

UNIVERSITY OF CALIFORNIA
LICK OBSERVATORY TECHNICAL REPORTS

No. 25

TIME STANDARD

EL 498

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Santa Cruz, California

March 1978

INTRODUCTION

The Time Standard contains 3 clocks, each of which has a calendar, a 24 hour alarm and a 10 hour timer.

The power supply has dual outputs, with all time determining circuits on the battery back-up outputs.

Very stable crystal oscillators are provided for the two time bases. Time base outputs of 60 Hz and 1 Hz in both Solar and Sidereal are available on the rear panel, as are connectors to and from the multiplexer.

The multiplexer can potentially operate every function in the Time Standard, but only reading the time and calendar is presently implemented.

Since the clock chips are 15v MOS devices, there are both 5 volt and 15 volt logic levels in the system.

CLOCK FUNCTION

To set the time on a clock, first select that clock with the TIME DISPLAY SELECT switch; then set the CLOCK/RUN switch to CLOCK. This halts the clock. Press SET HR or SET MIN as required to reset the time. When the time is correct and at the moment the clock should resume counting, set the CLOCK/RUN switch to RUN.

The part of the clock chip that counts seconds is not halted during this procedure, although the displayed seconds have been halted, so when the CLOCK/RUN switch is set back to RUN, the seconds will increment on the next one second count which could come at any time.

If the clock is a fraction of a second fast, the $\overline{\text{CLEAR}}$ pin of the divide-by-50,000 card (PIN R, EL501) can be held low for a fraction of a second. The same procedure can be used on the output pin, pin T.

- CAUTION -

When a clock is de-selected by changing the TIME DISPLAY SELECT switch, the conditions set by all of the switches will be remembered. Thus, if the PST clock were being advanced with SET HR and the TIME DISPLAY SELECT were switched to the ST clock and back to the PST clock, the ST clock would be left in the SET HR mode with its hours advancing.

CALENDAR FUNCTION

The on-chip calendar provides dates in the format MM;DD and keeps track of all month lengths (28/30/31) except Feb. 29.

A hardware year function has been added which is displayed the "seconds" position when the clock is in the calendar only mode. When the computer reads the month and day, it also reads the year.

To correct the calendar, select the right clock with the TIME DISPLAY SELECT switch, move the CALENDAR/ALTERNATING/CLOCK switch to CALENDAR, set the CALENDAR/RUN switch to CALENDAR and press SET HR (months) or SET MIN (days) switch. Return the CALENDAR/RUN switch to RUN.

If the years need changing, reset the DIP switch on EL 624 in slot A12.

ALARM FUNCTION

All 3 clocks have alarms which can be set from the front panel. Select which clock you wish to set the alarm on and press the VIEW ALARM button. The time will be replaced on the display by the alarm time for that clock.

When the button is released, the regular time returns.

If you want to change the alarm time, press either SET HR or SET MIN while holding VIEW ALARM in. When the alarm time reaches the proper setting release both buttons. Then throw the ALARM TONE switch up. This enables the alarm function within the clock and also enables the tone generator output.

One second after the indicated alarm time, the tone will sound off and one of the 3 alarm lamps will light. Put the ALARM TONE switch to OFF to silence the tone.

The tone and lamps will indicate that an alarm has gone off even when the TIME DISPLAY SELECT switch is not selecting that clock.

Each clock "remembers" where all the switches were when the TIME DISPLAY SELECT is switched away from it. So, if you have set the PST alarm and put the ALARM TONE switch up, then switch the TIME DISPLAY SELECT to ST, and back to PST, the result is that both PST and ST alarms have been set.

Therefore, if you wish to set the PST alarm for 0330HRS, for example, check the setting of the UT and ST alarms to see if their alarms will go off in the interval prior to 0330 HRS PST,

ALARM SETTING EXAMPLE

As an example, suppose the PST alarm is to be set to 02:30 and the current PST alarm is 17:59. You would press VIEW ALARM and the display would show 17:59. Press SET HR and the hours part of the display will start incrementing. When hours shows 2, release SET HR and press SET MIN until the minutes indicate 30. Release SET MIN and VIEW ALARM buttons - current PST time will be displayed. Throw up the ALARM TONE switch.

Further suppose the current PST time is 23:30, UT time is 07:30, UT alarm is 0930, ST time is 16:28 and ST alarm is 16:48. If the TIME DISPLAY SELECT switch is never changed from PST for the 3 hours before the PST alarm goes off, all will be as expected. But if you happen to switch over to UT (going through ST), those two alarms will also be enabled by the alarm tone switch. So in addition to the PST alarm in 3 hours, there will be an alarm in 20 minutes from the sidereal clock and one in 2 hours from the universal clock. If you do not want the other alarms to go off during the 3 hour interval, they must be set to a time greater than 3 hours beyond the present UT or ST, The other option to avoid false alarms, is to throw the ALARM TONE switch off before reviewing other times. Be sure to put ALARM TONE on again after going back to PST.

TIMER FUNCTION

All 3 clocks have a timer which can be set in one minute increments to a maximum of 9 hours 59 minutes. The only outputs of the timers are the LED's on the front panel and a line to the multiplexer.

The computer (through the multiplexer) can set timers only if the jumper is removed from COMPUTER SET DISABLE to ground (B16L). Removing this jumper also allows the computer to modify the time. This is not a good situation.

To manually set a timer, say the PST timer, first select the PST clock with the TIME DISPLAY SELECT switch. Turn on the SET TIMER switch and press SET HR or SET MIN as needed. When the timer is set, turn off the SET TIMER switch. The timer will start when the TIMER ENABLE switch is thrown. The PST timer LED will be on during the timed interval.

In most respects, the timers are much like the alarms,

CLOCK CHIP FUNCTION SELECTING

(See drawing EL 500)

The clock chip drives the display by multiplexing BCD data (Q0-Q3) with the digit driver lines (D1-D6). To implement all of the options built into the clock chip, diode isolated switches are multiplexed back into the chip by D1-D6 on input lines IN1-IN3.

For example, the clock naturally runs in the 12HOUR mode. By connecting D2 to IN3 with a diode, the clock runs in the 24HOUR mode.