-Air Temperature Range 0°C to 55°C

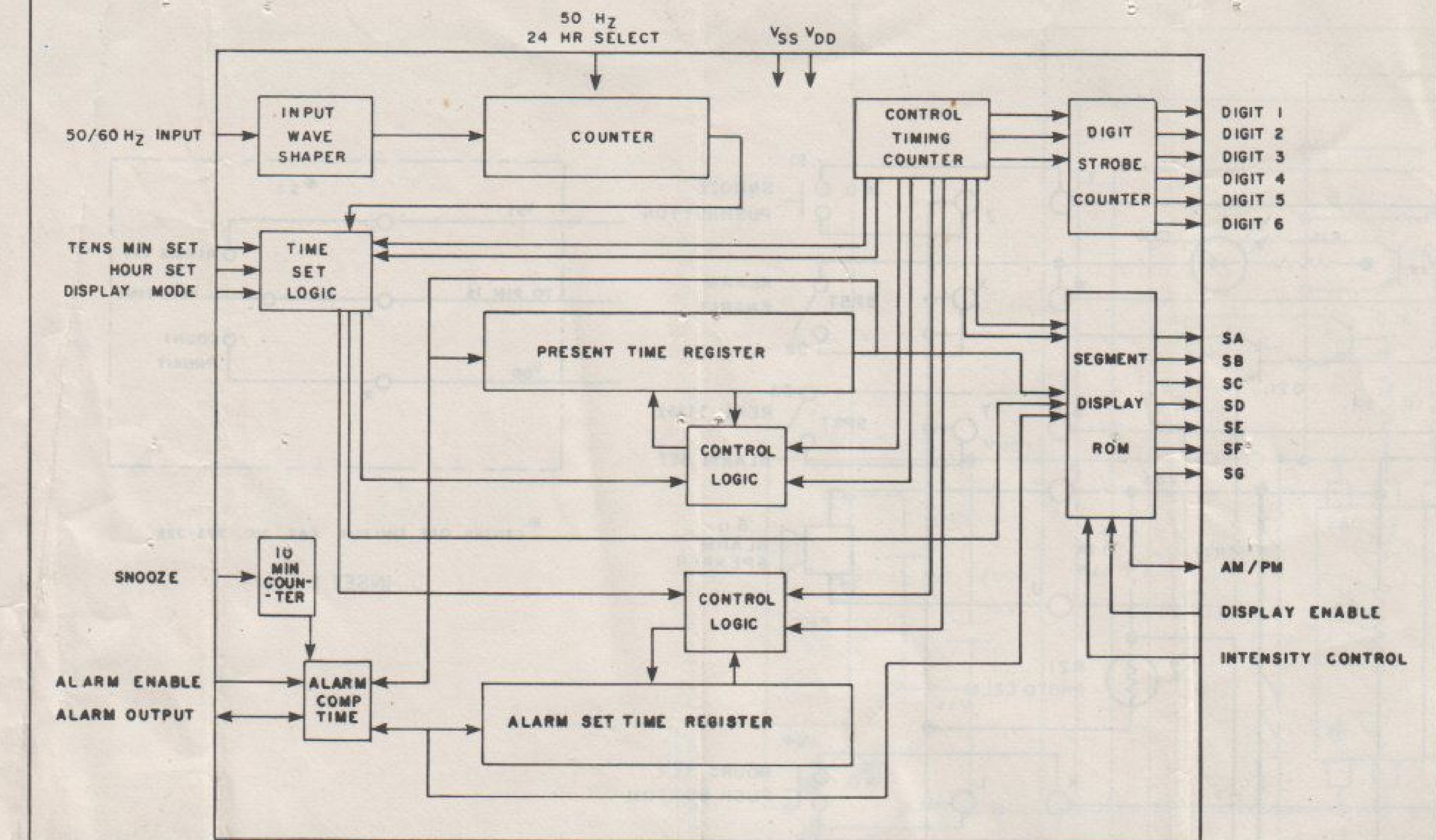
RECOMMENDED OPERATING CONDITIONS @ Free Air:

Operating Voltage V_{DD} Relative to V_{SS} -18V to -9V

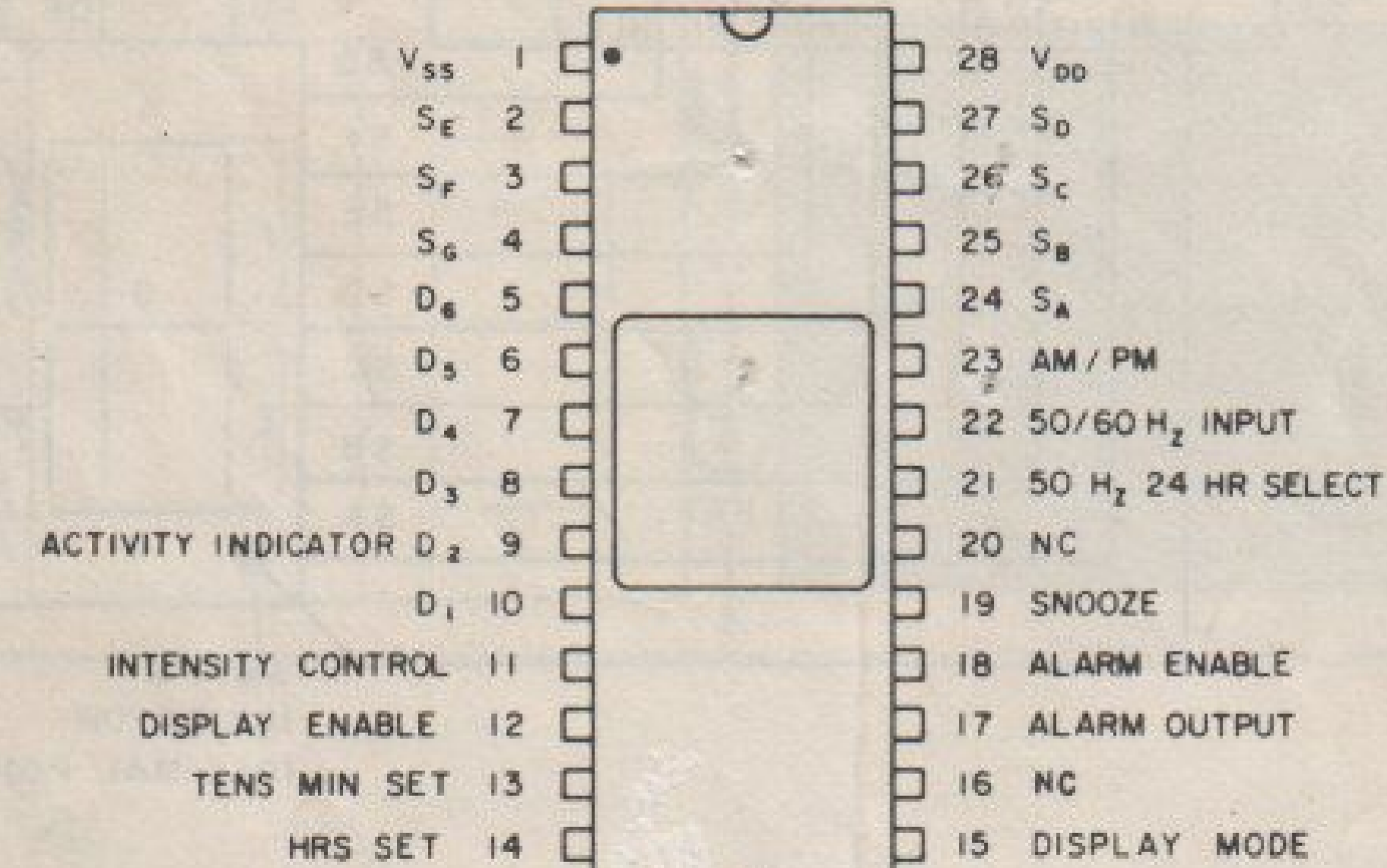
Input Logic Levels
"1" Logic Level $V_{SS}-0.3V$ to $V_{SS}+0.3V$

"0" Logic Level -18V to $V_{DD}+0.5V$

FUNCTIONAL DIAGRAM



PIN CONNECTIONS



ELECTRICAL CHARACTERISTICS @ Free Air:

Output Current
SA -SG, D6 - D1, AM/PM
(1) "1" Logic Level 0.5mA (min)
"0" Logic Level Open Drain Output

Alarm Output Current
(1) "1" Logic Level 0.5mA (min.)
(2) "0" Logic Level -5 μ A (min)

Supply Current, I_{DD} 10mA (max)

Input Current
TensMin Set, HRS SET 50 μ A to 1000 μ A
50H:24 Hr. Select 5 μ A to 100 μ A
Alarm Enable, Snooze 5 μ A to 100 μ A
50/60Hz Input, Display Enable -15 μ A to -200 μ A

(1) Output voltage equal to $V_{SS} - 2$ volts.
(2) Output voltage equal to $V_{DD} + 4$ volts.

This chip can be used with either a 4 or 6 digit display. If a 4 digit display is used, the user is unable to tell if the circuit is active until the minutes digit changes. By connecting D1 to V_{SS} , a colon (:) will flash at a 1Hz rate. D2 can then be used to drive the colon ("Activity Indicator").

When power is initially applied, both real time and alarm time will be at 12:00:00 midnight in the 12 hour 60Hz mode or 00:00:00 in the 24 hour 50Hz mode. The minutes can be advanced one digit at a time by depressing both the "Hours Set" and "Tens Minutes" pushbuttons. Depressing the "Tens Minutes" pushbutton only will advance the minutes in increments of ten. The hours digits can be advanced by depressing the "Hours Set" pushbutton. Any combination of pushbuttons will advance the digits at a 2Hz rate.

To reduce system expense and simplify operation, a Three State Input is available: Alarm Set, Real Time and Count Inhibit. When in Alarm Set mode the alarm time is displayed and may be advanced using the same procedure. In the Real Time mode the real time is displayed and may also be advanced using the same procedure. The Count Inhibit mode will halt the counting of the clock. While in this mode, the digits can be advanced by again using the time set procedure.

The "Alarm Enable" switch enables the wake up alarm. When alarm occurs it may be disabled and immediately reenabled and will active 24 hours later at the alarm time. However, the characteristics of this chip are such that you should not set the alarm at exactly 12:00 AM or 12:00 PM nor should you set it at exactly 8:00 AM or 8:00 PM.

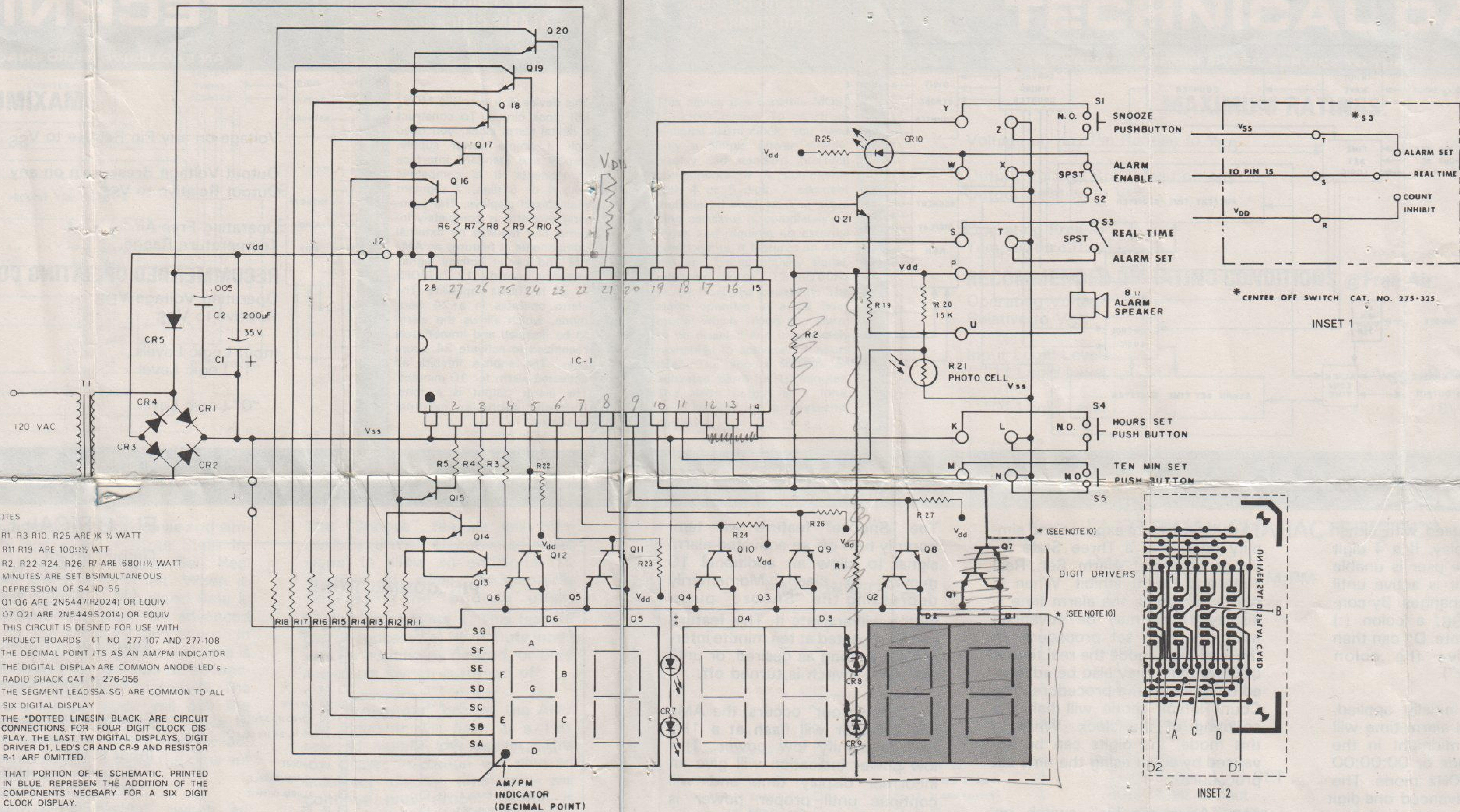
The "Snooze" feature will temporarily turn off an activated alarm signal to allow an additional 10 minutes of sleep. Momentarily depressing the "Snooze" pushbutton will activate it. This feature can be repeated at ten minute intervals for as long as desired, or until the alarm switch is turned off.

If a "brown out" occurs, the AM/PM indicator will flash at a 1Hz rate to signify low power. This low power indication will give an incorrect display time and will continue until proper power is restored and the clock is reset.

The intensity of the digital displays is automatically controlled by a photocell—from bright in full day-light to dim at night.

*NOTE: 50Hz is available only outside the United States.

SCHEMATIC DIAGRAM



NOTES

- 1 R1, R3, R10, R25 ARE 1/2 WATT
- 2 R11, R19 ARE 100Ω 1/2 WATT
- 3 R2, R22, R24, R26, R7 ARE 680Ω 1/2 WATT
- 4 MINUTES ARE SET BY SIMULTANEOUS DEPRESSION OF S4 AND S5
- 5 Q1, Q6 ARE 2N5447 (R2024) OR EQUIV
Q7, Q21 ARE 2N5449S2014) OR EQUIV
- 6 THIS CIRCUIT IS DESIGNED FOR USE WITH PROJECT BOARDS (KIT NO 277-107 AND 277-108)
- 7 THE DECIMAL POINT IS AS AN AM/PM INDICATOR
- 8 THE DIGITAL DISPLAY ARE COMMON ANODE LED'S - RADIO SHACK CAT # 276-056
- 9 THE SEGMENT LEADS (SA) ARE COMMON TO ALL SIX DIGITAL DISPLAY
10. THE *DOTTED LINES IN BLACK, ARE CIRCUIT CONNECTIONS FOR FOUR DIGIT CLOCK DISPLAY. THE LAST TWO DIGITAL DISPLAYS, DIGIT DRIVER D1, LED'S CR AND CR-9 AND RESISTOR R-1 ARE OMITTED.
11. THAT PORTION OF THE SCHEMATIC, PRINTED IN BLUE, REPRESENTS THE ADDITION OF THE COMPONENTS NECESSARY FOR A SIX DIGIT CLOCK DISPLAY.

990-0297

RADIO SHACK **A TANDY CORPORATION COMPANY**
FORT WORTH, TEXAS 76107

PRINTED IN U.S.A.

TANDY INTERNATIONAL ELECTRONICS

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