



**Farnell
Technical Data Service**

Farnell Electronic Components Limited
Canal Road, Leeds LS12 2TU.
Tel: Leeds (0532) 636311. Telex: 55147.

LCD Clock Module

Order Code 170-135

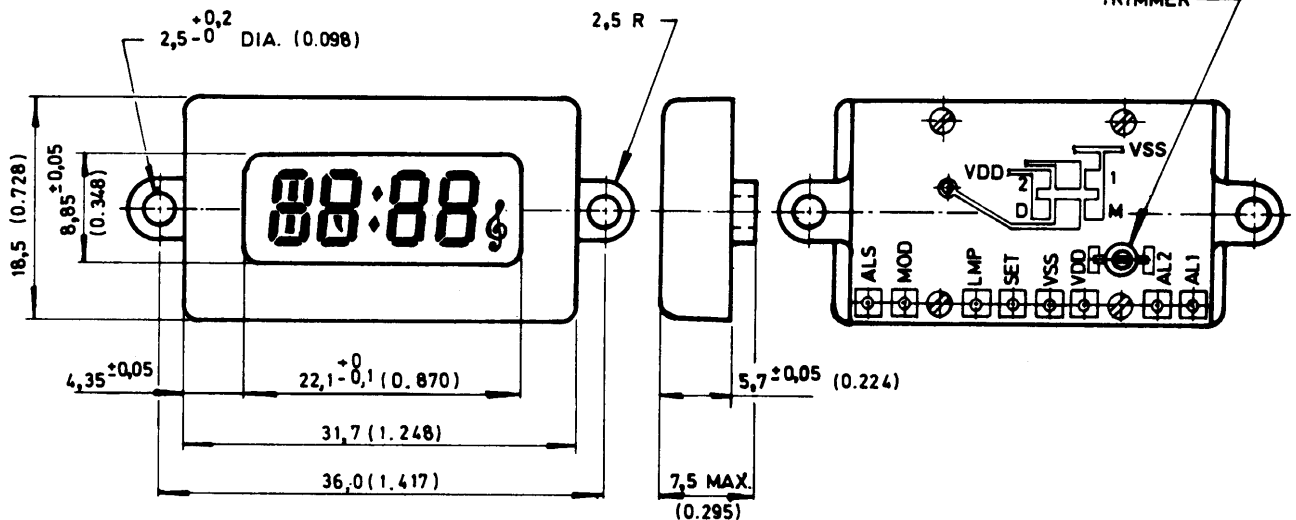
(Calendar Clock — PCIM 161)

OBSOLETE — OFFER 195887

FEATURES

- * 6 time keeping functions: Month, day, date, hours, minutes and seconds
- * Alphanumeric day — date
- * Reverse option for month and date position
- * 12 and 24 hours option
- * 0.25 inch (6.4 mm) digit height
- * 24 hour alarm output with piezo-electric ceramic transducer drive circuitry
- * Incandescent lamp backlighting
- * Compact and easy mounting design for pocket clock, cassette radio, Hi-Fi video cassette and TV applications

CLOCK MODULE DIMENSIONS



FRONT VIEW

REAR VIEW

DIMENSION MM (INCH)


DISPLAY FORMAT SELECTION

*FUNCTION PAD	*SOLDER TO SOURCE PAD	DISPLAY DIGIT				REMARK
		1st	2nd	3rd	4th	
D	V _{DD}	DAYS		MONTHS		EUROPEAN STYLE
M	V _{SS}	MONTHS		DAYS		AMERICAN STYLE
2	V _{DD}	HOURS	:	MINUTES		24-HOURS FORMAT
1	V _{SS}	HOURS	:	MINUTES		12-HOURS FORMAT

*Refer to rear view of clock module

NOTE: FOR THE 12-HOUR DISPLAY FORMAT AN 'A' FOR AM OR 'P' FOR PM APPEARS IN 4TH DIGIT WHEN SETTING THE HOURS

CLOCK MODULE SETTING

Display in this area  is flashing and can be set

	DISPLAY (actual size)	SEQUENTIAL Setting Instructions			DESCRIPTION
		SET	MOD	ALS	
DISPLAY TIME	1:00	power on			12-hour display format
	0 1:00				24-hour display format
	0 1:00	press			time is clocking (24-hour format)
TIME SETTING	10:00	press			setting hours to desired time
	10:25	2nd	1st		setting minutes to desired time
	10:25	press			set time is clocking
CALENDER SETTING	10 1	press			hold "MOD" for about 3 seconds until month and date appear, then set it to desired month
	10 8	2nd	1st		setting to desired date
	5A	press			setting day-of-week to desired day
	10:26		press		clock returns to normal display time
DISPLAY ALARM TIME	0 1:00			press once only	display alarm time and "♫" for 1/2-1 second, then normal time will appear
	10:26				
	0 1:00			press and hold on	display alarm time and "♫" for 1/2-1 second then display normal time. It will also enable or disable alarm alternatively by each operation
	10:26				
ALARM TIME SETTING	10:00	press 2nd		press 1st	press "ALS" twice within 3 seconds then set alarm hours to desired time
	10:30	press 2nd		press 1st	setting alarm minutes to desired time
	10:30			press once only	display alarm time momentarily, then automatically returns to normal display time with "♫" to show alarm is enabled
	10:27				

CLOCK MODULE OPERATION

1. Normally hours and minutes are displayed, but other functions can be displayed as follows:—
 - a) A momentary press on the "SET" button causes the month and date to appear for one (1) second, followed by the day-of-week for another second, then the display returns automatically to hours and minutes.
 - b) If "SET" button is held on, the display alternates between month and date (1 second), and day-of-week (1 second).
 - c) Seconds can be displayed by pressing "SET" button twice momentarily within 2 seconds. The display will return to hours and minutes on another momentary press of "SET".
2. If alarm circuit has been enabled, alarm symbol is displayed. The alarm is activated when the alarm time coincides with the normal time. The alarm is cut off automatically after 15 seconds, or the user may manually de-activate it by pressing "SET" or "ALS" button. When the alarm is de-activated, the alarm circuit and the $\frac{1}{2}$ will be turned off. In order to use the alarm again, it must be reset by using "ALS" as per display alarm time setting instructions.

NOTES

1. The incandescent backlighting lamp will be on when "LMP" is connected to VDD.
2. Days of the week display format are as follows:—

SU MO TU WE TH FR SA

3. The momentary switches for "SET", "MOD", "ALS" and "LMP" are recommended.

ELECTRICAL CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS

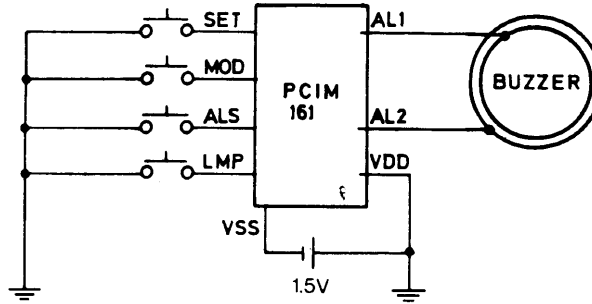
Operating voltage referenced to V+ -1.3V to -1.6V
 Operating temperature..... 0°C to 50°C
 Storage temperature -10°C to 60°C

OPERATING CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_{DD} = 0\text{V}$)

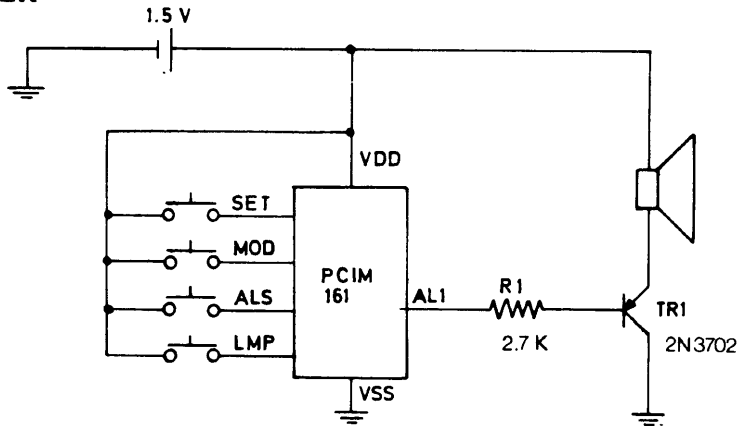
PARAMETERS	CONDITIONS	MIN	TYP	MAX	UNITS
SUPPLY CURRENT	$V_{SS} = -1.5\text{V}$		6	20	μA
OUTPUT CURRENT—ALM1, ALM2	$V_{SS} = -1.3\text{V}$		150		μA
DISPLAY LIGHT PER LAMP	$V_{SS} = -1.5\text{V}$		12.5	15	mA
CRYSTAL FREQUENCY			32, 768		Hz
ACCURACY (TRIMMER IS PRESET)			± 2.5		MIN/YEAR

EXAMPLES OF APPLICATION CIRCUIT

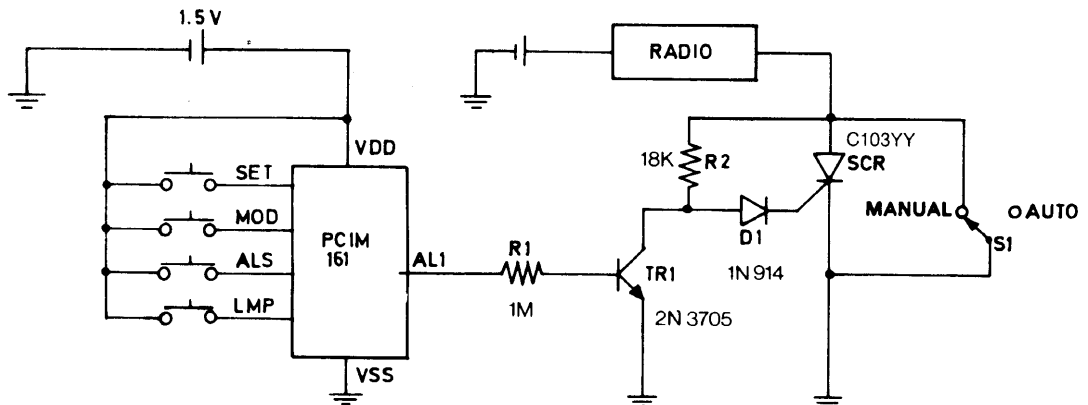
1. ALARM WITH "PIEZO CERAMIC BUZZER"



2. ALARM WITH SPEAKER



3. ALARM CLOCK RADIO



- 1) When S1 is at "Manual" position the radio will be on all the time.
- 2) When S1 is at "AUTO" position the radio will be on if alarm timer is set and alarm time coincides with the normal clock time.
- 3) Radio can be switched off when S1 is switch to "Manual", and then return to "AUTO".



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(Calendar Clock — PCIM 161)

PCIM 164 MINIATURE CLOCK MODULE OPERATING INSTRUCTIONS

ANDERS

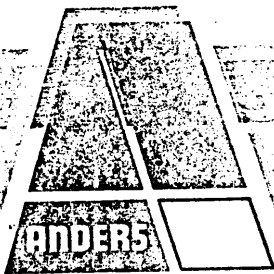
FUNCTION SELECTION

12-hour or 24-hour display format can be selected by bonding the 'M1' terminal to the respective source pad shown in the table below.

The PCIM 164 can provide the ALARM WATCH, the TIMER WATCH or the ALARM & TIMER WATCH by bonding 'M2' and 'M3' terminals to the respective source pads as shown below:

FUNCTION PAD	CONNECTED TO SOURCE PAD	FUNCTIONS
M1	12	12-HOUR FORMAT
	24	24-HOUR FORMAT
M2	A or T	Depend on M3 connection
	A & T	Alarm and Timer
M3	T	Timer Only
	A	Alarm Only

NOTE: The Module is originally configured as a 12-Hour, Alarm and Timer Clock.



DISPLAY CONTROL

NORMAL WATCH MODE

When used as a watch, the MSM5519 has three display modes, the time mode, the calendar mode and the second mode. The time mode displays the HOUR in digit position 1 and 2, the MINUTE in digit position 3 and 4, and the

COLON flashes at a 1 Hz rate, 0.75 sec. ON and 0.25 sec. OFF rate. 12/24 hour operation is controlled by the logical state of 'M₁' input.

Leading zero values of the HOUR is blanked.

The calendar mode displays the MONTH in digit position 1 and 2, the DATE in digit position 3 and 4,

Leading zero values of the MONTH is blanked.

The second mode displays the SECOND in digit position 3 and 4 with COLON.

ALARM TIME MODE

Normal Watch Mode is changed to Alarm Time Mode by depressing the switch S₂ (when the MSM5519 is bonded to the alarm & timer watch) or the switch S₃ (when the MSM5519 is bonded to the alarm only watch).

The MSM5519 will display ALARM HOUR in digit position 1 and 2, ALARM MINUTE in digit position 3 and 4, and COLON will remain constantly displayed.

The alarm indicator flashes at a 1 Hz rate, 0.75 sec. ON and 0.25 sec. OFF. Set and reset of alarm function is alternately made by depressing the switch S₁ during alarm time display mode.

Alarm begins to sound when the normal watch time reaches the set alarm time if the watch is not in any setting mode. The alarm sound is automatically stopped 30 seconds later or stopped manually by depressing any switch.

COUNTDOWN TIMER MODE

Normal Watch Mode is changed to COUNTDOWN TIMER MODE by depressing the switch S₂, and the display mode will automatically return to the normal time mode in 4 seconds.

The MSM5519 will display TIMER HOUR in digit position 1 and 2, and TIMER MINUTE in digit position 3 and 4. COLON, and the countdown timer indicator will flash at a 1 Hz rate, 0.75 sec. ON and 0.25 sec. OFF.

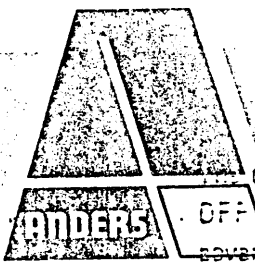
The maximum settable time is 11 hours 59 minutes.

Alarm begins to sound when the counter reaches to 0 hour 00 minute, if the watch is not in any setting mode. The alarm sound is automatically stopped 30 seconds later or stopped manually by depressing any switch.

SETTING OPERATION

NORMAL WATCH

When the display is in the time mode or the calendar mode, setting mode is accessed by depressing the switch S₂ (Alarm or Timer only watch) or S₂ and S₃ (Alarm and Timer watch).

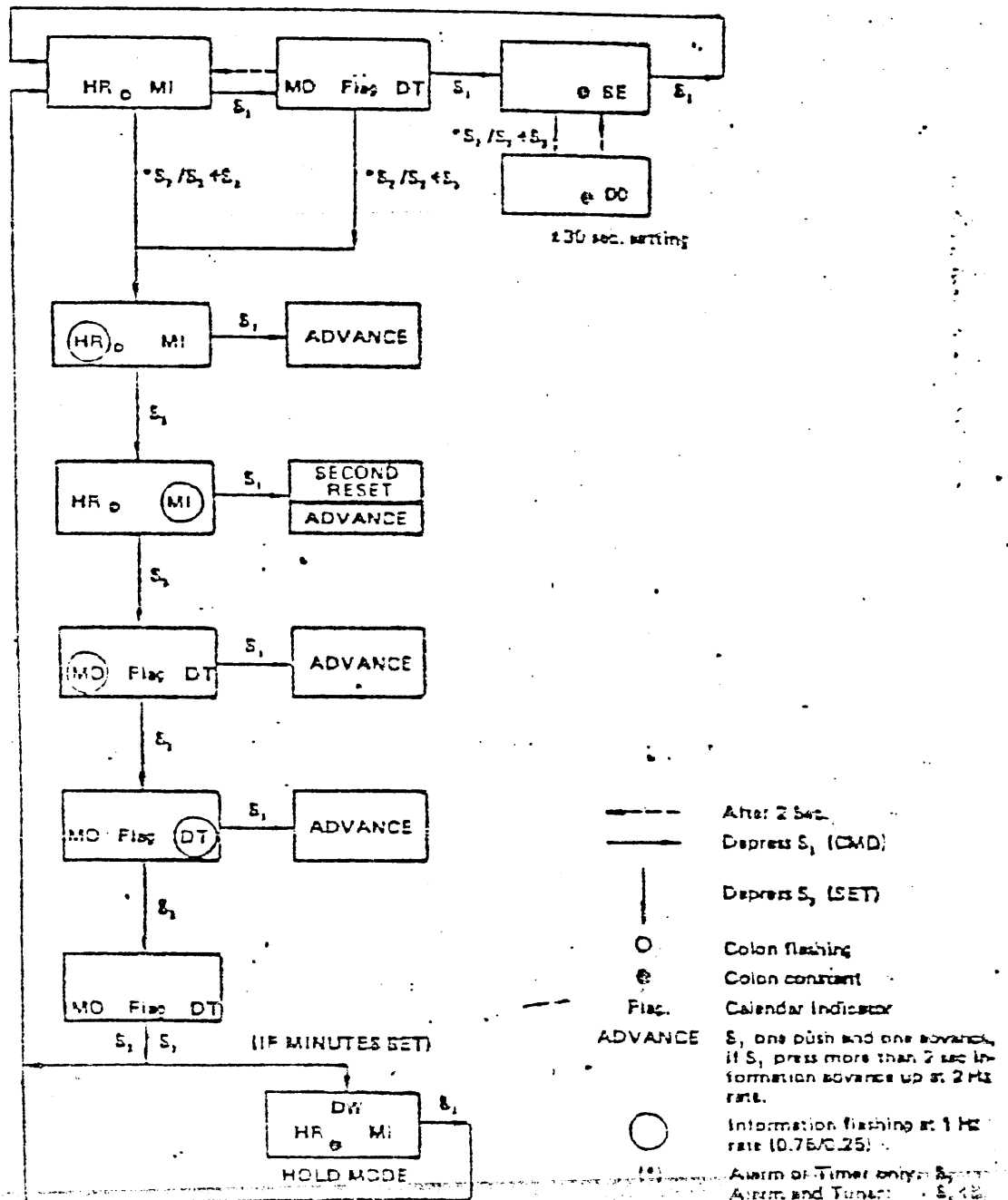


digits to be set are selected by switch S_1 and flash at a 0.75 second ON and 0.25 second OFF rate. The figure advances by +1 each time the switch S_1 is depressed or automatically advances at 2 Hz if the switch S_1 is depressed more than 2 seconds. When the watch is in the minute set mode, depressing the switch S_1 not only advances the figure but also resets the SECOND counter to zero and the counter is stopped (held).

When the display is in the SECOND mode, SECONDS are reset to zero by depressing the switch S_2 (Alarm only or Timer only) or S_2 and S_3 (Alarm and Timer). If the figure is 30 or more, one minute is added to the minute display and if less than 30, the minute counter is not changed.

Setting operation is done as described in Figure E.

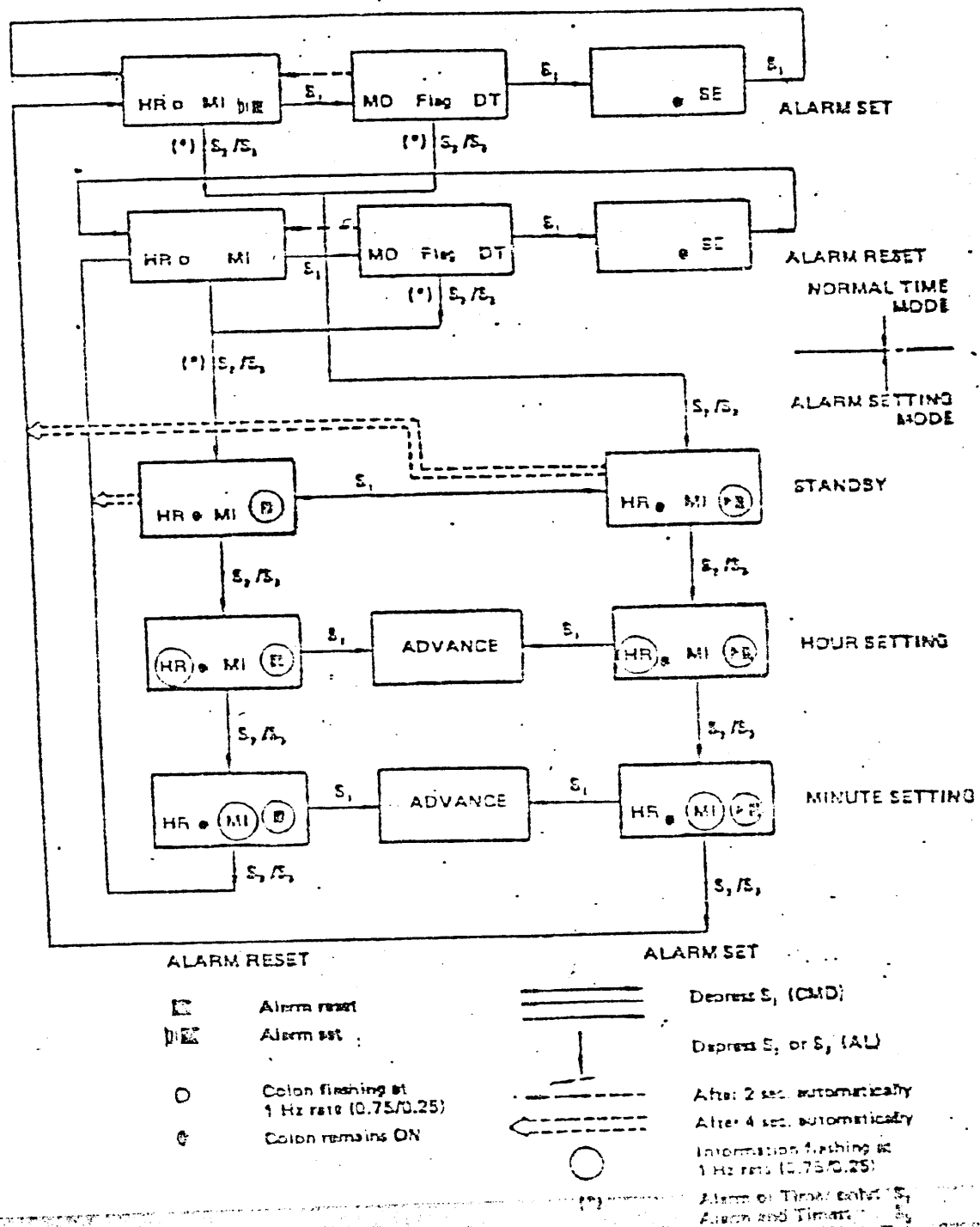
NORMAL WATCH SETTING





ALARM TIME SETTING

By depressing the switch S_2 (ALARM & TIMER WATCH) or S_3 (ALARM or TIMER ONLY WATCH), alarm setting standby mode is selected. Alarm indicator flashes at 1 Hz rate (0.75/0.25) and the seven day-flag remains ON. When the alarm time is set, alarm set indicator will flash at 1 Hz rate. Alarm set and reset is alternate by depressing switch S_1 . ALARM HOUR is selected by depressing the switch S_2 or S_3 once and ALARM MINUTE is by twice. The figure advances by +1 each time the switch S_1 is depressed. Display mode will return to the normal time by depressing the switch S_2 or S_3 three times or automatically in 4 seconds, if alarm time setting is not operated. Alarm time setting operation is done as described in Figure 7.



COUNTDOWN TIMER SETTING

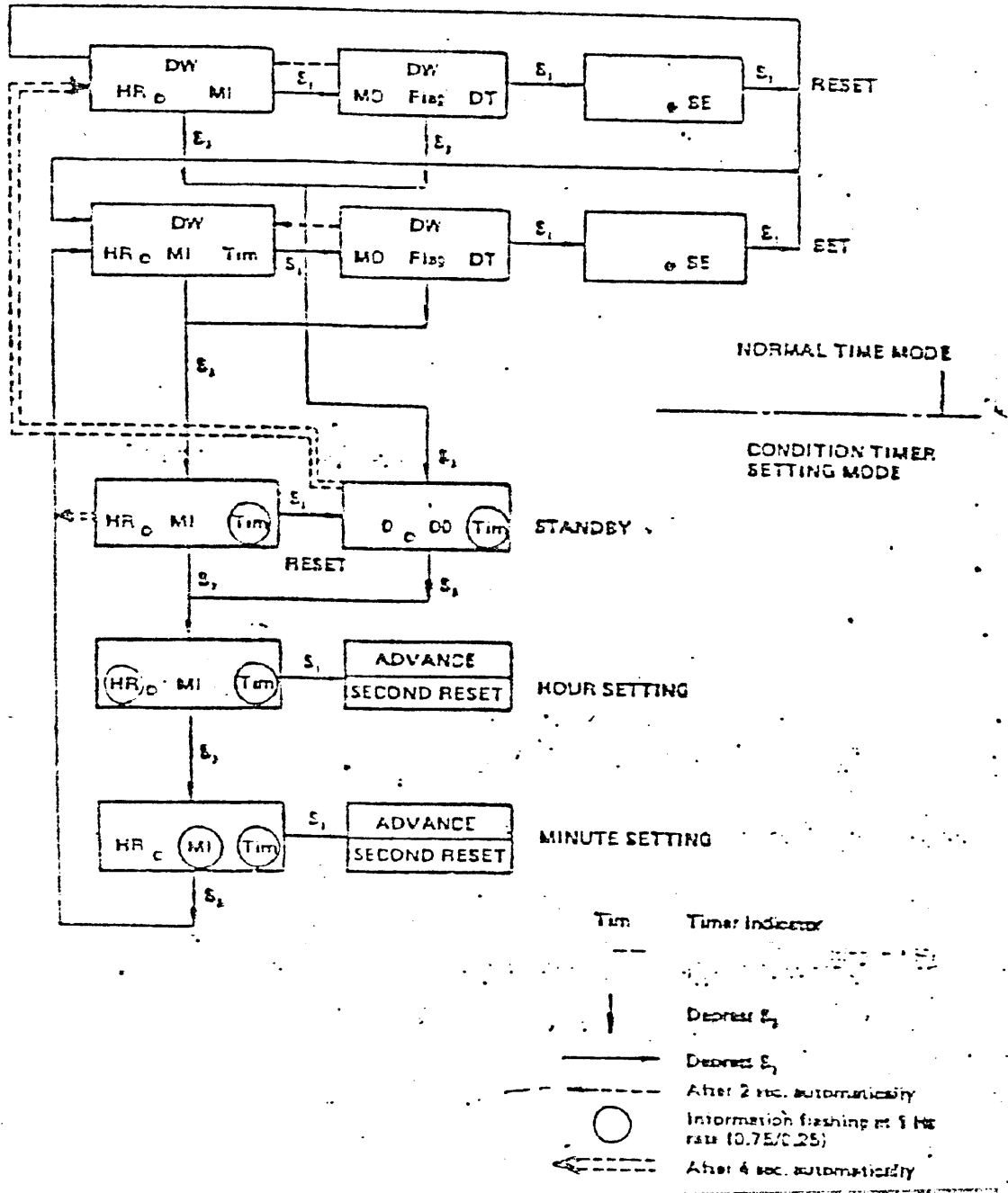
By depressing the switch S_3 , countdown timer setting standby mode is selected. Timer indicator, the seven-day-flap and COLON flash at 1 Hz rate (0.75/0.25).

By depressing the switch S_1 timer is reset to zero and will start counting down automatically. The set digits are selected by the switch S_2 and the figure advances by +1 each time the switch S_1 is depressed.

The display will return to the normal time mode by depressing the switch S_3 three times or automatically if timer setting is not operated.

COUNTDOWN TIMER SETTING is done as described in Figure E.

TIMER SETTING SEQUENCE



Alarm and Timer: $S_1, 45$

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	Z1	
Input Voltage	VSS-0.3V to	VDD+0.3V
Operating Temperature	0 C	to 150 C
Storage Temperature	-20 C	to 170 C

ELECTRICAL CHARACTERISTICS

V_{DD} = Ground, T_a = 25 C

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Voltage	VSS		-1.3	-	-	V
Supply Current	IDD		-	-	-1.6	mA
Switch Input Current	IIE	VIE = 0V	2	6	20	mA
Switch Input Current	IIL	VIE = -1.5V	-200	15	30	mA
Switch Input Voltage	VIE		-0.3	-	-	V
Buzzer Output Current	IOE	VOH = -0.4V	-150	-	VDD+0.3	mA
Buzzer Output Current	IOL	VOL = -1.15V	100	-	-	mA
Buzzer Output Voltage	VOH	IOH = -150mA	-	-	-	V
Buzzer Output Voltage	VOL	IOL = 100mA	-1.15	-	-0.4	V
Accuracy	-		-	4.0	-	bits/
						YEAR

