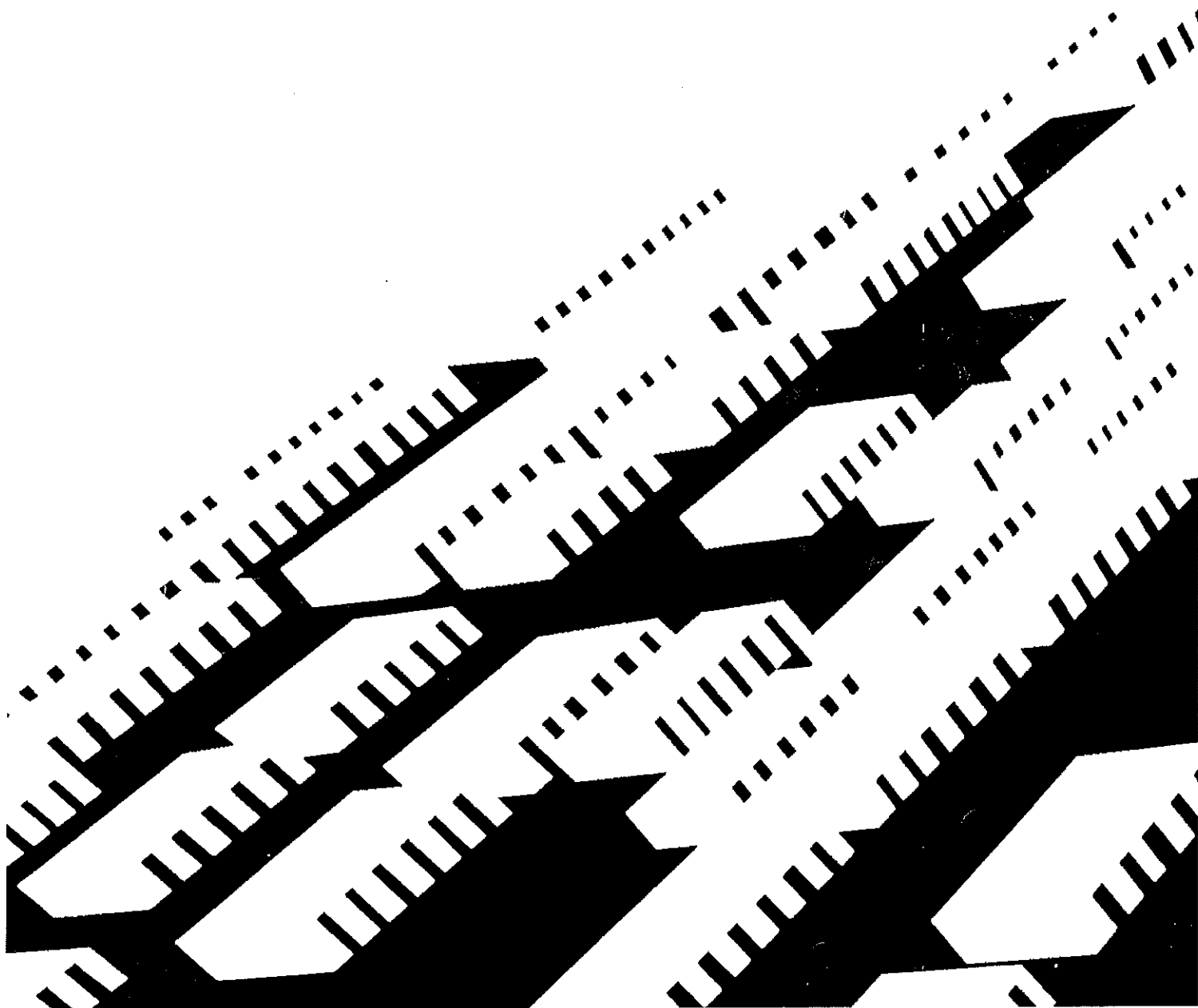


**INTERMATIC®**

**2** CIRCUIT *ET 7215C*  
**ELECTRONIC TIME SWITCH**

OWNER/INSTALLER INSTRUCTION MANUAL



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## SPECIFICATIONS

### ELECTRICAL

#### Input Power:

**CAUTION** Refer to Sample Wiring Diagram section for correct timer input power connections. Incorrect wiring could damage the time switch.

#### Power Consumption:

4.0 Watts Maximum with both output relays energized.

#### Timing Accuracy:

Time of day is as accurate as the line frequency and can be synchronized to the second.

#### Switch Configuration:

Single pole double throw (SPDT) for both circuits; isolated contacts

#### Switch Rating-Each Circuit:

Refer to label on inside of case cover.

#### Wiring Terminals:

Accommodates #18 to #14 AWG wire.

#### Approvals:

UL Listed (CSA approval pending)

#### Program and Time of Day Protection:

Internal solid state circuit maintains program and correct time of day within 0.01% (0.002 typical) accuracy for 24 hours (48 hours typical) minimum. This circuit will fully charge within 5 minutes after input power is applied to the time switch. THIS SOLID STATE CIRCUIT DOES NOT REQUIRE A BATTERY. For additional operating characteristics of the solid state memory backup circuit see CONTROLS AND OPERATING INFORMATION.

#### Optional Battery Backup:

For program and time of day protection during long term power outages a battery backup can be added, but is not required. One 9 volt non-rechargeable battery is required for the optional battery

backup. This will maintain the program and time of day for a minimum of 125 days or 3,000 hours of accumulated power outages when using a 9 volt alkaline battery.

### ENVIRONMENTAL

#### Operating Temperature Range:

14 degrees F (-10 degrees C) to 122 degrees F (50 degrees C). Hold time for solid state program protection circuit may be less than specified outside of 32 degrees F (0 degrees C) to 104 degrees F (40 degrees C).

#### Operating Humidity:

0-95% noncondensing

### PHYSICAL

#### Case:

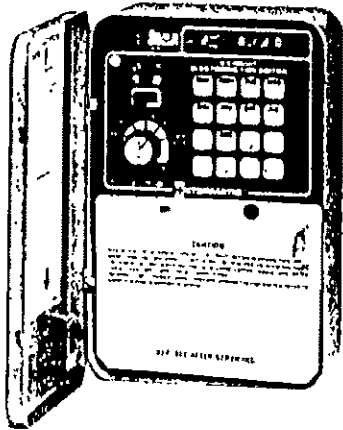
Drawn steel, 7/8" (19.7 cm) high, 5" (12.7 cm) wide, 3" (7.6 cm) deep, gray finish w/lockable spring hasp

#### Case Knockouts:

Combination 1/2"-3/4" (one on back and each side, two on bottom)

#### Shipping Weight:

2.9 lbs (1.32 kg)



**CAUTION...** Read this entire instruction manual carefully **BEFORE** attempting to install or operate this time switch. Failure to comply with instructions could result in personal injury and/or property damage.

## INTRODUCTION

This time switch is designed to control lighting, HVAC, refrigeration, and other energy consuming loads as well as security and convenience systems. It is capable of reducing energy consumption by providing accurate, independent scheduling, cycling and defrost control for two circuits. This time switch is ideal for small or medium size buildings such as schools, churches, restaurants, apartment complexes, fast food restaurants and other applications where accurate, full-year control of energy is desired.

### THE ET7215C FEATURES ARE:

- Independent to-the-minute scheduling, cycling and defrost control for two circuits
- A total of 320 set points, assignable in ANY COMBINATION to ON times, OFF times, daylight saving time dates and holidays
- Copy feature copies all programmed times, for both circuits, from one day to any other day(s), effectively increasing the number of scheduling times.
- Solid state memory protection circuit maintains all program data and time-of-day for 24 hours minimum without the need for batteries and associated battery maintenance.
- Optional battery backup, with low battery indicator, for long term power loss of up to 125 days or 3,000 hours of accumulated power outages
- Single pole double throw (SPDT) isolated contacts for each circuit
- Full year control with automatic daylight saving time and leap year adjustment.
- Automatic day of week correction.
- Programming for an 8th day (A1) in addition to the normal 7 day week (For holidays)
- Holidays programmable one year in advance, by month and date assignment. Can be assigned to the alternate day(A1) or any of the 7 week days
- Automatic delay of 8 to 10 seconds between each circuit programmed for the same on time or upon power up after a power outage.
- Load status indicator for each circuit
- Manual on/off override.
- Easy to program - uses the same programming steps, for set points, as the Intermatic 11700 series time switches.
- Automatic review feature for easy review of data points and calendar information
- Continual display of current day and time
- .14" LED display prevents washout and provides easy programming even in poorly lit areas.
- Large, well defined keypads with tactile feel.
- Rugged steel enclosure with lockable hasp. Optional flushmount, plastic, or steel raintight (NEMA 3) or 2 in 1 enclosures available.

# INSTALLATION

**REMOVE DEAD FRONT (fig. 1):** An electrical insulator called a "dead front" is installed to prevent accidental contact with the electrical connections, and a possible shock hazard. Lift the left side of the dead front off of the retaining post and pivot it up and to the right to expose the terminal strip. Be sure to replace the dead front after making all wiring connections.

**MOUNT CASE:** Using the mounting holes provided, mount case, eye level if possible, using anchors if necessary. Note: Allow sufficient room to left of case for the door to open.

**MAKE LINE WIRE CONNECTIONS:** (See sample wiring diagrams) **CAUTION:** Turn power off at the panel board. You may have to remove two fuses or switch two breakers to the OFF position. If the panel board is out of sight, tag it to prevent power from inadvertently being turned on. Connect the line wires from the panel board to the timer input power terminals. For time switches requiring 120 volt power, either the hot or neutral may be connected to either terminal. **CAUTION:** Failure to follow the correct input power connections for the available power can cause damage to the time switch. For a 120 volt supply make sure the hot and neutral wires are identified by the appropriate color coding or by another code accepted and permanent means. Securely connect the ground lead to the ground connection in the case. The ground screw is identified by the green color.

**MAKE LOAD WIRE CONNECTIONS:** (See sample wiring diagrams) **CAUTION:** TURN POWER OFF to the load to prevent inadvertent load actuation. Identify and label all wires from the load or load control devices to ensure that load/circuit connections are as desired. Connect load wires or load control device wires to the appropriate terminals on the terminal strip. See contact configuration shown on door label. Both circuits are single pole double throw (SPDT) contacts. Both output contacts, are isolated contacts. This means that the contacts are not automatically powered when power is connected to the timer input power terminals. Power to the contacts can either be paralleled off of the timer input power, thru the load, or supplied by a separate power source. Note that the normally closed contacts can be used for switching set-back temperature controls or to provide selected load shedding if required.

Load control devices; relays, contactors, motor starters, etc., are required if the load exceeds the voltage and or current ratings of the time switch contacts. As noted previously, the contacts are isolated contacts and therefore must be supplied power by either providing a separate power source or by paralleling from the timer input power, through the load. If the time switch power input is 120 volt and power is being paralleled from the timer input power terminals, be sure the time switch contacts are breaking the hot side of the line. This is done by connecting the hot wire to the common terminals and the neutral wire to one side of the load. The other side of the load is then connected to either the normally open or normally closed contacts of the time switch.

Due to the eight to ten second soft start feature it is recommended that indoor lighting loads be controlled by circuit 1 to prevent a delay before lighting is switched back on after a power outage.

**CAUTION:** For critical loads, appropriate safety overrides should be installed in conjunction with the time switch contacts; high temperature thermal switch overrides for refrigeration control in a grocery store for example.

When switching 24 volt control devices do not use excessive wire lengths because a large voltage drop across the wire may prevent sufficient operating voltage from being applied to the control relay. If in doubt, connect and test the relay, that is to be

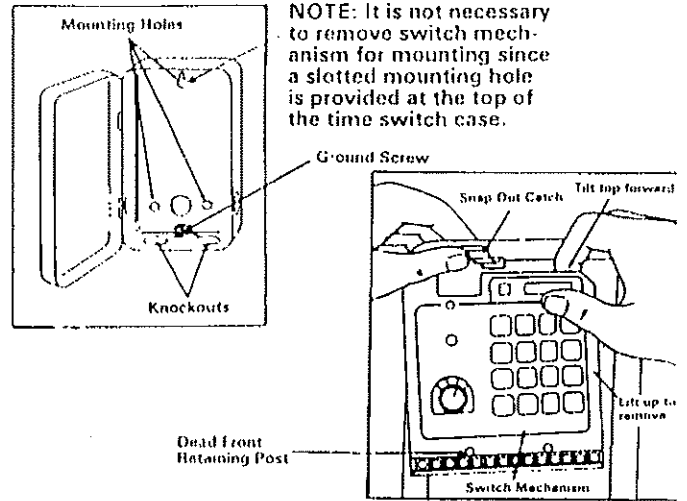


Fig. 1

installed furthest from the time switch, using the required length of wire and wire size planned. The approximate resistance of COPPER wire in ohms per 1000 feet is:

14 AWG 2.52 ohms/1000 feet 20 AWG 10.15 ohms/1000 feet  
16 AWG 4.02 ohms/1000 feet 22 AWG 16.14 ohms/1000 feet  
18 AWG 6.38 ohms/1000 feet 24 AWG 25.67 ohms/1000 feet

As an example, a run of 600 feet is required, 18 AWG copper wire is to be used, and the relay, using a 24 volt coil, draws 350 milliamperes of current. Total wire length, including return run, is 1200 feet.

- The wire resistance equals the total number of feet times the resistance per foot.  
or 1200 ft. x 6.38 ohms/1000 ft. = 7.66 ohms.
- The voltage drop equals the resistance times the current  
or 7.66 ohms x .35 amps = 2.68 volts.

Most relays are designed to operate at a minimum of 85% of their nominal voltage or 15% less than nominal. For a 24 volt relay this means it would operate at a minimum of 3.6 volts less than nominal. Based on this, the 2.68 volts drop across the 1200 feet of wire would not be excessive.

Insert stripped ends of COPPER wires (18 to 14 gauge, solid or stranded) under the pressure plate and securely tighten the terminal screws. DO NOT USE ALUMINUM WIRING. Be sure insulation clears the pressure plate.

Surge suppressors (metal oxide varistors or MOV's) may be installed across the normally open and normally closed contacts for inductive load switching. Use INTERMATIC part number 176ET8A for 24 volt loads, 176ET9A for 120 volt loads, 176ET10A for 240 volt loads or 176ET22A for 277 volt loads. Although unlikely to be required, additional protection against electrical "noise" interfering with the operation of the microprocessor may be achieved by installing surge suppressors across the contacts of the externally controlled switching devices such as relays, contactors or motor starters. The proper surge suppressors to use will depend on the load being controlled. Consult manufacturer of transient protection devices or the manufacturer of the controlled switching device for the recommended surge suppressor to use.

**CHECK WIRING:** Make sure all grounding leads are securely connected to a good earth ground. (See fig. 1) Check all wiring then replace the dead front by pivoting it down over the locating post provided.

**TEST WIRING AND TIME SWITCH FUNCTION:** Apply line power. Within 60 seconds the display should indicate Day 1 (Sunday) 10:00 AM. If the display is lit but indicates something other than Sunday 10:00 AM, or if the display is not lit after 60 seconds, press the recessed RESET switch and hold it for 5-10 seconds. The display should now indicate Sunday 10:00 AM.

If the display does not light up within 60 seconds, even after pressing the RESET switch, move the circuit selector to the "1" position, the mode selector to the MAN position then press the ON/COPY keypad. Note that this may cause the load connected to circuit #1 to operate. If this does not cause the load 1 indicator to light, recheck time switch power connections to make sure time switch is actually receiving line power.

**INSTALL BATTERY (if required)** The optional battery backup is not required, but if it is to be installed, do so at this time. Any 9 volt non-rechargeable battery can be used. For best service life, an alkaline battery is recommended. Connect the battery to the 9 volt battery clip then secure the battery with the battery holder provided.

A low battery indicator, identified as LOW BATT, is located in the top left corner of the keyboard panel. The indicator will be lit if the auxiliary battery is not installed or if the battery voltage is too low to protect from loss of clock, calendar and set point data beyond the 24 hour minimum as provided by the solid memory protection circuit. The LOW BATT indicator will function only if line power is applied.

## CONTROLS AND OPERATING INFORMATION

(See Fig. #2)

**LOAD INDICATORS:** The two LED indicators monitor the status of the load relays on both circuits individually. When an indicator is LIT, the NORMALLY OPEN (NO) contacts on that relay are CLOSED. Likewise, when the indicator is NOT LIT, the NORMALLY OPEN contacts on the relay are OPEN. **CAUTION:** A load may be on or off when the indicator is lit, depending on whether the load is wired to the normally open or normally closed contacts.

When performing load maintenance DO NOT use the manual override as a means of turning off power to the loads and do not use the load indicators to determine if there is power to the loads.

**ALWAYS TURN POWER TO THE LOADS OFF AT THE PANEL BOARD WHEN PERFORMING LOAD MAINTENANCE.**

**CIRCUIT SELECTOR:** The circuit selector must be set to the appropriate circuit, #1, or #2, to set on and off times, to review or clear these times or to override the status of a temporarily circuit by means of the ON/COPY or OFF keypads.

**MODE SELECTOR:** This (5) position selector switch is used to select one of five modes; MAN, AUTO, REVIEW, SET or CLNDR/HLDY SET.

- **MAN (Manual):** Placing the mode selector in the MAN mode allows automatic load control to be overridden. Either load can be switched on or off in the manual mode by placing the circuit selector in the circuit #1 or #2 position, then pressing the ON/COPY or OFF keypads. Both loads will remain on or off, as indicated by the respective load indicator until the automatic (AUTO) mode is once again selected. When power is restored after a power failure and the mode selector is in MAN, both circuits will remain off.

To resume automatic load switching, return the mode selector to the AUTO mode. When the mode selector is returned to the AUTO mode both circuits will, within 2 minutes, assume the state dictated by the most recent preceding set point for each circuit. If no set points exist between midnight and the current time of day for a given circuit, that circuit will remain in the same state as when the selector was moved to AUTO and remain in this state until the time of day for which a set point is programmed for the opposite state.

- **AUTO:** This position of the selector provides for automatic program control of both circuits. Automatic circuit control for both circuits is provided regardless of which position the circuit selector is in.

Note that either circuit can be temporarily switched on or off in the AUTO mode by setting the circuit selector to the desired circuit, then pressing the ON/COPY or OFF keypad. The circuit will remain in the selected on or off state until the next, programmed, opposite state. If the mode selector is moved to another position during this time, then returned

to the AUTO mode, all loads which have been temporarily overridden will return to their current programmed on or off state. The system switches the loads, beginning with circuit #1, at the START of each minute and then switches circuit #2 on with an 8 to 10 second delay. Because of this, if you return to AUTO and a load, that is programmed to be on, has been temporarily switched off, that load may not switch on until after the start of the next minute.

- **REVIEW:** This position of the selector provides for review of all programmed on and off times and, if required, omitting any on and off times. The REVIEW position is used for reviewing and omitting calendar information as well.

- **SET:** This is the position the mode selector must be in to program the current day, time of day and ON/OFF set points. During the programming of ON/OFF times for a selected circuit the CIRCUIT SELECTOR must be set to the respective circuit.

\*\*Note that the ET7215C uses the exact same procedure for setting data in the SET mode as does the Intermatic ET700 series time switches.

The day and time of day as well as all programmed on and off times are programmed using the following sequence.

1. Press a day keypad 1=Sunday, 2=Monday, etc. or A1. The alternate day (A1) is an extra "8th" day and can be used to program holidays, or other selected days, for a different schedule than any of the 7 days of the week.
2. Press the numbered keypads, 1 thru 0, to select the time, hours first, then minutes. The clock is a 12 hour repeating clock and a leading zero is not required. For example 6:00 A.M. is set by pressing 6 0 0.
3. Press AM or PM (12:00 PM is noon)
4. Press the ON/COPY, OFF or CLK/HLDY keypads respectively to program an on time, off time or to set the time of day.

**CAUTION:** Either or both of the circuits may be programmed for short on and off times (1 minute) to provide for load cycling. When doing so it is important to follow manufacturers guidelines for cycling equipment. Failure to adhere to these guidelines can affect the life and warranty of that equipment. If in doubt, consult the equipment manufacturer for recommended duty cycling rates.

The time switch provides an automatic delay of 8 to 10 seconds between the switching of both circuits if programmed for the same ON time. This "soft start" reduces power surges by preventing more than one load from switching on at the same time.

- **CLNDR. HLDY SET (Calendar/Holiday)** This position of the mode selector is used to program the following calendar information to provide for a full year control.

1. Month and Date
2. Year
3. Daylight saving time adjustment for Spring and Fall (2:00 A.M. for the days programmed)

# PROGRAMMING

You may use the SHORT FORM PROGRAMMING INSTRUCTIONS which are located on the inside of the case cover and also in this instruction manual.

BEFORE BEGINNING TO PROGRAM, press and hold the MEMORY CLEAR (MC) switch then the CLEAR (C) keypad and hold both depressed simultaneously for 5 to 10 seconds. The display will blank momentarily when this is done.

This will insure that all data is removed from the memory and will reset the microprocessor. DO NOT REPEAT THIS STEP AFTER PROGRAMMING HAS BEGUN because the entire program will be lost.

The following sequence (#1, #2, etc.) is recommended for programming the time switch. Any desired sequence can be used, although calendar data must be entered prior to holiday and daylight saving time data.

## • SET CALENDAR, HOLIDAY and DAYLIGHT SAVING TIME DATA

(Place mode selector in CLNDR/HLDY mode)

Existing data CANNOT be written over.

If month, date, holidays, and daylight saving time information has previously been entered, any portion can individually be cleared in the REVIEW mode. This can be done at any time. Re-enter only the new data.

NOTE: A maximum of 320 set points can be entered into the time switch memory. Each of the following count as one set point; an on time, an off time, each daylight saving time date, each copied day and each holiday. ANY COMBINATION of these data points can be programmed up to 320 set points. The display will prompt "FULL" if an attempt is made to add a setpoint after maximum number of setpoints have been programmed.

### 1--SET CALENDAR DATA (Place Mode Selector in CLNDR/HLDY MODE).

- The display should be prompting "-- --".
- Press the numbered keypads (1 thru 0) to select the current Month and Date. Note that a leading zero is required for the Date; example February 3rd is entered as 2 0 3. A leading zero is not required for the month, but may be entered.
- Press the CLK/HLDY keypad to enter the Month and Date.
- The display will prompt "Yr--" for a year entry.
- Press the numbered keypads to select the current Year.
- Enter only the last 2 digits; 8 7 for 1987.
- Press the CLK/HLDY keypad to enter the Year.
- The display now shows "-- -- --".

### 2--SET HOLIDAYS (Place mode selector in CLNDR/HLDY MODE).

- The display should be prompting "-- -- --".
- Press the day keypads (SUNday thru SATurday or Alternate Day A1) to select the day schedule that is to be run on the date desired.
- Next press the numbered keypads to select the Month and Date that the Holiday schedule is to occur. Note that a leading zero is required for the Date; example, March 8th is entered as 3 0 8.
- Next press the CLK/HLDY keypad to enter.
- The display will Prompt "X XX XX" showing holiday data entered.
- Repeat this procedure for as many days, in the coming year, as required.

### 3--SET DAYLIGHT SAVING TIME ADJUSTMENT Spring and Fall. (Place mode selector in CLNDR, HLDY MODF) REFER TO CHART, which follows, for DS dates

- The display should now be prompting with last holiday entered or "-- -- --" if CLNDR/HLDY mode is selected
- Press the 0/DST keypad
- The display will Prompt "O -- --".
- Press the numbered keypads to select the Month and Date for DST to begin. A leading zero is required for the Date, for example April 7th is entered as 4 0 7. This is the date, at 2 00 AM, that the clock will advance 1 hr.
- Press the CLK/HLDY keypad
- The display shows "S X XX" showing the date entered and "S" for Spring.
- Press the 0/DST keypad again.
- The display will prompt "O -- --".
- Press the numbered keypads to select the Month and Date for DST to end. The clock will fall back by 1 hr. a 2 00 AM on this date.
- Press the CLK/HLDY keypad.
- The display shows "F XX XX" showing the date entered and "F" for Fall.
- Note that either Spring or Fall can be entered first. The system automatically determines if the date is Spring or Fall by the following convention:  
If the month entered is 1 (January) thru 6 (June) the date assigned is Spring.  
If the month entered is 7 (July) thru 12 (December) the date assigned is Fall.

Both Spring and Fall dates must be entered for DST adjustment to function. BASED ON THE DST LAW EFFECTIVE FOR 1987 the following are the DST dates (the first Sunday of April and the last Sunday of October) for the coming years. The DST dates must be reentered each year.

YEAR	SPRING	FALL	YEAR	SPRING	FALL
1987	Apr 05	Oct 25	1994	Apr 03	Oct 30
1988	Apr 03	Oct 30	1995	Apr 02	Oct 29
1989	Apr 02	Oct 29	1996	Apr 07	Oct 27
1990	Apr 01	Oct 28	1997	Apr 06	Oct 26
1991	Apr 07	Oct 27	1998	Apr 05	Oct 25
1992	Apr 05	Oct 25	1999	Apr 04	Oct 31
1993	Apr 04	Oct 31	2000	Apr 02	Oct 29
			2001	Apr 01	Oct 28

### • SET CLOCK AND SCHEDULE TIMES (Place mode selector in SET MODE).

#### 1--SET CURRENT DAY OF WEEK AND TIME OF DAY

The display should be prompting "-- -- --".

Press a day keypad to select the current day; SUNday thru SATurday, then press the number keypads to select the HOUR and MINUTE, then press AM or PM (12:00 PM is noon)

The display should now be prompting with time of day and the number corresponding to the day of week selected. Press the CLK/HLDY keypad.

The display will prompt "-- -- --". The time of day is displayed only in AUTO mode.

Note: The calendar information, previously entered, is used by the microprocessor to establish the day of the week. If a different day of the week is entered, it is automatically revised to agree with the day of the week as determined by the calendar information. If you have entered the correct day of the week and it is revised by the micro-

processor, review and correct the calendar information  
Proceed to SET SCHEDULE TIMES.

## 2- SET SCHEDULE TIMES (Place mode selector in SET mode)

BE SURE THE CIRCUIT SELECTOR is set for the circuit; #1, or #2, that you are programming

- The display should be prompting "- --:--".
- Press a day keypad to select the DAY (SUN thru A1), the numbered keypads to select the HOUR and MINUTE the load is to switch, then either AM or PM (12:00 PM is noon)
- The display shows "X XX XX". If the day of week selected is alternate day A1 "8 XX XX" is displayed.
- Press the ON/COPY or OFF keypads to enter the desired operation for the Circuit, Day and Time selected.
- Repeat for both circuits and all days (Sun thru A1) as required.

## 3- COPY A DAY SCHEDULE TO ANOTHER DAY(S) (Place mode selector in SET mode)

The COPY FEATURE copies schedule times for BOTH CIRCUITS from one day to any other day or days.

Once this is done, the set points for that "copied to" day (s) CANNOT be modified in any way until the copy feature is cleared. The day that is being copied (copy from day) CAN BE modified at any time as required. These changes are automatically recognized by the "copy to" day (s). Copied days cannot be copied to. "Copied to" days cannot be copied from.

- The display should be prompting with the last schedule time entered or "- --:--" if SET mode is just entered.
- Press a DAY keypad to select the "copy to" day.
- Press the ON/COPY keypad.
- Press a DAY keypad to select the "copy from" day.
- Repeat for All Copied Days.

EXAMPLE: Mondays program for both circuits is copied to Tuesday thru Friday; Tuesday thru Friday are the "copy to" days and Monday is the "copy from" day.

Note that the COPY feature copies IDENTICAL data for both circuits from one day to another day (s). If both circuits are not EXACTLY THE SAME for a day, programming must be completed for each circuit for that day.

## • REVIEW ALL CALENDAR, HOLIDAY, AND SCHEDULE DATA (Mode selector in REVIEW MODE)

### 1- REVIEW OR OMIT MONTH/DATE, YEAR, DST AND HOLIDAY DATA

The circuit selector can be in any position.

Press CLK/HLDY: All CALENDAR DATA IS AUTOMATICALLY displayed as follows:

"XX XX" MONTH/DATE

"Yr 87" YEAR for 1987

"S X XX" DST for Spring

"F XX XX" DST for Fall

"HLDY" To identify that holidays are to follow

"X XX XX" Holiday Month and Date, and the day

schedule for that holiday are displayed.

Holidays are displayed chronologically beginning Jan 1st (1 01) regardless of the order in which they were entered.

The display will show "End" after all holidays have been reviewed.

TO REMOVE CALENDAR DATA FROM PROGRAM

- Press the CLK/HLDY keypad again when the data to be removed is displayed. The display will pause.
- Press the CLEAR (C) keypad: Displays "- --:--" The data that was displayed is now removed from the program
- Press the CLK/HLDY keypad to continue the automatic review process, if desired.

Note: Pressing CLEAR WITHOUT PAUSING the display has NO AFFECT ON DATA.

- New data may be re-entered, if desired, by following applicable steps of instructions: "SET CALENDAR, HOLIDAY AND DAYLIGHT SAVING TIME DATA"

### 2- REVIEW OR OMIT SCHEDULE TIMES

Be sure the circuit selector is set to the circuit; #1, or for which schedule times are to be reviewed

- Press the DAY keypad (SUN thru A1) to select the day circuit being reviewed.

- The display will prompt one of the following "X CP YX" indicating that the day being reviewed is a copy of another day, shown as X

"End" indicating that there are no ON or OFF points

" : : " indicating that there may be set po

- Press the ON/COPY or OFF keypads, in any sequence review the schedule times for the day and circuit selected. Schedule times are displayed in chronological order beginning at midnight, (12:00 AM), regardless of order in which they were entered. Because of several on or off times may be shown in sequence. The display will show "End" after all ON and OFF set points have been reviewed

### 10 REMOVE A SCHEDULE TIME(S) FROM THE PROGRAM

- Press ON/COPY or OFF keypads until setpoint to be omitted is displayed

- Press the CLEAR (C) keypad.

- The display shows "- --:--", indicating that the schedule time that was displayed is now removed from program.

- Press the ON/COPY or OFF keypad, in any sequence continue the review, if desired.

- Review can be terminated by exiting review mode.

- Repeat this procedure for both circuits and all days desired

### 3 AUTO REVIEW OF SCHEDULE TIMES

Be sure the Circuit Selector is set to the circuit to be reviewed

- Press the DAY keypad to select the day for the circuit being reviewed.

- Press the ON/COPY AND OFF keypads SIMULTANEOUSLY. The display shows "On" or "OFF" momentarily, then displays the ON or OFF schedule time for 3 seconds

The schedule times are displayed in chronological sequence beginning at midnight, (12:00 AM), regardless of the sequence in which they were entered. Because of this, several on or off times may be shown in sequence

- The display prompts "End" after all ON and OFF points have been reviewed.

### TO REMOVE A SCHEDULE TIME IN AUTO REVIEW:

- Press either the ON/COPY or OFF keypad when the time to be removed is being displayed.

The Auto Review will pause.

- Press the CLEAR (C) keypad, the display shows "- --:--". The scheduled time is now removed from the program

- Press the ON/COPY and OFF keypads simultaneously continue the Auto Review of schedule times, or press either the ON/COPY or OFF keypad to step through programmed schedule times one at a time.

Repeat this procedure for both circuits and all days desired

Automatic review may be prematurely terminated by either momentarily exiting review mode or by pressing any keypad

MAKE SURE TO MOVE MODE SELECTOR BACK TO "AUTO MODE" AFTER SETTING OR REVIEWING

RESET does not Clear Set Point Memory. Reset initiates system self diagnostic cycle.

Note that RESET will cause the time to be reset to 10:00 / the correct time and day must be reprogrammed.

TO CLEAR THE ENTIRE MEMORY press the CLEAR (C) key while the recessed MEMORY CLEAR (MC) switch is depressed.

# SAMPLE WIRING DIAGRAMS

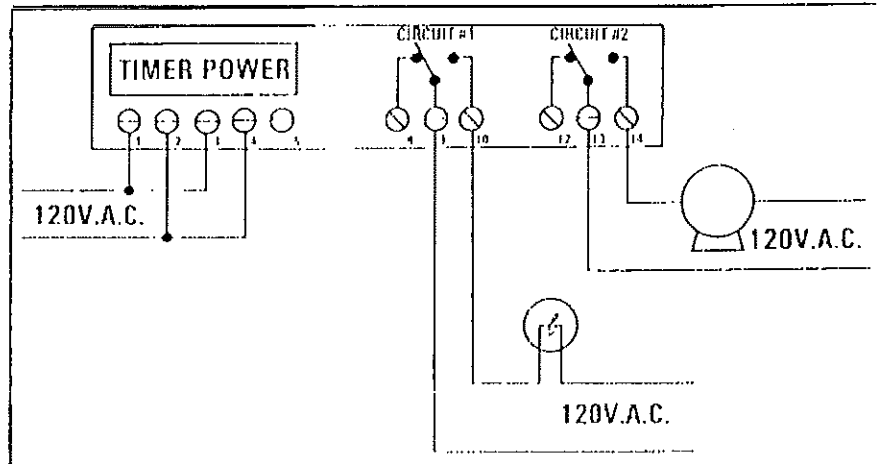
The following wiring diagrams show typical wiring for 120 volt, 240 volt and 277 volt input supplies

## CAUTION:

- FOLLOW ALL LOCAL ELECTRICAL AND SAFETY CODES, AS WELL AS THE NATIONAL ELECTRICAL CODE (NEC).
- FAILURE TO OBSERVE THE CORRECT INPUT POWER CONNECTIONS FOR THE AVAILABLE VOLTAGE MAY CAUSE DAMAGE TO THE TIME SWITCH.
- DO NOT EXCEED THE MAXIMUM CURRENT CAPACITY OF THIS TIME SWITCH. THIS TIME SWITCH MUST BE GROUNDED.

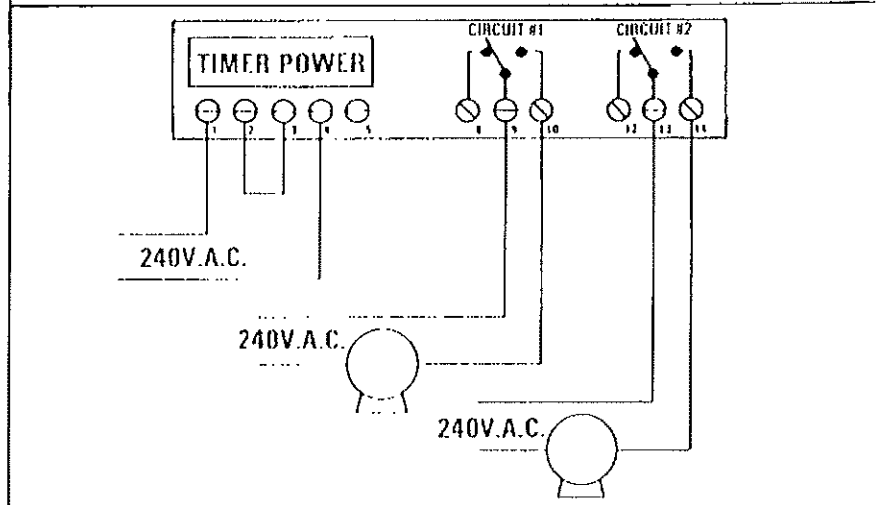
### SAMPLE SCHEMATIC FOR 120 VOLT INPUT

In this wiring diagram, the 120 volt input is connected to terminals one and two. Note that jumpers must be connected from terminal one to terminal three and from terminal two to terminal four. The output contacts are used to control a motor load and a lighting load directly. Both loads are connected to the normally open contacts, which allows the loads to be on during programmed ON times. The two independent circuits provide for lighting and motor load control on independent schedules for different times of the day and different days of the week.



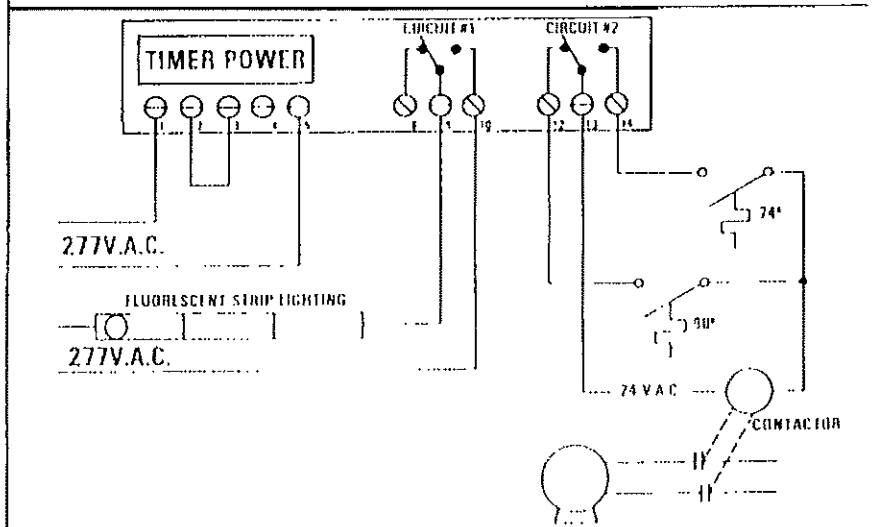
### SAMPLE SCHEMATIC FOR 240 VOLT INPUT

In this wiring diagram, the 240 volt supply is brought into terminals one and four. Terminals two and three must be jumpered together. The loads being controlled are motor loads which operate exhaust fans. Both fans can be programmed to alternate their ON times, to provide cycling of the loads throughout the normal work-day. As in the example for the 120 volt input, both loads are being controlled by the normally open contact, such that they are on only when the respective circuit is programmed for an ON time. This type of control provides for kilowatt hour utility charge savings, as well as kilowatt, or peak demand, savings by cycling the two loads.



### SAMPLE WIRING DIAGRAM FOR 277 VOLT INPUT

In this diagram, the 277 volt input is connected to terminals one and five. Terminals two and three must be jumpered together. In this application, a lighting load and an air conditioning load, are being controlled. Circuit number one is used to control an indoor lighting load, in this case, 277 volt fluorescent recessed strip lighting. Circuit number two controls a relay, or definite purpose contactor, which in turn controls the compressor motor. The relay is powered by a separate 24 volt supply. Two thermostats are wired in parallel with each other and in series with the control relay to provide two levels of temperature control. One side of the 24 volt supply is connected to the common terminal of circuit #2. The opposite side of the 24 volt supply is connected to one side of the control relay. The opposite side of the control relay is connected to the thermostats. One thermostat selects the "occupied" temperature, in this case 74°, the other thermostat selects the "unoccupied" temperature, in this case 90°



CONTROLS, SHOWN EXTERNAL TO THE TIME SWITCH, ARE NOT INCLUDED WITH THE TIME SWITCH.

# --SHORT FORM OPERATING INSTRUCTIONS--

\*If programming the time switch for the first time press CLEAR (C) keypad while holding recessed MEMORY CLEAR (MC) switch depressed. Do not repeat this procedure if you are only modifying the program because all data will be lost.

\*SET CALENDAR, HOLIDAY and DAYLIGHT SAVING TIME DATA (Mode Selector in CLNDR/HLDY (Calendar Holiday Mode) Cannot "write over" existing data. If a mistake is made during data selection press CLEAR (C) keypad then re-enter data.

## 1—SET CALENDAR DATA

If Month/Date have been previously entered must clear in REVIEW mode first

Prompts "... .."

Press keypads to select current Month and Date leading zero required for Date (Ex: Feb. 3rd = 2 03)

Press CLK/HLDY to enter

Prompts "Yr -.."

Press keypads to select Current Year: Last 2 digits only

Press CLK/HLDY enter

## 2—SET HOLIDAYS

If Holidays previously entered are to be removed do so in REVIEW mode

Prompts "... .."

Press keypad to select the day schedule (SUN thru SAT or A1) that is to be run on date desired.

Press keypads to select Month and Date for Holiday schedule to occur - leading zero required for Date

Press CLK/HLDY to enter

Displays "X XX XX" showing holiday entered.

Repeat for as many days, in the coming year, as required.

## 3—SET DAYLIGHT SAVING TIME ADJUSTMENT - Spring and Fall (DST adjustment will occur at 2:00 AM on the dates set)

If DST dates have been previously entered you must clear in REVIEW mode first

Prompts "X XX XX" showing last holiday entered or "- .. .." if CLNDR/HLDY mode just selected and Month, Date and Year have been programmed.

Press O/DST keypad

Prompts "O- .."

Press keypads to select Month and Date for DST to begin, leading zero required for Date -the clock will advance 1 hr on that date.

Press CLK/HLDY

Displays "S XX XX" showing date entered and "S" for Spring

Press O/DST keypad

Prompts "O - .."

Press keypads to select Month and Date for DST to end-this is the date that the clock will fall back by 1 hr.

Press CLK/HLDY

Displays "F XX XX" showing date entered and "F" for Fall

## \*SET TIME OF DAY AND SCHEDULE TIMES (Mode Selector in SET MODE)

### 1—SET CURRENT DAY OF WEEK AND TIME OF DAY

Press keypads to select DAY (Sun thru Sat), HOUR, MINUTE and AM or PM. Displays time of day and day of week selected

Press CLK/HLDY

Prompts "- :-:-": Ready for setting schedule times

### 2—SET SCHEDULE TIMES-BE SURE CIRCUIT SELECTOR is set for the proper circuit; #1 or #2.

Prompts "- :-:-"

Press keypads to select DAY (SUN thru A1), HOUR, MINUTE and AM or PM

Displays time "X XX:XX" and day of week selected ("8 XX:XX ") for alternate day A-1.

Press ON or OFF to enter the desired operation for the Circuit, Day and Time selected. Displays data entered.

Repeat for both circuits and all days (Sun thru A1) as desired

### 3—COPY A DAY SCHEDULE TO OTHER DAY (S)

COPY feature copies schedule times for both circuits from one day to any other day or days

Prompts "X XX:XX" showing last schedule time entered or "- :-:-" if set mode just selected.

Press Day keypad to select "Copy To" Day

Press ON/COPY keypad. Displays "X CP Y." for day "X" to be a "COPY TO" day.

Press Day keypad to select "Copy From" Day

Repeat for All Copied Days

EXAMPLE: Monday program is Copied to Tuesday thru Friday-Tuesday thru Friday are the "Copy To" days-Monday is the "Copy From" Day

## \*REVIEW MONTH/DATE, YEAR, DST AND HOLIDAY DATA Circuit selector can be in either position. (Mode selector in REVIEW MODE)

### 1—Press CLK/HLDY AUTOMATICALLY displays all data as follows:

"XX XX" MONTH/DATE

"Yr 86" YEAR for 1986

"S XX XX" DST for Spring

"F XX XX" DST for Fall

"HLDY" To identify that holidays are to follow. Holidays shown chronologically beginning Jan 1st (1 01)

"End" Indicates completion of Automatic Calendar Review

### TO REMOVE CALENDAR DATA FROM PROGRAM

Press CLK/HLDY to initiate Automatic Calendar Review.

Press CLK/HLDY when DATA IS DISPLAYED: Display pauses

Press CLEAR (C): Displays "... .." Data that was displayed is now removed from program

Press CLK/HLDY to continue automatic review

Note: Pressing CLEAR WITHOUT PAUSING display has NO AFFECT ON DATA.

### 2—REVIEW SCHEDULE TIMES (Mode Selector in REVIEW MODE)

Circuit Selector MUST be set to circuit for which schedule times are to be reviewed

Press DAY KEYPAD (SUN thru A1) to select Day for circuit being reviewed

Prompts one of the following:

"CP YX" Indicates day being reviewed is a copy of another day (shown as X)

"End" Indicates there are no ON or OFF set points

"X XX:XX" Indicates there may be set points

Press ON/COPY or OFF keypad (in any sequence) to review schedule times for day and circuit selected

Schedule times review in chronological order beginning at 12:00 AM regardless of order in which entered

Prompts "End" after last ON or OFF set point has been reviewed

### TO REMOVE SCHEDULE TIME(S) FROM PROGRAM

Press CLEAR (C) when scheduled time is being displayed

Prompts "- :-:-" Schedule time that was displayed is now removed from program

Continue to press ON/COPY or OFF keypad (in any sequence) to display all data.

Repeat procedure for other circuit and days as desired.

# TROUBLESHOOTING

Symptom	Possible Causes	Corrective Action
Loads fail to switch	<ul style="list-style-type: none"> <li>• Faulty wiring</li> <li>• Program in error</li> </ul>	Check wiring, attempt to cycle loads using manual pushbuttons. Check all holiday, set point data and daylight saving dates programmed
Erratic operation	<ul style="list-style-type: none"> <li>• Electrical noise can be interfering with the microprocessor</li> </ul>	<p>Install surge suppressors across all contacts switching inductive loads.</p> <p>Suppressors across external contacts can be added, but are not normally required. Be sure the time switch case is securely grounded to a good earth ground. Isolation relays may be used to isolate electrically "noisy" loads.</p>
No operation at all. No display.	<ul style="list-style-type: none"> <li>• No power to time switch.</li> </ul>	Check wiring to time switch supply terminals. Be sure connections are correct for the supply voltage being used, 120, 240 or 277 volts.
"EE:EE" in display	<ul style="list-style-type: none"> <li>• An error has been made in programming.</li> </ul>	Press CLEAR (C) keypad to remove "EE EE". Review programming instructions.
"FULL" in display	<ul style="list-style-type: none"> <li>• The maximum number of set points have been used.</li> </ul>	Remove holidays or set points no longer required. Additional set points can now be entered
Loss of program after long term power outage.	<ul style="list-style-type: none"> <li>• The auxiliary battery is dead or was not installed</li> </ul>	Install new 9 V. alkaline battery.
Erratic operation, loads fail to switch or display is dim	<ul style="list-style-type: none"> <li>• Low line voltage or error in timer supply wiring.</li> </ul>	Verify that time switch supply voltage is correct as indicated in sample wiring diagrams
Keyboard and/or display inoperative.	<ul style="list-style-type: none"> <li>• Microprocessor is "locked up".</li> </ul>	Press RESET button for 5 to 10 seconds. If problem still exists, remove line power and battery, if so equipped. Wait 5 minutes then reapply power.
Calendar incorrect or automatic day of week calculation incorrect.	Memory loss due to extended power outage greater than (24 hrs.)	Re-enter calendar data after first clearing wrong data in review.
Channel 1 load appears to switch one minute late.	Any channel 1 schedule times entered after 120 setpoints have already been entered will be executed at end of scheduled minute, not beginning, thus causing delayed operation.	If delay is objectionable, program all channel 1 schedule times first, so that they are within the first 120 entered times.
Clock runs 4 seconds slow each minute after long power failure.	<ul style="list-style-type: none"> <li>• Micro processor not correctly initialized.</li> </ul>	Remove line power to timer for at least 5 seconds then re-apply
Time switch did not adjust for daylight saving time.	<ul style="list-style-type: none"> <li>• DST date incorrect.</li> <li>• Both DST dates not entered.</li> </ul>	Check for correct dates and be sure both Spring and Fall dates are entered

4-Holidays or special days, programmed by Month and Date, and assigned to any of the eight available days (Sunday thru Saturday or A1).

For convenience in programming, the daylight savings time dates thru the year 2001 are shown in the programming section of this manual.

**RESET and MEMORY CLEAR SWITCHES (MC) and CLEAR (C) KEYPAD:** Pressing the RESET switch causes the micro-processor to reinitiate. This also resets the time to 10:00 A.M. RESET DOES NOT clear any of the programmed on/off times or any programmed calendar data.

Pressing the MEMORY CLEAR (MC) switch alone has no effect on the programmed data. If the CLEAR (C) keypad is pressed while MEMORY CLEAR (MC) is held depressed ALL PROGRAMMED ON/OFF TIMES AND CALENDAR DATA ARE ERASED from the memory. Display will blink until this process has been completed.

**KEYBOARD:** The keyboard is used to select and enter all calendar and on/off program times. All keypads have tactile feel when pressed.

- The number keypads 1 thru 0 are used to enter all calendar dates and set point times
- The number keypads 1 thru 7 are also used to select the days SUNDAY thru SATURDAY. The number 8 keypad is used to select the alternate day (A1) and the number 0 keypad is used for programming daylight saving time (DST) adjustment.
- The AM and PM keypads are used to select "day or night" based on a 12 hour repeating clock. Note that 12:00 PM is 12:00 noon.
- The ON/COPY and OFF keypads are used to program ON and OFF set times and to temporarily switch a circuit on or off. The ON/COPY and OFF keypads can also be used to initiate manual or automatic set point review. Both methods of review are accomplished in the REVIEW mode. After a day to be reviewed has been selected, by pushing appropriate day

keypad, the ON/COPY or OFF keypads are pressed, one at a time, for manual review of set points. Pressing both keypads simultaneously initiates the automatic set point review whereby all set points, for the selected day, are displayed in chronological order beginning at 12:00 AM or midnight. Automatic or manual review may be terminated by exiting the review mode or by pressing any day keypad.

The ON/COPY keypad is also used to copy all set points for both circuits from one day to another day(s).

- The CLK/HLDY keypad is used to set the time of day and to set or review all calendar data
- The CLEAR (C) keypad is used to clear an error (F.F.F) indication, to clear the display if a mistake is made during data entry or to remove unwanted set point or calendar data during review
- The CLEAR (C) keypad is also used in conjunction with the MEMORY CLEAR SWITCH (MC) to clear all set point and calendar data.

**SOLID STATE MEMORY BACKUP OPERATING CHARACTERISTICS:** When using either the solid state memory backup or the optional battery backup, the time switch has the same operating characteristics, as follows:

Immediately after restoration of power both output relays will be de-energized. Within one minute of restoration of line power, the time switch will "catch-up" with the existing programmed set point data. This means that the outputs will assume the state they would have been in, had there been no power failure. Any manual override, selected by use of the ON or OFF keypads, prior to the power outage will be overridden by the set points currently in effect. The only exception to this is if there are no set points programmed for that day for that circuit(s). If there are no set points programmed for that day, the circuit(s) output will return to the on or off state as selected by the ON or OFF keypad prior to the power outage.

It is recommended that override control for either circuit be accomplished by use of spring wound overrides. This will allow the time switch enclosure to be locked, to ensure that program control is made by authorized personnel only.

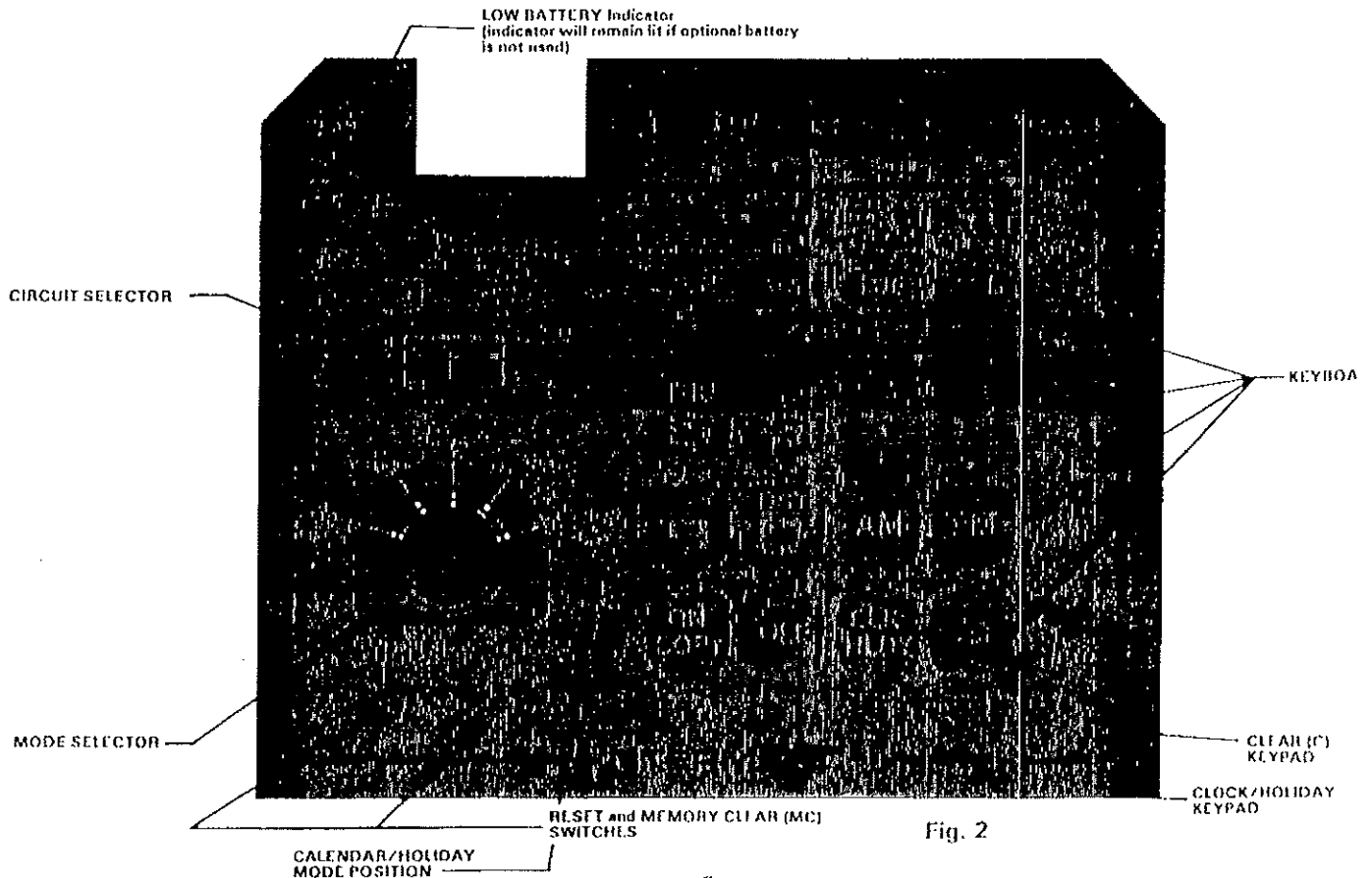


Fig. 2