OPERATING MANUAL

30000A

CONTROL PANEL

HP 3000 COMPUTER SYSTEM

30000A CONTROL PANEL

Figure 1 illustrates the control panel of the HP 30000A Central Processor/Mainframe. The function of each control and indicator is defined in this figure. The following paragraphs provide additional operating information.

SYSTEM HALTS

Irrecoverable errors which cause a system halt (SYSTEM HALT and HALT lights both on) are the following:

a. A parity error interrupt while processing a previous parity error.

b. A module error interrupt while processing a previous module error.

c. Any of the first 17 (octal) code segments indicated absent in the Code Segment Table.

d. Fewer than 17 (octal) entries in the Code Segment Table.

e. I/O device controller fails to reset its interrupt-active logic during EXIT from interrupt routine.

Causes c and d are checked during the execution of PCAL and EXIT instructions and during the interrupt call for internal interrupts. Cause e is checked only during the execution of the EXIT instruction.

HALT MODE

If the CPU halts when an input/output operation is in progress, the I/O operation continues to its normal completion.

If a power failure interrupt occurs while the CPU is in the halt state, the CPU enters the run state and processes the interrupt in the interval between the interrupt and loss of power.

For all other interrupts during halt mode, the CPU remains in the halt state. When RUN–HALT is pressed to start the computer, the interrupts are processed sequentially in accordance with their priority. Exceptions are: console interrupts are ignored, and external interrupts are canceled if I/O RESET is pressed prior to RUN–HALT.

COLD LOAD OPERATION

Separate operating procedures are given below for:

Magnetic Tape Units
(HP 7970B-202, 7970B-206, or 7970E)

Fixed-Head Disc Units
(HP 2660A)

Disc File Units
(HP 2888A)

Cartridge Disc Units
(HP 7900A)

MAGNETIC TAPE UNITS

When performing a cold load from magnetic tape, any number of words can be acquired up to the capacity of main memory. The bootstrap routine, acquired from the tape, specifies the number of words to be read. The procedure is as follows.

a. Press the RUN–HALT switch if the computer is running.

b. Remove the write ring from the reel of tape containing the program to be loaded.

c. Install the reel of tape on the tape unit to be used.

d. Advance the tape to the load point by means of the LOAD pushbutton on the tape unit.

e. If there is more than one tape unit being controlled by the same device controller, press the unit select 0 pushbutton on the tape unit to be used and make sure no other tape unit has this pushbutton lighted.

f. Press the ON LINE pushbutton on the tape unit.

g. Set into positions 0 through 7 of the Switch Register the cold-load control byte for magnetic tape. This number is 006 octal (1's in bit positions 5 and 6).

h. Set into positions 8 through 15 of the Switch Register the device number of the controller associated with the magnetic tape unit.

i. Press the I/O RESET switch. This resets the I/O system and selects tape unit 0.

j. Press the COLD LOAD switch.

k. When the computer returns to the halt state, cold load is complete.

FIXED-HEAD DISC UNITS

When performing a cold load from fixed-head disc, any number of words can be acquired up to the capacity of main memory. Loading can start at sector 0 of any specified track; but after the last sector of the highest-numbered track, reading cannot proceed to track 0. The bootstrap routine, acquired from the disc, specifies the number of words to be read. The procedure is as follows:

a. Press the RUN–HALT switch if the computer is running.

b. Set into positions 0 through 7 of the Switch Register the starting track number, right-justified.

c. Set into positions 8 through 15 of the Switch Register the device number of the disc unit.

d. Press the I/O RESET switch.

e. Press the COLD LOAD switch.

f. When the computer returns to the halt state, cold load is complete.

DISC FILE UNITS

When performing a cold load from disc file units, a maximum of 11,776 (decimal) words can be acquired, including the disc bootstrap routine. The information loaded must be read from disc unit 0, and must be acquired from between the following inclusive addresses in cylinder 0: head 0 sector 0, and head 3 sector 22. The procedure is as follows.

a. Press the RUN–HALT switch if the computer is running.

b. Install module select plug 0 on the disc unit to be used.

c. Install the disc pack containing the program to be loaded.

d. Set into positions 0 and 1 of the Switch Register the starting disc head number, right-justified.

e. Set into positions 3 through 7 of the Switch Register the starting sector number, right-justified.

f. Set into positions 8 through 15 of the Switch Register the device number of the controller associated with the disc unit.

g. Press the I/O RESET switch. This resets the I/O system and selects cylinder 0, disc unit 0.

h. Press the COLD LOAD switch.

i. When the computer returns to the halt state, cold load is complete.

CARTRIDGE DISC UNITS

When performing a cold load from cartridge disc units, a maximum of 6144 (decimal) words can be acquired, including the disc bootstrap routine. The words loaded must be read from cylinder 0 of the disc unit 0. Reading can start at any specified sector, but cannot proceed past disc head 1 or disc head 3. One disc head change can take place during the cold load operation; this change can be only from head 0 to head 1, or from head 2 to head 3. The procedure is as follows.

a. Press the RUN–HALT switch if the computer is running.

b. If the information to be loaded is not on the fixed disc, install the disc cartridge containing the program. If the desired program is on the fixed disc, a disc cartridge must be in place to permit the disc unit to operate.

c. Set into positions 0 and 1 of the Switch Register the starting disc head number, right-justified.

d. Set into positions 3 through 7 of the Switch Register the starting sector number, right-justified.

e. Set into positions 8 through 15 of the Switch Register the device number of the controller associated with the disc unit.

f. Press the I/O RESET switch. This resets the I/O system and selects cylinder 0, disc unit 0.

g. Press the COLD LOAD switch.

h. When the computer returns to the halt state, cold load is complete.
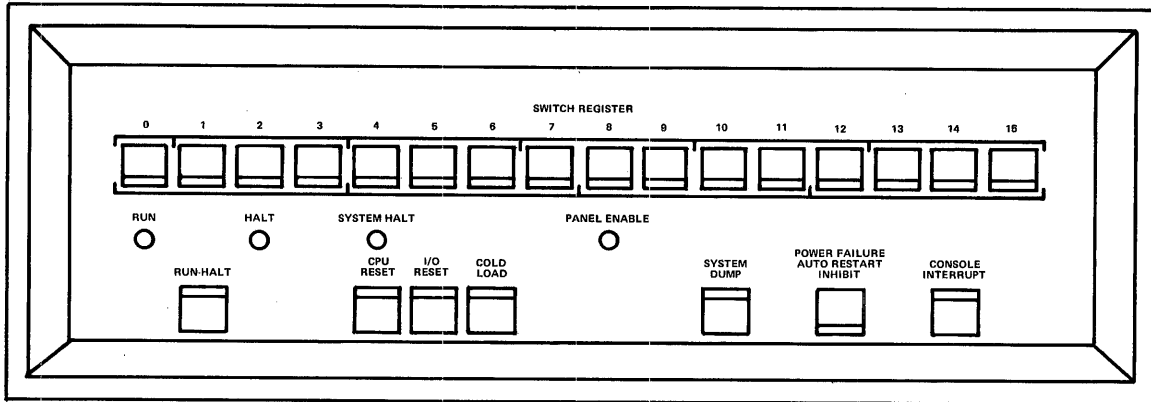
SWITCH REGISTER

The Switch Register establishes the bit pattern of a 16-bit word. Each switch represents binary 1 if up, binary 0 if down. Marked lines indicate octal grouping (above switches) and byte and half-byte grouping (below switches). The Switch Register is used to furnish a 16-bit word for the RSW (Read Switch Register) instruction, and to provide the device number and control byte for cold load and system dump operations. For cold load and system dump, the control byte is given in bits 0 through 7, and the device number is given in bits 8 through 15. For disc units, the control byte may be a track number or other addressing information, depending on the specific unit.

INDICATOR LIGHTS

Run. The RUN light is on when the computer is in the run state. The light goes off when the computer enters the halt state.

HALT. The HALT light is on when the computer is in the halt state. The light goes off when the computer enters the run state.

SYSTEM HALT. The SYSTEM HALT light goes on when the computer halts due to an irrecoverable error. (The HALT light also goes on.)

PANEL ENABLE. The PANEL ENABLE light indicates the state of the panel-enable switch. The panel is enabled when the light is on. The panel may be disabled while in run or halt state; all controls except CONSOLE INTER-RUPT are disabled. The panel-enable switch is located behind the front panel, accessible when the panel is unlocked and swung out.

CONTROLS

RUN–HALT. Pressing this switch halts the computer if it is running, or starts the computer if it is halted. Spring-return switch. (*)

CPU RESET. Pressing this switch places the CPU and memory control logic in a known condition. Clears Status bits 0 through 7 and SYSTEM HALT indication. Do not press when computer is running with panel enabled. Spring-return switch.

I/O RESET. Pressing this switch places the I/O control system in a known condition. Controllers for all I/O devices are reset and all external interrupts awaiting service are canceled. Do not press when computer is running with panel enabled. Spring-return switch.

COLD LOAD. Pressing this switch places the computer in the run state and causes a program to be acquired from a selected magnetic tape unit or disc unit. Effective only in halt state. Spring-return switch. (*)

SYSTEM DUMP. Pressing this switch places the computer in the run state and records the entire contents of main memory, plus the principal CPU registers, on a selected magnetic tape unit. Effective only in halt state. Returns to halt state on completion. Spring-return switch. (*)

POWER FAILURE AUTO RESTART. When this switch is in the INHIBIT position (up), the computer enters the halt state on restoration of power. Otherwise (down position), the computer enters the run state and interrupts to the Power-On segment (code segment 2). Two-position switch.

CONSOLE INTERRUPT. Pressing this switch causes a CPU interrupt to code segment 5 (Console Interrupt). Effective in run state; no effect in halt state. Spring-return switch.

(*See text for additional information.)

Figure 1. Control Panel

SYSTEM DUMP OPERATION

A system dump consists of recording the entire contents of main memory, plus the principal CPU registers, on a selected magnetic tape unit. After completion of the dump operation, main memory and CPU registers are irrevocably altered; a cold load is necessary to restart. Dumping cannot take place on any type of disc unit, and device numbers 3, 4, and 5 may not be used for the cold dump device. The procedure is as follows.

a. Press the RUN–HALT switch if the computer is running.

b. Install a reel of magnetic tape, with write ring, on the tape unit to be used. Be sure the tape does not contain needed information.

c. Advance the magnetic tape to the load point by means of the LOAD pushbutton on the tape unit.

d. If there is more than one tape unit being controlled by the same device controller, press the unit select 0 push-button on the tape unit to be used and make sure no other tape unit has this pushbutton lighted.

e. Press the ON–LINE pushbutton on the tape unit.

f. Set into positions 0 through 7 of the Switch Register the system-dump control byte for magnetic tape. This number is 004 octal (1 in bit position 5).

g. Set into positions 8 through 15 of the Switch Register the device number of the controller associated with the tape unit.

h. Press the I/O RESET switch. This resets the I/O system and selects tape unit 0.

i. Press the SYSTEM DUMP switch. (System dump may not be repeated expecting correct results.)

The RUN indicator light will then go on and will remain on until completion of the dump operation. Records of 4096 words are written on tape with the following format.

1st Tape Record

The first tape record consists of the contents of the first 4096 locations of main memory (addresses 000000 through 007777 octal). The words are written in memory address sequence, starting with address 000000. Exception: six words, consisting of the four DRT word locations for the cold dump device and the two following locations, are not valid; these locations are used by the dump procedure, and the correct contents are saved for dumping in the second tape record.

2nd Tape Record

This 4096-word record consists of the following. (Octal values.)

Word	Contents
0	Content of location 0
1-6	The six words saved while dumping the preceding tape record
7	Content of Switch Register
10	Content of DL-register
11	Content of DB-register
12	Content of Index register
13	Content of Q-register
14	Top-of-stack address (S)
15	Content of Z-register
16	Content of Status register
17	Content of PB-register
20	Content of P-register
21	Content of PL-register
22	Content of Current Instruction Register
23	Content of Mask register
24	Content of CPX1 register
25	Content of CPX2 register
26	Main memory capacity (highest memory address + 1)
27 thru 7777	A repetition of words 27 through 7777 of the first tape record (Exception: seven words, consisting of the four DRT word locations for the cold dump device and the three following locations, are not valid.)

3rd and Subsequent Tape Records

These records contain the remainder of the contents of main memory. The first word in record 3 is the content of memory address 010000 (octal). This is followed by the remaining words in memory-address sequence. The computer halts after the last address has been dumped.

OTHER PANELS

Three optional panels are available to provide a more extensive array of indicators and controls than is provided on the mainframe control panel. These panels, which are desk-top

units attachable by plug-in cables, are used primarily for hardware maintenance or hardware-level analysis of program execution. The three panels are:

HP 30350A   Auxiliary Control Panel

HP 30351A   Controller Processor Maintenance Panel (Interface)

HP 30352A   Hardware Maintenance Panel

When any of these panels is connected, the mainframe control panel is disabled. The Auxiliary Control and Hardware Maintenance Panels may be connected simultaneously, and by replacing overlays, interface cards, and cables, a wide range of manual operations is possible.

Operating information for these panels is provided in the following two manuals. The first is oriented to programmers, the second to technicians.

HP 30350A   Auxiliary Control Panel
Operator's Manual
(Part No. 30350-90001)

HP 30350A   Auxiliary Control Panel and
HP 30352A Hardware Maintenance Panel Operator's Manual
(Part No. 30352-90001)

The latter manual also covers the use of controller overlays (30351A), which are used to convert the Hardware Maintenance Panel for testing of disc and magnetic tape controllers.