26.1 SOP LAMPS

When a system is halted due to a serious system error, an error code is displayed on the SOP lamps. This code should be noted and can be used later as an aid in analyzing the dump. The following lamps may be lit (lamp 1 is leftmost on the SOP panel):-

SOP LAMP NUMBERS (x = lit)

7	8	9	10	11	
			x	x	No currency buffer available.
		x		x	Illegal interrupt.
		x	x	x	Stack overflow.
	x			x	Instruction not accepted. *
	x		x	x	No blocks available.
	x	x		x	Invalid instruction (trap).
	x	x	x	x	Requested LKM processor not in monitor.
x				x	Data management (SYSGEN) error.

* SST, OTR, or INR not accepted due to a hardware error.

However, in some cases the RUN lamp is off and the SOP lamps give no indication of the cause of the problem. If this occurs, it is useful to take the approach outlined in section 26.3.

8-9-11 Timque, Curr. buffers, Swt-link, excl. access, pending queue (loop!).

26.2 ACTIONS BEFORE TAKING A DUMP OF MEMORY

Before executing the dump utility DMPGEF or DMPGEN, created under DOS6800, it is necessary to save some memory words because these utilities overwrite the first part of memory.

When dumping on flexible disk, the utility DMPGEF will overwrite memory locations X'0000' to X'021A' if the flexible disk drive is connected to an IOP. If the drive uses the programmed channel, memory locations X'0000' to X'027E' are overwritten. The DMPGEN utility, used to dump on cassette, will overwrite memory locations X'0000' to X'00FE'.

In order to save memory words it is necessary to connect a full panel, which is used to select the relevant memory locations. The contents of these selected locations must be noted as displayed on the lamps of the full panel.

It is useful to save the following words from SYSTAB (system table):-

X'00A0' - Start of free area.
X'00A2'
X'00A4' - End of free area.
X'00A6'
X'00B0' - PAGTAB address. B6
~~X'00B2' - SEGTAB address.~~
X'00B4' - SWBTAB address. B8
X'00C8' - TCTAB address. B2
X'00CA' - CDTAB address. B4
X'0100'
X'01FE' } - System Stack, addressed via A15.

The PSW may be saved via the console panel.

26.3 MEMORY DUMP

Various situations can cause the system to come to a halt. An error indication may be given on the SOP lamps, but sometimes this is not so, when the RUN lamp is off.

It is important to know whether the problem concerns only one work station, or if all are involved, and to localise the problem as much as possible.

26.3.1 Problem with a Single Workstation

1. Find the pointer SCTTCT at /C8 (/B2) in the System Control Table, which addresses the TCTAB.

2. From TCTAB can be found the address of the TTAB corresponding to the problem workstation.

3. Note the dispatch address and the contents of registers A7, A8, A13, and A14 which are stored in the save area of the TTAB.

A8 points to the ECB. Bit 0 in the ECB is used as an indication of I/O operation status. If it is 1, then the I/O has completed and the dispatch address points to the next instruction to be executed. If it is 0, I/O is not finished and the dispatch address is the last one used.

The DWT for the device can be found by scanning the TTAB device dependent part for the filecode contained in the ECB.

For CREDIT, A13 points to the Task Control Area, T:AxxO, which contains the CIA. CIA is the logical address of the last CREDIT instruction which was executed (i.e. Current Instruction Address).

26.3.2 Problem Workstation Unknown

1. Find TCTAB via the SCT as in step 1 above.

2. From TCTAB, locate all TTAB's and thus the status of each task.

3. Check I/O status for each task as in step 3 above, and similarly establish the halt point instructions from the CIA.

26.3.3 Problem with Multiple Workstations

Check the contents of the word PRUN. If not zero, establish I/O status and CIA's as above. If it is zero, it is likely that all tasks are waiting for completion of I/O.

If it appears that the system is hanging up because of a Data Management task, you will probably need technical assistance.

26.3.4 Reading the Dump

To aid in interpreting a memory dump (printed using PRDUMP), it is useful to have available the following:-

* The monitor source listings.

* The linkage editor map of the monitor (output from SYSGEN).

* The linkage editor map of the application.

Note that the LKE map of the monitor is not valid for modules SYSLOD, SYSLDA, SYSLDM, and subsequent prototype module locations, since they are not used after system loading, or are reallocated then.

With MMU systems, addressing in User Mode is done via the MMU, and this must be allowed for when reading the dump.

Some tables and keywords are important to find out the state of the system when the dump was made. See next page for details.

Occurs in Linklist monitor

Keywords

PRUN This word contains the TTAB address for the running task. When zero the system is in the idle loop, or all tasks are waiting for completion of I/O.

INTSAV This word contains the last interrupt. It is the contents of the instruction counter (P) from the driver which received the interrupt.

DISQUE The dispatcher queue pointer, pointing to the first task (TTAB) in the queue. When zero, the dispatcher queue is empty.

TIMQUE Pointer to the timer queue. When zero, no timers are set.

PAGQUE In a paging system, two words pointing to the beginning and end of the page queue (inactive pages, but present in memory).

FREQUE A pointer to the first free block (3 words). When zero, blockpool is empty, no blocks available.

Tables

T:AxxO Task control area for a CREDIT task.

TCTAB Contains pointers to all TTAB's.

TTAB This table gives the current task status. In the save area is stored the contents of register A13, which points to T:AxxO. A7 contains the order code, A8 the ECB address, and A0 the dispatch address.

DWT Includes current device status.

CWT This table includes the current control unit status.

26.4 ADDRESS TRANSLATION VIA MMU

In systems with more than 64kB of memory, addresses are translated via the MMU when the system is executing instructions in User mode.

The memory is divided into four 64kB sections, which are addressable when using the CREDIT debugger by using letters as follows:-

'S' - First 64kB (the system area).
'X' - Second 64kB.
'Y' - Third 64kB.
'Z' - Fourth 64kB.

A 16-bit address may be translated for user mode in the following way when reading a dump (see also figure 26.1 on the next page):-

Consider the address X'B68A' for example.

The most significant tetrad (in this case 'B') of the 16-bit address specifies the entry in the MMU table (on top of TTAB). The contents of entry B in the MMU table is in this case X'9000'.

The two most significant bits give the memory section, 2, and the next four bits form the most significant tetrad of the 16-bit displacement in the addressed section. The three other, less significant tetrads of the original address (X'68A') must now be added, resulting in a displacement of X'468A' from the start of section 2.

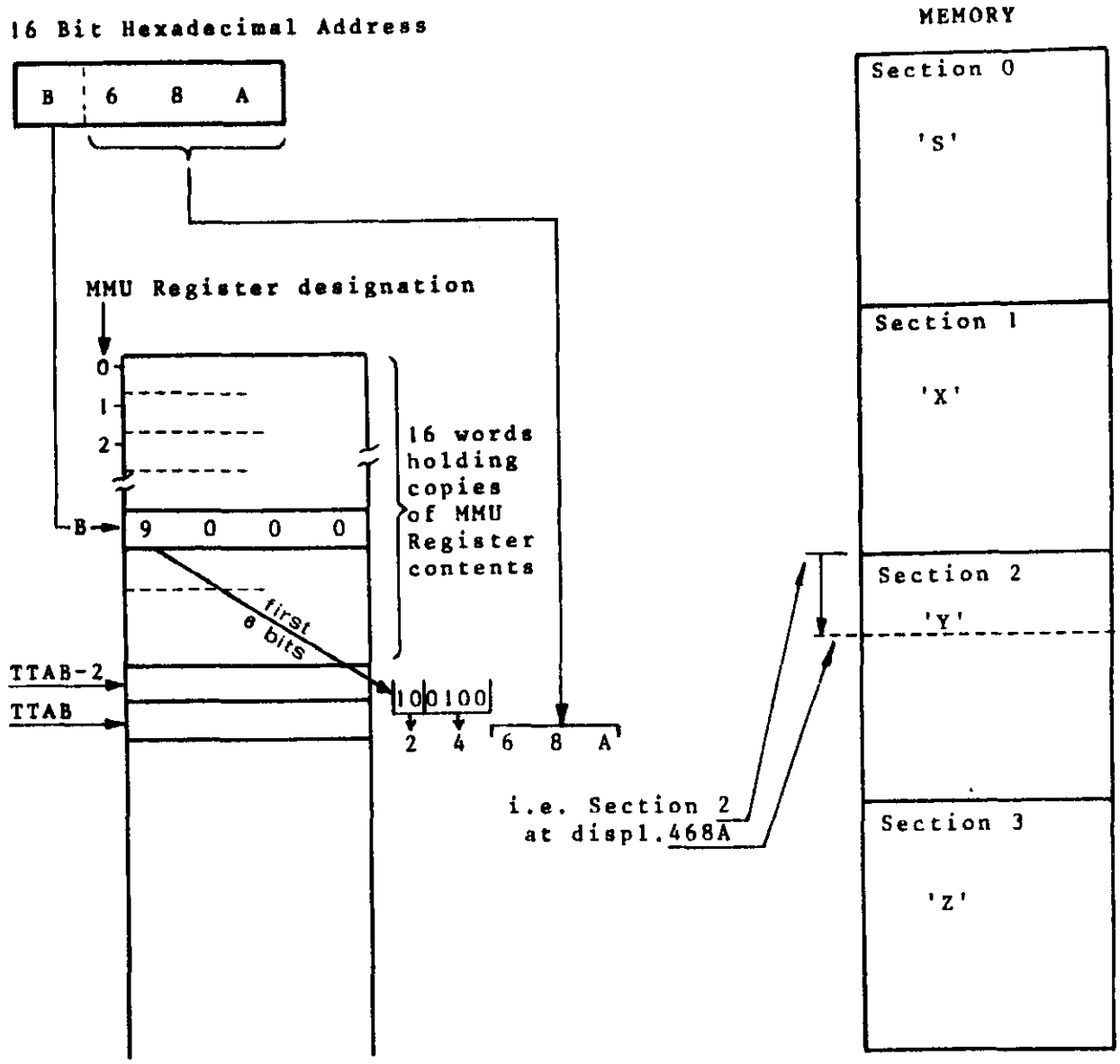

Figure 26.1. MMU Address Translation.