

CHECKING AND RESETTING SYSTEM CLOCK

NO. 2B ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section covers the procedures to be followed in changing the time of the system clock for either of the following reasons:

- Compliance with building master clock
- Change from standard time to daylight saving time and vice versa

No procedure is necessary for leap year changes because these changes are performed automatically by the No. 2B ESS program.

1.02 This is the initial issue of this section.

1.03 The No. 2B ESS needs to know the time of day for printouts, automatic message accounting, coin calls, call tracing and general scheduling. This time of day is derived from the No. 2B ESS 26.624-MHz crystal oscillator. This oscillator can drift by as much as ± 4.32 seconds per day; hence, a more stable frequency standard is desirable. The commercial power company's 60-Hz power is used for this standard, since it possesses good long-term stability.

1.04 Most of the power generating stations in the United States are connected into one huge power network called the "Interconnected System." The goal of this system is to maintain a frequency stability of $\pm .03$ Hz. Errors are permitted to accumulate until a maximum deviation of 3 seconds (180 cycles) has occurred. Then all generating stations change their frequency by 0.02 Hz or less until the accumulated errors have been corrected.

1.05 The 4A timer (SD-2H095) contains a synchronous motor which drives a cam-operated contact that saturates and unsaturates a ferrod at a 6-second rate. The system clock is corrected every five minutes when it is resynchronized to this 4A timer.

Thus, the accuracy of the system clock is based on the frequency stability of commercial power. In the event of commercial power failure, the program still maintains time of day based on the crystal oscillator.

1.06 The time of the system clock should be checked every day in accordance with the Equipment Test List (ETL). If the system clock time deviates from the building master clock time by more than five seconds, the system clock should be reset as described in Part 2.

1.07 In offices that are unattended during the hours of a desired time change, the procedures outlined in this section can be performed from the remote maintenance TTY.

1.08 Time changes to the system clock may be made at any time. However, certain programmed routines may be skipped or may occur twice, depending on whether the clock is set forward or backward, if the time change is made during the interval they are scheduled to occur. The following programmed routines are performed at the times shown:

- 2300 hours—Control unit (CU) exercise
- 0000 hours—System status information printouts
- 0100 hours—Peripheral unit (PU) exercise
- 0200 hours—TTY diagnostics
- 0215 hours—Type data controller (TDC) 0 diagnostics
- 0230 hours—TDC 1 diagnostics

The times that other routines are run by the system are provided in the traffic work table which can

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be obtained by using the following TTY input message:

T PR:TWT!

1.09 Additional information about the input messages described in Part 2 is found in the Input Message Manual (IM-2H200).

2. SYSTEM CLOCK VERIFICATION

2.01 At the building master clock (see Section 030-125-501) which has been checked against a precise time source, perform the following:

- Simultaneously start a stopwatch precisely at the beginning of any minute and record the building master clock time.
- Check the time of the system clock by typing the input message which follows the note on the maintenance TTY:

Note: After the execute character is typed, the system will respond with a 2-line printout. When the carriage return starts at the end of the first line, stop the stopwatch.

OP:CLK!

The system will respond with PF followed by a 2-line printout. The first line of the printout gives message OP .CLK plus the abbreviated name of the day of the week i.e., MON, TUES, etc. The TTY uses two seconds in typing this first line; the information for the second line of the printout is then extracted from call store. The second line of the printout contains the month in decimal, day of the month in decimal, time in hours, minutes and seconds; and the office identification code.

2.02 The following functions must now be performed to compare the system clock to the master clock:

- Add the previously recorded building master clock time to the expended time recorded on the stopwatch.
- Compare the sum determined above to the printout of the system time.
- If the system clock deviates from the determined sum by more than five seconds

update the system clock. (See System Clock Reset.)

3. SYSTEM CLOCK RESET

3.01 System clock time changes are performed using the following TTY input message:

SET:CLK:TIME (hh,mi,ss), day (mo,dd,yy)!

hh = Hour of the day (0-23).

mi = Number of minutes past the hour (0-59).

ss = Number of seconds past the minute (0-59).

day = Day of week (SUN, MON, TUES, WED, THURS, FRI, SAT).

mo = Month of Year (1-12, January is 1).

dd = Day of the Month (1-31).

yy = Year (0-99).

3.02 If it is only necessary to change the time of day, the part of the TTY input message for changing the date may be omitted. For example, if it is desired to set the system clock to 2229 and 32 seconds, the TTY input message would appear as:

SET:CLK:TIME (22, 29, 32)!

3.03 If it is necessary to change the date without changing the time of day, the part of the TTY message pertaining to the time of day must also be included. For example, if it is desired to set the clock to Wednesday, October 23, 1975, the TTY input message would appear as:

SET:CLK:TIME (22, 29, 32), WED (10, 23, 75)!

3.04 Obviously if it is necessary to change both the time of day and the date, the entire TTY input message is used just as it is in changing the date.

3.05 The above TTY message is processed by the system when the execute character is typed at the end of the message. Thus, it is essential that the execute character be typed at the exact time that the change should become effective. To accomplish this, the message (except

for the execute character) should be typed during the minute before the time that the change is to become effective. Then the execute character should be typed at the exact time that the change is desired. However, the message will be invalid if a character is not typed within 45 seconds of another character. Thus the execute character should be typed within 45 seconds of the character preceding it. If more than a 45-second delay is required between the last character of the message and the execute character, a space should be typed before the 45 seconds elapse. Each time a space is typed, a new 45-second time-out period is begun.

3.06 If both the date and time of day are to be changed, both the time and date information must be included in the message and the execute character must be typed at the exact time specified in the message. For example, to set the clock to 43 minutes after midnight on Monday, November 27, 1975, the following procedure should be followed:

Caution: *The time and date used in Steps (1) and (2) are examples. The TTY messages and formats are correct, but the time and date entered in the data fields will change according to the time and date needed to set the system clock.*

- (1) At approximately 42 minutes after midnight type the following TTY message:

Do not type the execute character on this step!

SET:CLK:TIME (00, 43, 00), MON (11, 27, 75)

- (2) At exactly 43 minutes after midnight the execute character is typed. However, if more than 45 seconds will elapse between the completion of Step (1) and this step, a space should be typed shortly before 45 seconds and increments of 45 seconds elapse, until the execute character is typed.

3.07 When the above message is used to change the system clock, the system will automatically make an entry on the Automatic Message Accounting (AMA) tape showing the time before and after the change. If the AMA entry cannot be made, the system will respond with RL (repeat later). To verify that the clock is set to the correct time, the following message is typed:

OP:CLK!

An output message specifying the current time will be printed out by the system. Remember the seconds printout will show two more seconds than when the execute character was typed. This must be taken into account when judging the accuracy of the system clock.

4. SCHEDULED TIME CHANGES

TIME CHANGE FROM STANDARD TO DAYLIGHT

Note: Changing from standard to daylight time at the exact time a system exercise is to be run is not advisable. Making the change at such a time will keep the system from running the exercise. For example, if the time change were made at 2300 hours the CU exercise would not be run.

- 4.01** To perform the time change from standard to daylight saving time, proceed as follows:

Note: If only the hour needs to be changed, the following TTY message may be used:

SET:CLK:TIME hh!

- (1) Use the TTY input message to advance the clock by one hour (see 3.02).
- (2) If the change is being made between 2300 and 2359 and 59 seconds, change the date as well as the time of day (see 3.04).
- (3) Type the SET:CLK:TIME input message on the maintenance TTY making sure that the execute character is typed at the exact time specified in the message (see 3.05).
- (4) To request a printout of the new system time, type the following message on the TTY:

OP:CLK!

TIME CHANGE FROM DAYLIGHT SAVING TIME TO STANDARD

Note: The repetition of system exercises may be avoided by making the change from daylight to standard time prior to scheduled system exercise or more than one hour after they are scheduled.

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4.02 To perform the time change from daylight saving time to standard time, proceed as follows:

Note: If only the hour needs to be changed, the following TTY message may be used:

SET:CLK:TIME hh!

- (1) Use the TTY input message to set the clock back by one hour (see 3.02).
- (2) If the change is being made between 0000 and 0059 and 59 seconds, change the date as well as the time of day (see 3.04).
- (3) Type the SET:CLK:TIME input message on the maintenance TTY making sure that the

execute character is typed at the exact time specified in the message (see 3.05).

- (4) To request a printout of the new system time, type the following message on the maintenance TTY:

OP:CLK!

4.03 In accordance with local instructions, notify the traffic department that a time change has been made and the time the change was made. This notification is necessary because traffic measurements may have been affected by the time change.