CRAY C90™ Series LME System Monitor Utility

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CRAY C90 SERIES LME SYSTEM MONITOR UTILITY

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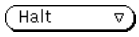
Description of this Document

This document describes the System Monitor (SMON) utility. SMON is used to automatically acquire CPU information during hardware and software failures. This document describes what SMON is, how you use SMON, and how SMON works. This document also provides examples that show how to interpret SMON output files.

Notational Conventions

This document uses the following notational conventions:

- Buttons are shown the way they appear in a window; for example, 

.
- Settings are shown the way they appear in a window; for example, 

.
- The –> symbol indicates holding the MENU mouse button down and moving the mouse pointer to the next menu item.
- `Courier` type indicates a command you can enter and indicates references to the LME interface windows.
- **`Courier bold`** type indicates commands you should enter and indicates menu entries you should choose from the LME interface.
- All instructions and memory references are octal numbers.

What Is the System Monitor Utility?

The System Monitor utility (SMON), shown in Figure 1, is an extension of the Logic Monitor Environment (LME) application. SMON automatically acquires CPU information during hardware or software failures by using the diagnostic monitor (DM) hardware of the CRAY C90 series computer system. The DM hardware is a maintenance feature, analogous to a logic analyzer, that is integrated into the hardware design of each CPU.

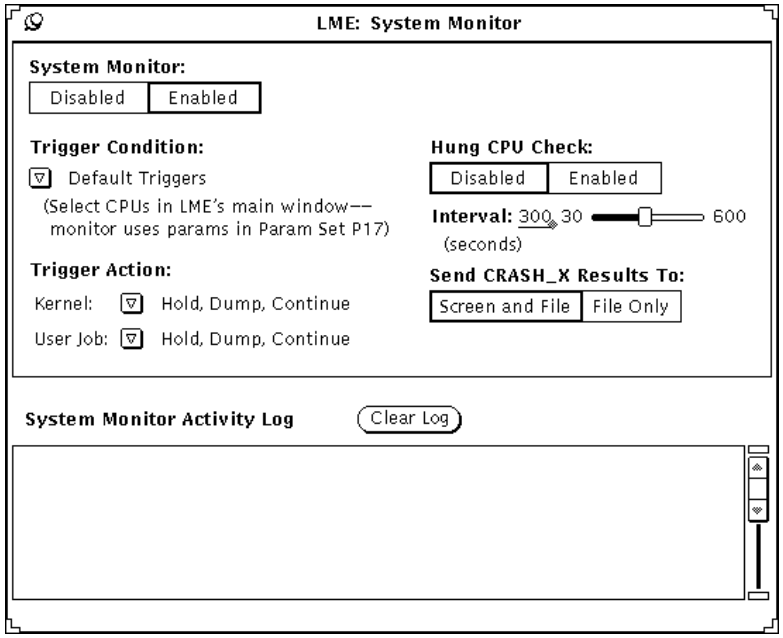


Figure 1. SMON Window

SMON programs each DM to continually record the CPU's program register (P register), current instruction parcel (CIP), and various status flags in its 64-bit by 64-element first-in-first-out (FIFO) DM buffer until a trigger occurs. SMON's `Trigger Condition` selection enables you to select from a list of predefined trigger conditions including `Default Triggers`, any current instruction parcel value (CIP value), any P register value, and various hardware flags.

After programming the DMs with the trigger conditions, SMON monitors the status of each CPU's DM. The `Trigger Action` selection determines SMON's reaction to sensing a DM trigger.

NOTE: SMON monitors only CPU modules; SMON does not monitor shared or shared I/O modules, which do not execute instructions.

SMON can also check for hung CPUs. To determine whether a CPU is hung, SMON stops the CPU's DM and examines the data recorded in the DM buffer. If there is no valid data in the DM buffer, which indicates that the CPU has not executed any instructions since the DM started recording, the CPU is hung. When SMON detects hung CPUs, SMON runs the `CRASH_X` program to gather more information.

What Are Trigger Conditions?

SMON programs the DMs to trigger, or stop recording, on the trigger conditions. Once a trigger condition occurs, the DM stops recording, and SMON creates an output file. Three types of trigger conditions are available:

- The default triggers condition
- Several trigger conditions defined by SMON, called *other predefined trigger conditions*
- User-defined trigger conditions that you create by using LME parameter sets

You can have only one trigger condition set at a time. Normally, you should use the default triggers condition, which causes SMON to collect the most data in the output file.

What Is the Default Triggers Condition?

The default triggers condition causes a CPU's DM to trigger when the CPU issues a 002740, 002750, 002760, or 002770 instruction. These instructions were chosen because they are not defined by the Cray Assembly Language (CAL) and are normally not issued; the hardware decodes these instructions as 002700 (CMR) instructions and does not modify any CPU registers. These trigger instructions are placed in various error-trap routines so the DM triggers and captures program activity traces for a wide variety of online, offline, hardware, and software failures.

The trigger instruction is followed by two nonoperational (no-op) instructions. These no-op instructions are used to prevent problems in selecting the proper P register value. This P register value is used to restart the CPU after forcing the CPU to exchange in order to dump its instruction buffers and registers.

After SMON senses a DM has triggered, it reads the last two CIP values recorded in the DM buffer. The first of these CIP values should be the trigger instruction (002740, 002750, 002760, or 002770). The last CIP value should be either 002770 or 001000, depending on whether it is an offline failure or online failure, respectively. If SMON does not recognize these two CIP values as one of the eight defined default trigger sequences, SMON does not dump the instruction buffers or CPU registers, regardless of which trigger action was set.

For the `Default Triggers Action` setting `Hold, Dump, Continue`, SMON temporarily takes control of the CPU to dump its 64-element DM buffer, instruction buffers, failing exchange package, all CPU registers, and a 200_8 word block of mainframe memory for each A register [each block starts at the value contained in the corresponding A register (A*xx* + DBA)]. After SMON finishes recording all of the available information, it rebuilds the CPU's exchange package and restarts the CPU. This enables the user job to core-dump or the kernel to panic normally.

NOTE: Currently, the UNICOS user hardware trigger option (002750) is not officially supported. Contact Hardware Product Support (HPS) for more information about this option.

UNICOS Trigger Sequences

The UNICOS trigger sequences provide SMON the functionality to gather CPU information while UNICOS is running in the mainframe. The UNICOS trigger sequences are instruction sequences that are inserted into the kernel code or a user program.

Table 1 shows the UNICOS hardware trigger instruction sequences. These instruction sequences are strategically located in the kernel to execute after a hardware flag sets and an exchange occurs.

Table 1. UNICOS Hardware Trigger Sequences

Trigger Sequence	Failure Case
002750 001000 001000	UNICOS user hardware (Placed in the CALLHOT path) Example: A user job takes an uncorrectable memory error and exchanges back into the kernel. A mask in the user mod defines which hardware interrupts will issue this trigger sequence. **NOTE:** This trigger sequence requires the UNICOS slave kernel mod. Refer to Table 5 on page 12 for information about the slave kernel mod that must be installed to match the version of UNICOS that is installed on the mainframe.
002770 001000 001000	UNICOS kernel hardware (Placed at the beginning of the immtrap code) Example: The kernel takes an uncorrectable memory error, and an exchange to the immtrap code occurs. **NOTE:** This trigger sequence requires the UNICOS master kernel mod. Refer to Table 5 on page 12 for information about the master kernel mod that must be installed to match the version of UNICOS that is installed on the mainframe.

Table 2 shows the UNICOS software trigger instruction sequences. These instruction sequences are placed in the kernel or a user program to gather information after a failure. You must insert these instructions into the user code or a software trap.

Table 2. UNICOS Software Trigger Sequences

Trigger Sequence	Failure Case
002740 001000 001000	UNICOS user software (Placed in the user code) Example: A user job discovers a miscompare and issues the trigger. **NOTE:** By default, SMON will not perform dumps for any trigger instruction sequences that issue in user mode.
002760 001000 001000	UNICOS kernel software (Placed in software trap) This trigger sequence provides the flexibility to trigger on failures or events that do not exchange to the immtrap code. Example: A non-panic WARNING condition occurs in the kernel.

Offline Diagnostic Trigger Sequences

The offline diagnostic trigger sequences provide SMON the functionality to gather CPU information while offline diagnostics are running in the mainframe.

Table 3 shows the offline diagnostic hardware trigger instruction sequences. These instruction sequences are strategically located in MME to execute after a hardware flag sets and an exchange occurs.

Table 3. Offline Diagnostic Hardware Trigger Sequences

Trigger Sequence	Failure Case
002750 002770 001000	Offline user hardware (Placed in MME interrupt router) Example: An operand range error occurs while running `pave.c`, and an exchange to the interrupt router occurs.
002770 002770 001000	Offline kernel hardware [Placed in the MME interrupt router trap (iTRAP) routine] Example: An uncorrectable memory error occurs while executing MME interrupt router code, and an exchange to the trap code occurs.

Table 4 shows the offline diagnostic software trigger instruction sequences. These instruction sequences must be placed in the user diagnostic code.

Table 4. Offline Diagnostic Software Trigger Sequences

Trigger Sequence	Failure Case
002740 002770 001000	Offline user software (Placed in user diagnostic code)
002760 002770 001000	Offline kernel software (Placed in user diagnostic code)

What Are the Other Predefined Trigger Conditions?

SMON includes other predefined trigger conditions that set the DMs to trigger on any one hardware flag (BPI, EEX, PRE, ORE, MEU, or RPE), CIP, or P register value. You can choose one of these trigger conditions from `Trigger Condition: ▽`.

With this option, you cannot restart the system or dump the instruction buffers. The other predefined trigger conditions output only CPU and system status, DM parameters and data, and test point dump data.

What Is a User-defined Trigger Condition?

A user-defined trigger condition enables you to define the triggers that cause the DMs to stop recording. You create a user-defined trigger condition by modifying an LME parameter set. This enables you to program the DMs to trigger a valid CIP, CIP and mask, P and LP mask, test point, inverted test point, or leading edge.

With this option, you cannot restart the system or dump the instruction buffers. The user-defined trigger conditions output only CPU and system status, DM parameters and data, and test point dump data.

What Is the Hung CPU Check Feature?

The hung CPU check feature enables SMON to monitor for hung CPUs. To determine whether a CPU is hung, SMON stops the CPU's DM and examines the data recorded in the DM buffer. If there is no valid data in the DM buffer, which indicates that the CPU has not executed any instructions since the DM started recording, the CPU is hung. Because the DM is set to record only on valid CIPs, valid data is any data recorded in the DM buffer that is not the word of 1's used to mark the beginning of the buffer. (The word of 1's is written when the DM starts recording.)

After checking all CPUs, SMON runs the `CRASH_X` program if any CPUs are hung. The `CRASH_X` program acquires and analyzes data recorded with the DM. SMON will run `CRASH_X` twice for any one hung CPU; after that, SMON runs `CRASH_X` only when new hung CPUs are detected.

SMON performs the hung CPU check only on CPUs that are active. You can specify whether SMON should check for hung CPUs and the interval of time SMON waits before checking for hung CPUs.

NOTE: You can manually run the `CRASH_X` utility by choosing the LME `Utilities –> Run CRASH_X` menu button command. For more information, refer to the "Logic Monitor Environment" section of the *CRAY C90 Series Mainframe Offline Diagnostic Manual*, publication number CDM-0505-0D0.

What Software Must I Install to Use SMON?

Before you can use SMON, you must have the proper UNICOS and maintenance software installed. Ensure that the following conditions are met:

- The appropriate kernel mod must be installed for the version of UNICOS you are using. The kernel mod contains the instructions that SMON uses to trigger the diagnostic monitors (DMs) to detect UNICOS hardware trigger conditions.

  UNICOS requires a *master* kernel mod to use the 002770 trigger instruction with SMON. UNICOS requires a *slave* kernel mod to use the 002750 trigger instruction with SMON. (Refer again to Table 1 on page 9 for more information about the 002770 and 002750 trigger instruction sequences.)

  Table 5 shows the kernel mods that are available.

Table 5. Kernel Mods

UNICOS Version	Master Mod	Slave Mod
7.C.3	7Cuts97669b	No slave mod is available.
8.0.0 – 8.0.2.3	80uts00000b †	No slave mod is available.
8.0.2.4 – 8.0.3	80uts97669a	Contact HPS for information about this slave kernel mod.
8.0.3.1 and higher	The standard UNICOS release includes support for the 002770 trigger instruction. No master mod is required.	Contact HPS for information about this slave kernel mod.

† Contact Dale Mays of Software Product Support (SPS) to obtain this mod. Use the `getfix` command on hydra.cray.com to obtain the 7Cuts97669b and 80uts97669a mods.

- The ME-C2.3.1 (or later) offline diagnostic release must be installed on the maintenance workstation (MWS-E). Enter the `release` command to verify the offline diagnostic release installed on the MWS-E.

What Are the Potential Risks of Using SMON?

Using SMON requires that the maintenance channel operate in its unrestricted mode. This is necessary because access to the CPUs' diagnostic monitors is disabled when the maintenance channel restrict switch is on.

There are risks involved with using the maintenance channel concurrently with OS operations in the mainframe. Anyone with access to the MWS-E could crash the system by deadstarting a diagnostic or by Master Clearing the system.

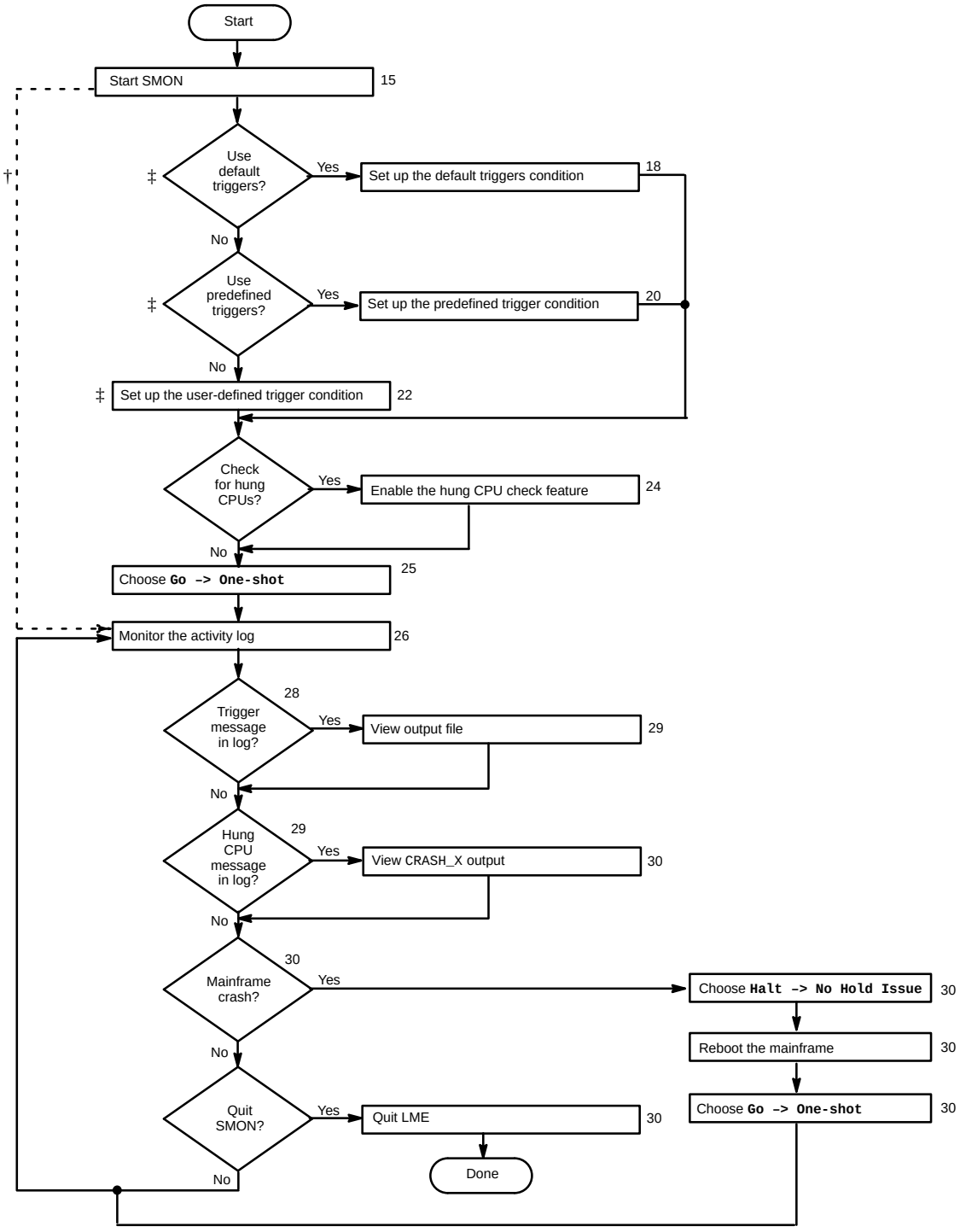
You can reduce these risks by performing the following actions:

1. Ensure that only authorized users are permitted logins on the MWS-E.

2. Instead of leaving the MWS-E screen unlocked to allow access to the `EASE` or `xelog` error report windows, export these windows to the OWS-E (use the `DISPLAY` variable). Then, lock the MWS-E screen to prevent unauthorized access to the MWS-E.

How Do I Use SMON?

Figure 2 shows the process you will perform to use SMON. The number next to a step indicates the page on which detailed information for the step is located.



† If you start SMON with the –mg command line option, SMON automatically starts monitoring with the default triggers.
‡ You will use only one of the trigger options at a time; normally, you should use the default triggers.

Figure 2. Using SMON Procedure (Flowchart)

How Do I Start SMON?

If you want to start SMON when UNICOS is already running, perform only Step 6 of the following procedure. It is not necessary to bring down UNICOS to start SMON.

For the following procedure to work, you must have the current mainframe configuration saved as the default configuration for MCE.

CAUTION

Always start SMON after the system has been booted to single-user mode because the I/O Master Clear performed during the boot process hangs the maintenance channel.

You can start SMON any time after UNICOS has reached single-user mode. To start SMON when UNICOS is not already running, perform the following procedure:

1. Clear the mainframe.
2. Quit all MCE, MME, and LME sessions on the MWS-E.
3. Disable the maintenance channel.

   This is necessary to re-enable the MCU LOSP with the hard switches.
4. Boot UNICOS to single-user mode.
5. Enable the maintenance channel.

NOTE: If the maintenance channel hangs, choose **`Reset -> Driver`** in the LME base window to clear the hang.

6. Use one of the options described in “From the OpenWindows Workspace Menu” or “From a UNIX Command Prompt” to start SMON.

From the OpenWindows Workspace Menu

Choose **`Maintenance Tools -> SMON`** to start SMON from the OpenWindows workspace menu.

From a UNIX Command Prompt

Change to the `/cri/cme/c90/bin` directory.

Enter one of the following commands to start SMON from the UNIX command prompt:

`lme -m` Starts LME; SMON appears but does not start.

`lme -mg` Starts LME and SMON.

If you enter `lme -mg`, SMON automatically runs with the default settings. These settings include `Default Triggers` trigger condition, `Hold, Dump, Continue` kernel and user job trigger actions, and hung CPU check feature disabled.

Table 6 describes the other available command line options.

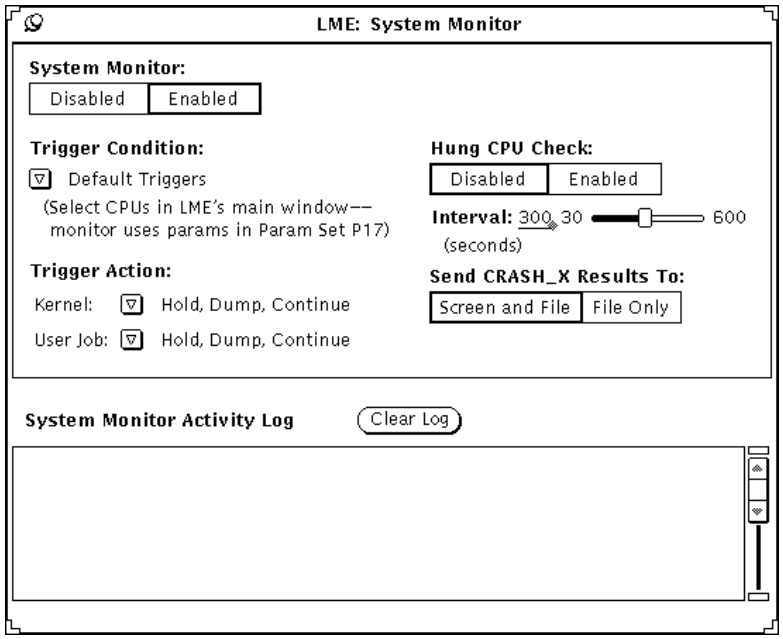
Table 6. Command Line Options

Option	Description
`-chn<`*num*`>`	Use the front-end interface (FEI) channel specified by <*num*>, which ranges from 0 to 7 The default channel number is 1.
`-client`	Start the client only
`-concurrent`	Use concurrent mode
`-config <`*file*`>`	Configure MCE with the configuration data stored in the file specified by <*file*>
`-copy <`*num*`>`	Connect to maintenance software assigned to the copy number specified by <*num*> This option allows you to differentiate which system is being supported by this session of the software.
`-kill`	Kill all MME, MCE, and LME processes
`-l <`*file*`>`	Load a layout file
`-m`	Open the SMON window; do not start the utility
`-mg`	Open the SMON window; start the utility

Table 6. Command Line Options (continued)

Option	Description
`-mh [num]`	Enable the hung CPU check feature and set it to [*num*] seconds; do not start the utility
`-mm`	Enable SMON to perform dumps for trigger instructions issued in user mode **NOTE:** By default, SMON does not perform dumps for trigger instruction sequences that issue in user mode.
`-offline`	Use offline mode Do not use this option when UNICOS is running. This option will crash UNICOS.
`-remote <host>`	Start client only, connect to remote host
`-server`	Start server only
`-sim`	Use the simulator

The `LME: System Monitor` window appears:



NOTE: If the `LME: System Monitor` window closes while you are using SMON, choose **`Utilities -> System Monitor`** in the LME base window to open the window again.

How Do I Set Up the Default Triggers Condition?

Normally, you should use SMON with the `Default Triggers` option, which enables SMON to output the maximum amount of failure information. If you use the default triggers condition, SMON provides CPU and system data, the DM parameters and data, the failing exchange package, the test point dump data, the instruction buffer dump data, the register dump data, and the memory data pointed to by the A registers.

To use SMON with the default trigger condition, perform the following procedure:

1. Click on `System Monitor:` Enabled to enable SMON.
2. Choose `Trigger Condition:` ▽ **`Default Triggers`** to enable the CPU to trigger on the default triggers.
3. From the `Kernel:` ▽ or the `User Job:` ▽ choose the action (**`Hold, Dump, Continue`**; **`Hold, Dump, Hold Issue`**; **`Hold Issue`**; or **`Don't Hold Issue`**) you want SMON to take when the kernel or user job trigger occurs. Refer to Table 7 for descriptions of the kernel and user job trigger action options.

NOTE: If you choose `Don't Hold Issue`, the CPU does not hold issue when a trigger occurs. This means that if a CPU triggers and a second trigger occurs before SMON has rearmed the CPU (which SMON does after processing a trigger), SMON does not sense the second trigger.

Table 7. Kernel and User Job Trigger Action Options

Trigger Action	Description
`Hold, Dump, Continue`	Holds issue; dumps CPU status, system status, DM parameters, DM buffer data, failing exchange package, test point dump data, instruction buffers, all CPU registers, and a 200_8-word block of mainframe memory for each A register (each block starts at address A*xx* + DBA); restarts the CPU. **NOTE:** For MEU interrupts, the CPU register dump code quickly scans memory to determine whether any additional MEUs occurred. SMON reports whether additional MEUs did occur.

Table 7. Kernel and User Job Trigger Action Options (continued)

Trigger Action	Description
`Hold, Dump, Hold Issue`	Holds issue; dumps CPU status, system status, DM parameters, DM buffer data, failing exchange package, test point dump data, instruction buffers, all CPU registers, and a 200_8-word block of mainframe memory for each A register (each block starts at address A*xx* + DBA); restarts the CPU and immediately holds issue. **NOTE:** For MEU interrupts, the CPU register dump code quickly scans memory to determine whether any additional MEUs occurred. SMON reports whether additional MEUs did occur. Having the CPU hold issue “freezes” the CPU and enables you to view its memory area as it was when the failure occurred.
`Hold Issue`	Holds issue; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data. Having the CPU hold issue “freezes” the CPU and enables you to view its memory area as it was when the failure occurred.
`Don’t Hold Issue`	Does not hold issue; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data.

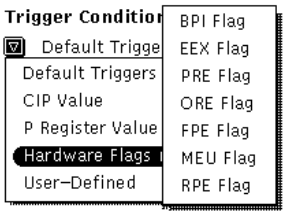
How Do I Set Up a Predefined Trigger Condition?

SMON enables you to choose from several other predefined trigger conditions. To run SMON using a predefined trigger condition, perform the following procedure:

NOTE: To receive the most output from SMON, you should use the `Default Triggers` option. The predefined trigger conditions output CPU and system status, DM parameters and data, and test point dump data only.

1. Click on `System Monitor:` Enabled to enable SMON.

2. From `Trigger Condition:` ▽, choose a trigger condition:



For descriptions of the available trigger conditions, refer to Table 8.

Table 8. Trigger Conditions

Trigger Condition	Description
`CIP Value`	Current instruction parcel value
`P Register Value`	Program register value
`Hardware Flags`	A hardware flag; choose one of the following options: Option — Description `BPI Flag` — Breakpoint interrupt `EEX Flag` — Error exchange `PRE Flag` — Program range error `ORE Flag` — Operand range `FPE Flag` — Floating-point error `MEU Flag` — Uncorrectable memory error `RPE Flag` — Register parity error
`User-Defined`	Refer to the “How Do I Set Up a User-defined Trigger Condition?” description on page 22 for more information.

3. If you selected a `CIP Value` or `P Register Value` trigger condition, enter the appropriate value in the field that appears when you click on the trigger.

4. From the `Trigger Action:` ▽, choose **`Hold Issue`** or **`Don't Hold Issue`** to specify which action you want SMON to perform when a CPU triggers. Refer to Table 9 for descriptions of the available trigger action options.

NOTE: If you choose `Don't Hold Issue`, the CPU does not hold issue when a trigger occurs. This means that if a CPU triggers and a second trigger occurs before SMON has rearmed the CPU (which SMON does after processing a trigger), SMON does not sense the second trigger.

Table 9. Trigger Action Options

Trigger Action	Description
`Hold Issue`	Holds issue; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data. Having the CPU hold issue "freezes" the CPU and enables you to view its memory area as it was when the failure occurred.
`Don't Hold Issue`	Does not hold issue; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data.

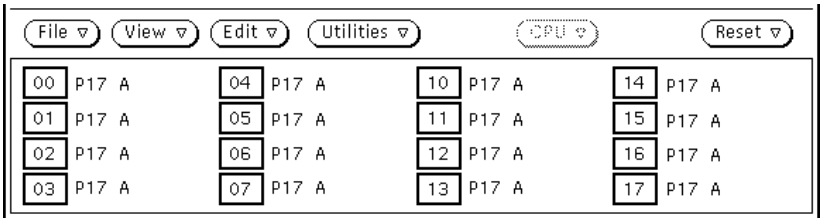
How Do I Set Up a User-defined Trigger Condition?

Using the user-defined trigger conditions enables a CPU to trigger on the conditions you select in the `LME: Edit Parameter Set` window.

NOTE: To receive the most output from SMON, you should use the `Default Triggers` option. The user-defined trigger conditions output CPU and system status, DM parameters and data, and test point dump data only.

1. Click on `System Monitor:` Enabled to enable SMON.

2. Choose `Trigger Condition:` **`User-Defined`** to specify that you want the CPU to trigger on the user-defined trigger conditions selected in the `LME: Edit Parameter Set` window. SMON assigns parameter set 17 to all available CPUs:



3. Double click on a parameter set listed under `Parameter Sets:` in the LME base window to set the user-defined trigger parameters. The `LME: Edit Parameter Set` window appears.

   For more information about setting parameters in LME, refer to the *CRAY C90 Series Mainframe Offline Diagnostic Manual*, publication number CDM-0505-0D0.

4. Choose `Trigger Action:` **`Hold Issue`**; **`Don't Hold Issue`**; or **`As specified in DM params`** to specify which action you want SMON to perform when a CPU triggers. Refer to Table 10 for descriptions of the available trigger actions.

NOTE: If you choose `Don't Hold Issue`, the CPU does not hold issue when a trigger occurs. This means that if a CPU triggers and a second trigger occurs before SMON has rearmed the CPU (which SMON does after processing a trigger), SMON does not sense the second trigger.

Table 10. User-defined Trigger Action Options

Trigger Action †	Description
`Hold Issue`	Holds issue; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data. Having the CPU hold issue “freezes” the CPU and enables you to view its memory area as it was when the failure occurred.
`Don’t Hold Issue`	Does not hold issue; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data.
`As specified in DM params`	Holds or does not hold issue as specified by the “mode” parameter in the DM parameters; dumps CPU status, system status, DM parameters, DM buffer data, and test point dump data.

† Choosing the `Hold Issue` or `Don’t Hold Issue` trigger action options overrides the mode parameter specified in the `LME: Edit Parameter Set` window. To use the mode specified in the `LME: Edit Parameter Set` window, you must choose `As specified in DM params`.

How Do I Enable the Hung CPU Check Feature?

NOTE: When the CRASH_X program is run, any CPUs that SMON caused to hold issue are released.

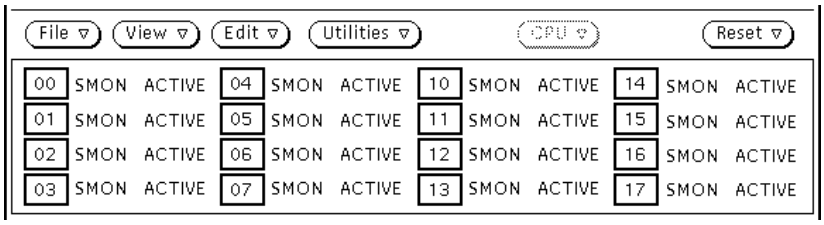
To enable SMON to check for hung CPUs, perform the following procedure:

1. Click on Hung CPU Check: [Enabled].
2. In the Interval: field, enter the number or use the slider to specify how often you want SMON to check for a hung CPU. The valid values for the interval range from 30 to 600 seconds.

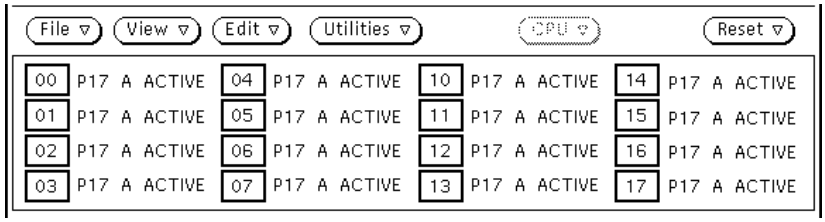
NOTE: The Send CRASH_X Results to: options send the output from the CRASH_X program to the screen and a file ([Screen and File]) or to a file only ([File Only]).

How Do I Make SMON Start Monitoring the CPUs?

In the LME base window, choose **`Go -> One-shot`**, as shown at the left, to run the parameter set(s) once. For the default and predefined trigger conditions, `SMON ACTIVE` appears in the CPU status display to indicate that SMON is monitoring that CPU:



For user-defined trigger conditions, LME displays a parameter set, a buffer, and the word `ACTIVE` next to the CPUs in the CPU status display:



NOTE: The `Go -> Continuous` option is not valid with SMON.

The `System Monitor Activity Log` displays a message indicating that SMON has started. Figure 3 shows an example.

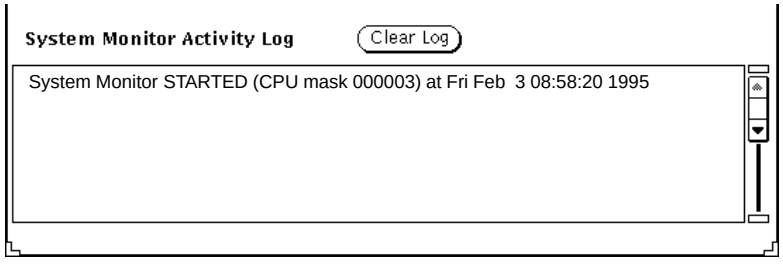


Figure 3. SMON Started Message

SMON remains active for a CPU until the DM triggers or you click on Halt in the LME base window.

What Should I Do While SMON Monitors for Triggers and Hung CPUs?

While SMON monitors for triggers and hung CPUs, all messages about SMON activity appear in the `System Monitor Activity Log` scroll box, shown in Figure 4. You should monitor the activity log for status messages.

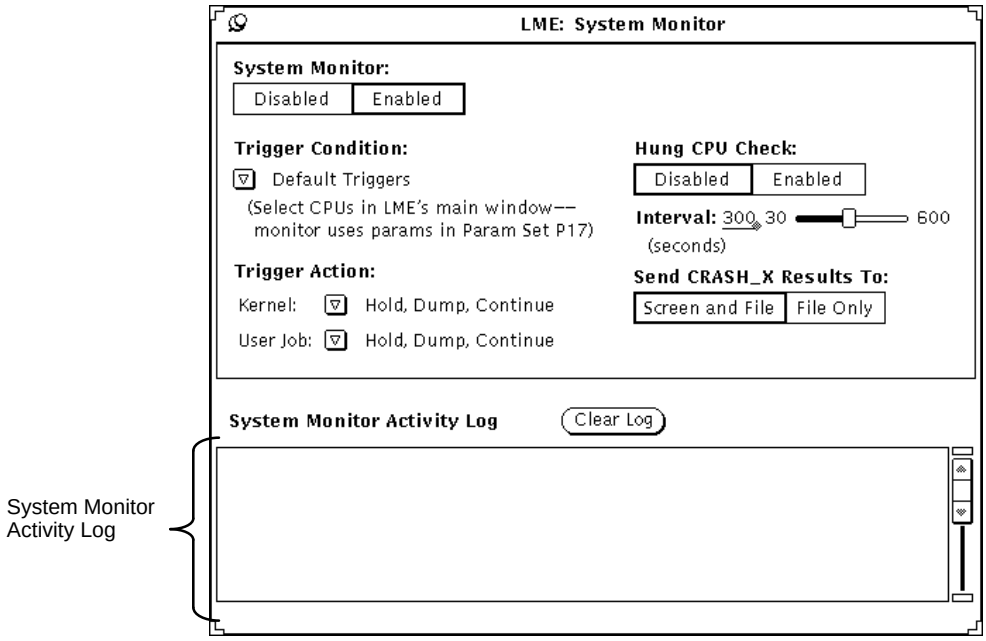


Figure 4. System Monitor Activity Log

NOTE: To clear the scroll box, click on Clear Log.

What Messages Will I See in the Log?

The following examples illustrate the messages that appear in the `System Monitor Activity Log` scroll box:

```
System Monitor STARTED (CPU mask 000003) at Fri Feb  3 08:58:20 1995
```

This message indicates that SMON has started monitoring the CPUs for triggers. This message shows a mask of the CPUs (0 and 1 in this example) that SMON is monitoring and the date and time that SMON started monitoring these CPUs.

```
System Monitor STOPPED (CPU mask 000003) at Fri Feb  3 08:58:34 1995
```

This message indicates that SMON has stopped monitoring the CPUs for triggers. This message shows a mask of CPUs that SMON was monitoring and the date and time that SMON stopped monitoring these CPUs.

```
CPU 01 triggered at Fri Feb  3 09:01:10 1995
   Summary in '/cri/cme/c90/usr/lme/smon/cpu01.Feb03_09:01:10'
```

This message indicates that SMON detected a trigger for a CPU (in this example, CPU 01). This message shows the date and time the trigger occurred and indicates the pathname for the output file that SMON generated.

Trigger messages may contain additional informational or error messages. Informational messages begin with `***`. Error messages begin with `ERROR`.

```
HUNG CPUS DETECTED at Fri Feb  3 09:01:10 1995
   CPU 01 is **HUNG**
   CRASH_X output in'/cri/cme/c90/usr/crash/crash_x_out.Feb03_09:01:10'
   CRASH_X data in '/cri/cme/c90/usr/crash/crash_x_data.Feb03_09:01:10'
```

This message indicates that SMON detected one or more hung CPUs. SMON prints a `CPU` *xx* `is **HUNG**` message for each hung CPU, where *xx* is the CPU number. This message indicates the pathnames for the `CRASH_X` output and data files.

```
CPU 00 triggered at Fri Feb  3 09:37:38 1995
   Summary in '/cri/cme/c90/usr/lme/smon/cpu00.Feb03_09:37:38'
   *** CPU is "pinging" (constantly triggering)--monitor not restarted.
```

This trigger message contains additional information that indicates a CPU has triggered 5 times in 1 minute. When this occurs, SMON stops monitoring the CPU, indicated by the `monitor not restarted` text.

```
CPU 03 triggered at Fri Feb  3 09:56:00 1995
   Summary in '/cri/cme/c90/usr/lme/smon/cpu03.Feb03_09:56:00'
   *** Multiple CPUs constantly triggering--monitor halted for all CPUs
```

This trigger message contains additional information that indicates more than 32 triggers have occurred for all CPUs in the last 5 minutes. When this occurs, SMON stops monitoring all CPUs, indicated by the `monitor halted for all CPUs` text.

How Do I Determine if a Trigger Occurred?

SMON displays a message in the `System Monitor Activity Log` when a trigger occurs. Figure 5 shows an example status message that indicates a CPU triggered.

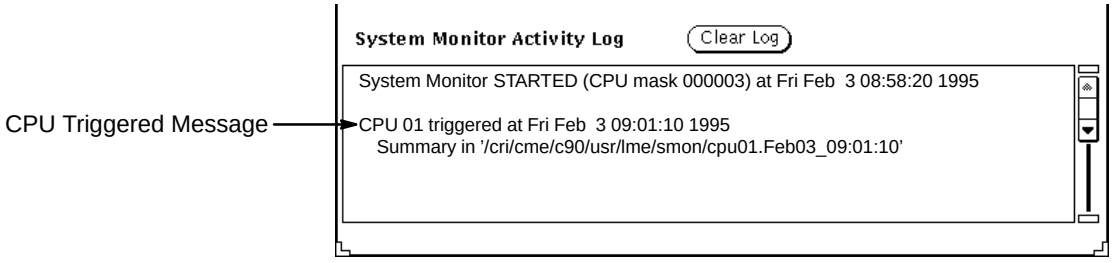


Figure 5. CPU Triggered Message

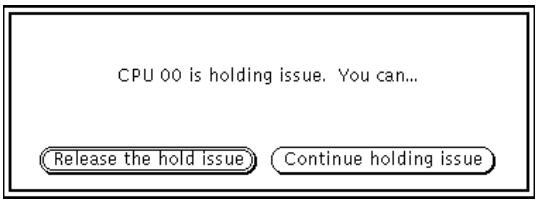
What Happens When a Trigger Occurs?

When a CPU's DM triggers, SMON creates an output file that contains all available information from the trigger. The information that SMON gathers is determined by the `Trigger Condition` and `Trigger Action` settings.

NOTE: The output file can be as large as 140 Kbytes (if you use the default settings to have SMON report all available information).

SMON also executes a user-defined script each time a trigger occurs. To use this feature, create a script named `.smon_trigger_cmd` in the `/cri/cme/c90/bin` directory. Refer to the "Run .smon_trigger_cmd Script" description on page 40 for more information.

If you chose to hold issue after SMON detects a trigger, SMON displays the following message when a trigger occurs:



Click on (Release the hold issue) to release the hold issue option; the CPU resumes executing instructions. Click on (Continue holding issue) to continue holding issue. Having the CPU hold issue "freezes" the CPU and enables you to view its memory area as it was when the failure occurred. If you click on (Continue holding issue), the CPU holds issue until you either disable SMON, click on (Go ▽) to restart SMON, or quit LME.

How Do I View the Output File?

To view the output file, view the file shown in the SMON activity log. Because the output file is an ASCII file, you can use the `more` or `vi` command to view the file.

Refer to "How Do I Interpret the SMON Output File?" on page 45 of this document for examples of how to interpret the data contained in the output file.

How Do I Determine if a Hung CPU Was Detected?

When SMON detects a hung CPU, SMON displays a message in the activity log. Figure 6 shows an example status message that indicates SMON detected a hung CPU (CPU 1).

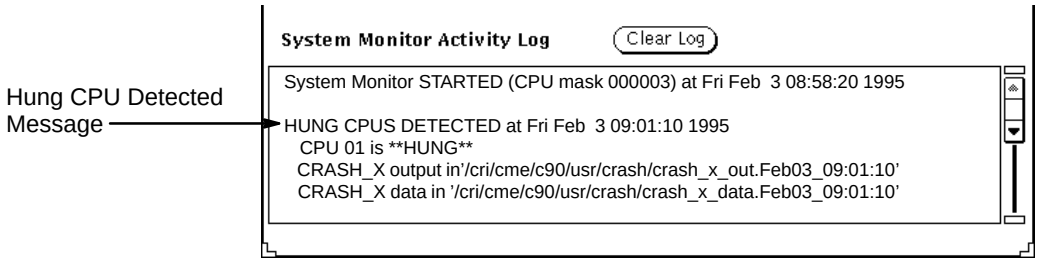


Figure 6. Hung CPU Detected Message

What Happens When SMON Detects a Hung CPU?

When SMON detects a hung CPU, SMON runs the `CRASH_X` program. SMON also executes a user-created script each time a hung CPU is detected. To use this feature, create an executable script named `.smon_hang_cmd` in the `/cri/cme/c90/bin` directory. Refer to the "Run .smon_hang_cmd Script" description on page 44 for more information.

After SMON runs CRASH_X, SMON restarts the DMs of all CPUs that were active before CRASH_X was run.

NOTE: The CRASH_X files can use up to 52 Kbytes of disk space (when SMON runs CRASH_X for a system with 16 CPUs).

How Do I View the CRASH_X Output?

There are two ways to view the CRASH_X output:

- If you clicked on Send CRASH_X Results To: Screen and File before SMON detected the hung CPU, SMON will automatically display the CRASH_X output file on the screen.
- Because the CRASH_X output file is an ASCII file, you can use the more or vi command to view the file. Change to the directory shown in the SMON activity log, and view the file shown in the SMON activity log.

The analysis information appears at the end of the CRASH_X output file.

What Should I Do if the Mainframe Crashes?

If the mainframe crashes and you want to restart SMON, choose **Halt -> No Hold Issue** in the LME base window to have SMON stop monitoring the CPUs. This prevents SMON from detecting false triggers and hangs when you reboot the mainframe. Then, boot the mainframe. Once the mainframe is booted, choose **Go -> One-shot** in the LME base window to have SMON start monitoring the CPUs again.

How Do I Quit SMON?

You should quit SMON before or when you bring UNICOS down to single-user mode, or SMON may detect false triggers.

To quit SMON, quit the LME application.

How Can I Test SMON?

You can test SMON with the C program shown in Figure 7. Start SMON with the default triggers condition. Then, compile and run this program in the mainframe. SMON should detect an ORE in a user job.

```
#include<stdio.h>
main()
{
  int c;
  char temp[3];

  for(c=1; c>0 ;c+=20000)
   printf("%c\n", temp[c]);
}
```

Figure 7. C Program You Can Use to Test SMON

How Does SMON Work?

This section describes how SMON works and is written with the assumption that you have an understanding of DM and maintenance channel activity. For more information about DM and maintenance channel activity, refer to Volume 2 of the *CRAY C90 Series Hardware Maintenance Manual*, publication number CMM-0502-0A0.

The flowchart in Figure 8 illustrates the process SMON uses to monitor CPUs and to detect and process trigger and hung CPU conditions. The number next to each step in the flowchart indicates the page on which a detailed description of the step is located.

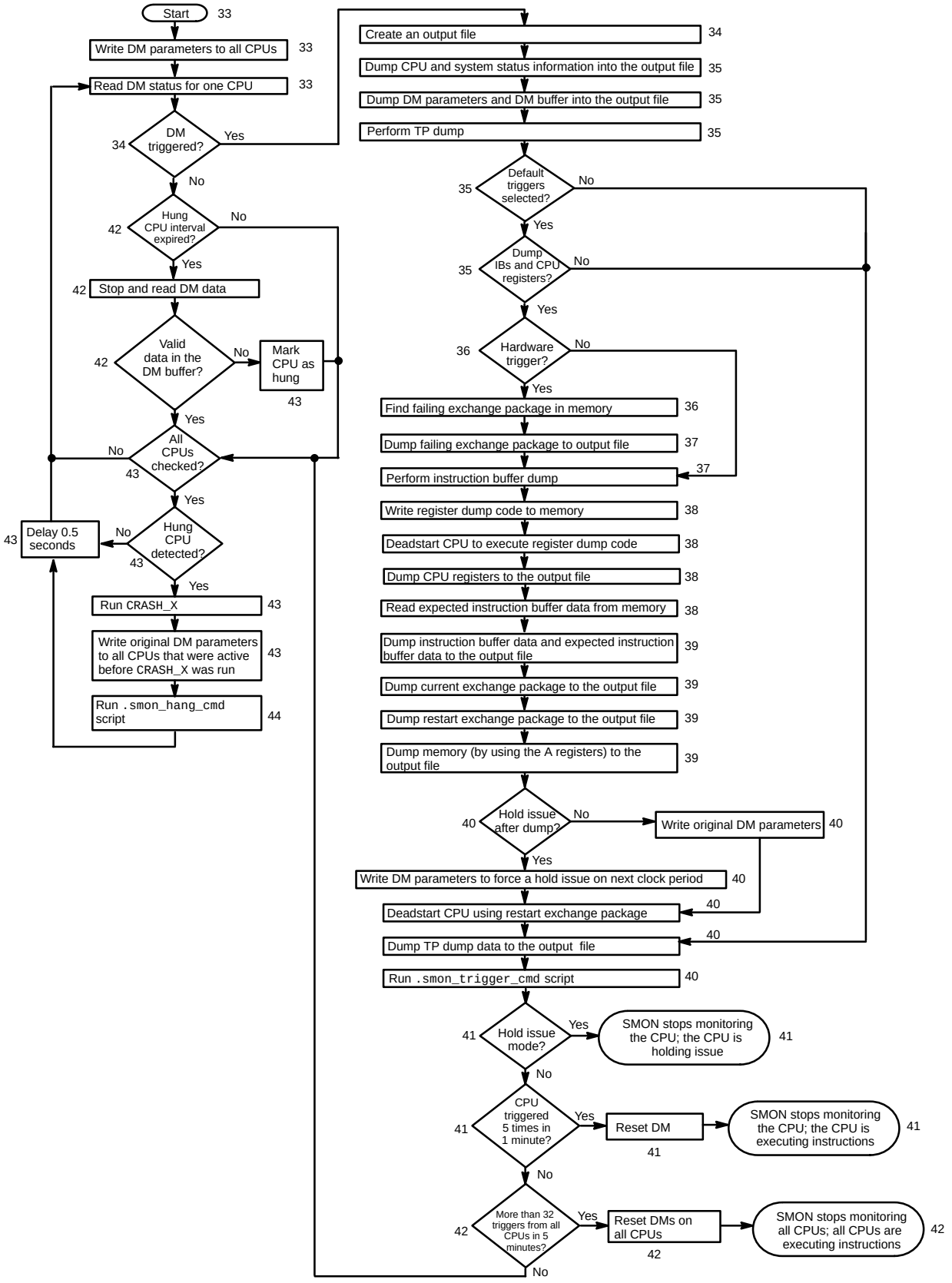


Figure 8. SMON Functions Flowchart

Start

SMON begins running when you click on `System Monitor:` Enabled in the `LME: System Monitor` window and choose **`Go -> One-shot`** in the LME base window.

NOTE: SMON starts automatically if you enter `lme -mg`.

Write DM Parameters to All CPUs

SMON sends a `DM_WRITE` command to all available CPUs. This write command is followed by 12 parcels of DM parameters. The trigger condition and trigger action from the `LME: System Monitor` window determine how the parcels of DM parameters are set. All the CPUs' DMs start to record program information.

SMON arms the trigger so the DMs will stop recording when the trigger condition occurs.

Read DM Status for One CPU

Every half second, SMON sends a `STATUS_RD` command to each CPU to test the state of its DM. Each CPU responds to the `STATUS_RD` command by returning 4 parcels of status information. SMON checks the state of the diagnostic monitor active (DA) bit in parcel 0 to determine whether the CPU's DM has triggered. When the DA bit clears, the DM has triggered and stopped recording. The `STATUS_RD` command is completely transparent to the CPU operation and uses no resources other than the maintenance channel.

One bit of the 12 parcels of DM parameters causes a CPU to hold issue when the DM triggers. Unless the trigger action is set to `Don't Hold Issue`, SMON programs the DM to assert this hold issue when the DM triggers.

NOTE: If you select `Don't Hold Issue` for both the `Kernel` and `User Job` trigger action settings, all DM activity is completely transparent to the CPU and has no effect on CPU performance. Otherwise, the CPU must momentarily hold issue on any trigger to determine if it is a trigger that needs to hold issue. If the selected trigger action does not include a hold issue, SMON releases the hold issue.

If the trigger action `Hold, Dump, Hold Issue` or `Hold Issue` option is selected, SMON does not automatically release the hold issue condition. This hold issue condition does not affect CPU operation; however, the OS shows the error message `"CPU has not exchanged for 30 seconds"`. This error message appears because the CPU is not executing any instructions while the hold issue is in effect. You must manually release the hold issue condition by disabling SMON (click on `System Monitor:` Disabled in the `LME: System Monitor` window) or by restarting the CPU (click on Go in the LME base window).

Having the CPU hold issue "freezes" the CPU and enables you to view its memory area as it was when the failure occurred. This is useful for user job failures. Normally, after a user job core-dumps, the OS reallocates the associated memory to a new process. By having SMON hold issue after a trigger, this memory reallocation is delayed. This enables you to view mainframe memory with the LME `Utility –> View Memory` command to search for additional clues about what happened, if necessary.

NOTE: If you quit LME, SMON also releases the hold issue by resetting all DMs.

DM Triggered?

SMON checks to whether the DM has triggered. If the DM triggered, SMON captures CPU data in an output file.

NOTE: SMON checks the system CPU Master Clear test point (DC0 test point 045) to determine if UNICOS was halted while SMON is running. If UNICOS was halted (the system CPU Master Clear test point is set), SMON ignores the trigger.

Create an Output File

Once SMON detects that a CPU's DM has triggered, SMON creates a text file to store the information that will be acquired. The complete path for the file is:

`/cri/cme/c90/usr/lme/smon/cpu#.`*`date`*`.`*`time`*

A new file is created for each new trigger. A header that contains the system serial number, the CPU that triggered, and the time at which the trigger occurred is stored in the file.

NOTE: The output file can be as large as 140 Kbytes (if you use the default settings to have SMON report all available information).

Dump CPU and System Status Information into the Output File

The first block of information recorded in the output file contains general CPU and system status read with the `STATUS_RD` maintenance channel command.

SMON samples the status information multiple times to determine whether memory priority is locked. SMON reports the memory priority status in the output file.

Dump DM Parameters and DM Buffer into the Output File

The second block of information recorded in the output file is the DM data. First, the DM parameters are recorded. Then, the contents of the 64-element DM buffer are recorded. SMON labels the 64 elements *events* and numbers them event 000 to event 077 (octal). By default, the trigger instruction is at event 076 of 077. The DM is programmed to record only valid CIP events; the DM buffer contains the last 62 instructions issued before the trigger event and contains the corresponding trace of P-register values.

Perform TP Dump

SMON reprograms the DM to perform a test-point dump, which takes a snapshot of the state of each available test point. One of the main reasons for performing the test point dump is to record the current value of the exchange address present on the HC0 option test points 060 to 067. The exchange address is later written in the restart exchange package.

NOTE: SMON saves the test-point dump data and writes it at the end of the output file.

Default Triggers Selected?

SMON checks whether the default triggers option is selected as the trigger condition.

Dump Instruction Buffers and CPU Registers?

SMON performs an instruction buffer dump and a CPU register dump after a trigger if the `Trigger Action` setting was `Hold, Dump, Continue` or `Hold, Dump, Hold Issue`.

Hardware Trigger?

SMON checks whether the trigger condition is a hardware trigger condition. To do this, SMON checks the triggering sequence recorded in the DM buffer to determine whether it is a hardware trigger sequence.

Find Failing Exchange Package in Memory

If a user hardware or kernel hardware failure occurs, SMON assumes that a bad flag caused the CPU to exchange and issue the trigger instruction. In these cases, the failing exchange package is written to memory. The "current exchange package" in the CPU itself is associated with the kernel job servicing the interrupt flag.

SMON calculates the location of the failing exchange package, reads the memory area through the CPU's maintenance port, and saves the exchange package to the output file. This data is labeled the `Failing Exchange Package`.

For a kernel failure, both the kernel and the user job exchange packages are dumped to the output file. This is done because often when an uncorrectable memory occurs in a user job, another will occur in the kernel before the user job trigger is issued, and the failure information would be lost.

Three different placement conventions, depending on the version of UNICOS being used, make it somewhat complicated to calculate where the failing exchange package is located in memory. SMON determines which convention is being used by searching for the ASCII tag field "CPU1" at locations 640 and 700. This exchange package is not used to restart the CPU. SMON uses the instruction base address (IBA) register to calculate the fetch address for reading the expected instruction buffer data. Also, the cluster number (CLN) field is used to determine which clusters of shared registers are dumped.

Table 11. Exchange Package Placement

Version of UNICOS	Exchange Package Placement
8.0.3 (8.0.2.4 is lower bound)	No “CPU” tags in lower memory CPU 0 kernel exchange package at 500_8 Kernel exchange package every 100_8 words USER always 040 word from KERNEL
8.0 – 8.0.2 (8.0.2.3 is upper bound)	“CPU0” tag at 500_8 “CPU1” tag at 640_8 CPU 0 kernel exchange package at 520_8 KERNEL exchange every 140_8 words USER always 100_8 octal words from KERNEL
7.C	“CPU0” tag at 500_8 “CPU1” tag at 700_8 CPU 0 kernel exchange package at 520_8 KERNEL exchange every 200_8 words USER always 140_8 octal words from KERNEL

Dump Failing Exchange Package to Output File

SMON dumps the failing exchange package to the output file.

Perform Instruction Buffer Dump

The instruction buffer dump feature of a CRAY C90 series computer system is implemented in the hardware by having the CPU exchange into a special maintenance mode in which issue is prevented, and the instruction buffer data is read out of the buffers through the normal issue path (NIP, CIP). If the CPU holds issue before exchanging into this mode, no registers or current instruction issue operations are corrupted.

However, when SMON sets the hold issue condition, the P register points to the next instruction to be gated out of the instruction buffers. Depending on issue conflicts, the other one or two instructions already in the issue pipe may or may not be issued. SMON cannot reliably determine which instructions issued and where the P register should point to upon returning the CPU to that process. When the default triggers are placed in the OS trap routines, a trigger is followed by two no-op instructions, which avoid this problem.

SMON dumps the instruction buffers and CPU registers only when the `Default triggers` trigger condition option is selected. This ensures that the CPU will be restarted with the correct P register value.

Write Register Dump Code to Memory

To dump the CPU registers, SMON writes a deadstart exchange package and a short code sequence to memory locations 0 through 77.

Deadstart CPU to Execute Register Dump Code

SMON deadstarts the CPU, which executes the code sequence to store the CPU registers to memory.

Dump CPU Registers to the Output File

SMON uses the CPU's maintenance port to read the register information from memory and stores it in the output file. There is only a small area of memory, from locations 0 to 77, that is not reserved for the OS. SMON handles this limitation by using the DM to freeze the CPU between writes of 0100_8 word blocks of register data while SMON issues a maintenance channel function to read the data from memory. SMON performs 19 reads of memory locations 0 through 77 to dump all of the CPU registers.

For MEU interrupts, the register dump code quickly scans memory to determine whether any additional MEUs occurred. If additional MEUs did occur, SMON reports this in the output file.

Read Expected Instruction Buffer Data from Memory

SMON tries to read the expected IB data from memory by calculating the fetch address by adding the P register address recorded in the DM buffer and the IBA recorded in the failing exchange package. SMON can tell which instruction buffer corresponds to the P register value in the DM buffer from the coincidence field. Therefore, SMON will be able to calculate the fetch address for an instruction buffer only if that instruction buffer number is present in the coincidence field of one of the 64 recorded events.

Note that for user hardware and kernel hardware failures, in which the CPU has done an exchange/fetch before issuing the trigger instruction, instruction buffer 0 is overwritten with the code fetched for the trap routine.

Dump Instruction Buffer Data and Expected Instruction Buffer Data to the Output File

SMON dumps the instruction buffer data and expected instruction buffer data into the output file. The data is organized as expected, actual, and difference.

Dump Current Exchange Package to the Output File

While SMON forces a Master Clear (MC)/exchange sequence to initiate the instruction buffer dump sequence, this is also the mechanism for dumping the CPU's current exchange package. In user software or kernel software failures, there is no exchange before issuing the trigger instruction, and the current exchange package is the "failing" exchange package. The current exchange package is written to memory location 0 as SMON forces the MC/exchange sequence to initiate the instruction buffer dump sequence. After this exchange, SMON reads the CPU's exchange package from memory location 0 and saves it in the output file.

Dump Restart Exchange Package to the Output File

SMON writes the restart exchange package to the output file. This exchange package is the same as the "current exchange package," except for the value in the exchange address (XA) register. As previously described, the mechanism for dumping the current exchange package is the MC/exchange sequence. Setting a CPU MC causes the XA register to be set to 0. The proper XA value is restored using the HC0 test point information previously read with the test point dump operation.

Also, SMON clears the MEU flag in the exchange package if the flag was not set in the test point dump, which indicates the trigger processing that SMON performed caused the MEU. This prevents an MEU from causing a system panic on a nonfatal user job core dump.

Dump Memory (by Using the A Registers) to the Output File

For each A register, SMON dumps a 200_8 word block of mainframe memory into the output file. Each block starts at the value contained in the corresponding A register plus the DBA (start address = A*xx* + DBA).

Hold Issue after Dump?

The trigger action you specified determines whether the CPU should hold issue.

Write Original DM Parameters

If the `Trigger Action` option was set to `Hold, Dump, Continue` SMON rewrites the original parameter set to the CPU's DM.

Write DM Parameters to Force Hold Issue on Next Clock Period

If you selected a trigger action that holds issue, SMON writes a DM parameter set to force a hold issue the next clock period.

Deadstart CPU Using Restart Exchange Package

SMON uses the restart exchange package to restart the CPU. The CPU is holding issue or executing instructions, depending on which DM parameter SMON wrote to the CPU.

Dump TP Dump Data to the Output File

SMON dumps the test-point dump data to the output file.

Run .smon_trigger_cmd Script

SMON checks the `/cri/cme/c90/bin` directory for the `.smon_trigger_cmd` script. If the script exists and the user running SMON has execute permission for the file, SMON runs the script with a `system( )` call.

SMON sends the full path of the SMON output file to this script. For example, if CPU 03 triggered on Wednesday, November 23, 1994, at 09:51:45, SMON issues the following command in the `system( )` call (from the `/cri/cme/c90` directory):

```
bin/.smon_trigger_cmd /cri/cme/c90/usr/lme/smon/cpu03.Nov23_09:51:45
```

You can create a `.smon_hang_cmd` script to use this data; for example, you could have the script use E-mail to send you a copy of the SMON output file:

```
echo ”RUNNING THE SMON TRIGGER COMMAND SCRIPT   (file=$1)”
mail –s ’SMON trigger file’ dtg@cray.com < $1
exit 0
```

If the file does not exist or the user running SMON does not have execute permission, SMON does not make the `system( )` call.

Hold Issue Mode?

SMON checks whether the trigger action assigned in the `LME: System Monitor` window includes a hold issue.

SMON Stops Monitoring the CPU; the CPU Is Holding Issue

If you selected a hold issue trigger action, SMON stops monitoring the CPU. The CPU is holding issue.

CPU Triggered 5 Times in 1 Minute?

SMON checks whether the CPU has triggered 5 times in the last minute. SMON monitors this because a CPU that repeatedly triggers continually generates output files.

Reset DM

If the CPU has triggered 5 or more times in the last minute, SMON resets the DM.

SMON Stops Monitoring the CPU; the CPU Is Executing Instructions

SMON stops monitoring the CPU. The CPU continues to execute instructions.

More Than 32 Triggers from All CPUs in 5 Minutes?

SMON checks whether more than 32 triggers occurred for all CPUs in 5 minutes. SMON monitors this because CPUs that repeatedly trigger continually generate output files.

Reset DMs on All CPUs

If more than 32 triggers from all CPUs occur in 5 minutes, SMON resets the DMs on all CPUs.

SMON Stops Monitoring All CPUs; All CPUs Are Executing Instructions

SMON stops monitoring all CPUs. All CPUs continue to execute instructions.

Hung CPU Interval Expired?

SMON determines whether the time you specified in the `Interval` field has expired.

Stop and Read DM Data

If the time has expired, SMON stops the CPU's DM and reads the data recorded in the DM buffer.

Valid Data in DM Buffer

SMON checks the DM buffer data to determine whether it contains valid data. If the buffer does not contain valid data, this indicates that the CPU has not executed any instructions since the DM started recording. The CPU is hung.

Mark CPU as Hung

If SMON detects a hung CPU, it marks that CPU as hung and continues to check the remaining CPUs. Once all CPUs are checked, SMON runs the CRASH_X program if any CPUs are marked as hung.

All CPUs Checked?

SMON verifies whether all CPUs were checked. If SMON did not check all CPUs yet, SMON checks the next CPU in the system.

Hung CPU Detected?

SMON checks for any CPUs it marked as hung.

Delay 0.5 Seconds

If no CPUs are marked as hung, SMON delays 0.5 seconds before starting to monitor all CPUs for a hung CPU condition again.

Run CRASH_X

If CPUs are marked as hung, SMON runs the CRASH_X program, which gathers all available information from all CPUs.

NOTE: To use CRASH_X, SMON gathers information for all CPUs that are marked as hung and passes this information to the CRASH_X program. While gathering data for CRASH_X, SMON checks the system CPU Master Clear test point (DC0 test point 045) to determine if UNICOS was halted while SMON is running. If the hung CPUs occurred because UNICOS was halted (the system CPU Master Clear test point is set), CRASH_X is not run.

The CRASH_X files can use up to 52 Kbytes of disk space (when SMON runs CRASH_X for a system with 16 CPUs).

Write Original DM Parameters to All CPUs That Were Active before CRASH_X Was Run

SMON writes the original DM parameters to all CPUs that were active before SMON ran the CRASH_X program.

Run .smon_hang_cmd Script

SMON checks the `/cri/cme/c90/bin` directory for the `.smon_hang_cmd` script. If the script exists and the user running SMON has execute permission for the file, SMON runs the script with a `system( )` call.

SMON sends the `CRASH_X` output and data files as parameters to this script. For example, if SMON detected a hung CPU on Wednesday, November 23, 1994, at 09:51:45, SMON issues the following command in the `system( )` call (from the `/cri/cme/c90` directory):

```
bin/.smon_hang_cmd /cri/cme/c90/usr/crash/crash_x_out.Nov23_09:51:45
/cri/cme/c90/usr/crash_x_data.Nov23_09:51:45
```

You can create a `.smon_hang_cmd` script to use this data; for example, you could have the script use E-mail to send you a copy of the `CRASH_X` output file:

```
echo ”RUNNING THE SMON HANG COMMAND SCRIPT   (file=$1)”
mail –s ’SMON hang file’ dtg@cray.com < $1
exit 0
```

If the file does not exist or the user running SMON does not have execute permission, SMON does not make the `system( )` call.

How Do I Interpret the SMON Output File?

To interpret the output file, start with the `Failure Analysis` information. Because the output file is different for every trigger, you should use the `Failure Analysis` information as a starting point to guide you through the output file.

Examples of Interpreting the Output

The following two examples illustrate how you can interpret the output file that SMON generates. These examples show:

- An ORE interrupt in the OS kernel
- A software trap in the user code

The "Appendix" of this document contains the complete output files for these examples.

ORE Interrupt in OS Kernel

View the `Failure Analysis` information. The highlighted text in Figure 9 indicates that the CPU triggered on a kernel hardware trigger sequence.

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                   Failure Analysis
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

** Hardware failure occurred within the UNICOS kernel
   (UNICOS revision:   8.0.2.4 or beyond)


Failing Exchange Package (read from Cray memory @ 1100):
----------------------------------------------------------------
P    00007752525d  A0 007775 140113   IMODES 176000
IBA  00000000000   A1 000000 000000   IFLAGS 010000
ILA  01777776000   A2 000003 027606
DBA  00000000000   A3 000000 000200    *IRP   RPE
DLA  01777776000   A4 000000 002135    *IUM   MEU
                   A5 000000 001750    *IFP   FPE
PN 04 XA 1100      A6 000000 000165    *IOR  *ORE
CN 01 VL 200       A7 007775 140016    *IPR   PRE
                                       *FEX   EEX
MODES 17 – *C90  *ESL  *BDM  *MM        IBP   BPI
STATS 01 –  VNU   FPS   WS   *PS        ICM   MEC
                                        IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 000165          IIP   ICP
S2 000000 000000 000000 000001          IIO   IOI
S3 004211 137646 123450 164211          IPC   PCI
S4 000006 103030 000000 000000          IDL   DL
S5 004400 002010 000037 155153          IMI   MII
S6 000000 000000 000000 000040          FNX   NEX
S7 000000 000000 000000 000000
```

Figure 9. ORE Interrupt Failure Analysis Information

Because hardware triggers occur after a CPU exchanges with an unexpected flag, you should view the `Failing Exchange Package` information in the `Failure Analysis` block to determine which unexpected interrupt(s) occurred. SMON marks any interrupts that occur with an asterisk (`*`).

The highlighted text in Figure 10 shows that an unexpected ORE interrupt occurred in the OS kernel.

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                    Failure Analysis
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

** Hardware failure occurred within the UNICOS kernel
   (UNICOS revision:   8.0.2.4 or beyond)


Failing Exchange Package (read from Cray memory @ 1100):
----------------------------------------------------------------
P    00007752525d  A0 007775 140113   IMODES 176000
IBA  00000000000   A1 000000 000000   IFLAGS 010000
ILA  01777776000   A2 000003 027606
DBA  00000000000   A3 000000 000200    *IRP   RPE
DLA  01777776000   A4 000000 002135    *IUM   MEU
                   A5 000000 001750    *IFP   FPE
PN 04 XA 1100      A6 000000 000165    *IOR  *ORE
CN 01 VL 200       A7 007775 140016    *IPR   PRE
                                       *FEX   EEX
MODES 17 - *C90  *ESL  *BDM  *MM        IBP   BPI
STATS 01 -  VNU   FPS   WS   *PS        ICM   MEC
                                        IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 000165          IIP   ICP
S2 000000 000000 000000 000001          IIO   IOI
S3 004211 137646 123450 164211          IPC   PCI
S4 000006 103030 000000 000000          IDL   DL
S5 004400 002010 000037 155153          IMI   MII
S6 000000 000000 000000 000040          FNX   NEX
S7 000000 000000 000000 000000
```

Figure 10. ORE Interrupt Occurred

Scan backwards through the DM buffer data to determine the most recent memory references. In this example, the last memory reference that issued before the trigger was the 121700 instruction, as shown by the highlighted text in Figure 11.

Event	P Register	CIP	Coincidence	Hold Issue Conditions									IB Data	Fetch	Wait	CIP
				JB	JA	MEM	SR	FU	BT	V	S	A	Valid	Quiet	Exch	Valid
000	0007752400c	075605	5	0	0	0	0	0	0	0	0	0	1	0	0	1
001	0007752400d	040640	5	0	0	0	0	0	0	0	0	0	1	0	0	1
002	0007752401c	051576	5	0	0	0	0	0	0	0	0	0	1	0	0	1
003	0007752401d	074705	5	0	0	0	0	0	0	0	0	0	1	0	0	1
004	0007752402a	040740	5	0	0	0	0	0	0	0	0	0	1	0	0	1
005	0007752402d	051657	5	0	0	0	0	0	0	0	0	0	1	0	0	1
006	0007752403a	040700	5	0	0	0	0	0	0	0	0	0	1	0	0	1
007	0007752403d	051567	5	0	0	0	0	0	0	0	0	0	1	1	0	1
010	0007752404a	130500	5	0	0	0	0	0	0	0	0	0	1	1	0	1
011	0007752404d	024162	5	0	0	0	0	0	0	0	0	0	1	1	0	1
012	0007752405a	101700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
013	0007752405d	042775	5	0	0	0	0	0	0	0	0	0	1	1	0	1
014	0007752406a	071617	5	0	0	0	0	0	0	0	0	1	1	1	0	1
015	0007752406b	046067	5	0	0	0	0	0	0	0	1	0	1	1	0	1
016	0007752406c	015000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
017	0007752407b	024702	5	0	0	0	0	0	0	0	0	0	1	1	0	1
020	0007752407c	117100	5	0	0	0	0	0	0	0	0	0	1	1	0	1
021	0007752410b	101600	5	0	0	0	0	0	0	0	0	0	1	1	0	1
022	0007752411a	042776	5	0	0	0	0	0	0	0	0	0	1	1	0	1
023	0007752411b	071116	5	0	0	0	0	0	0	0	0	1	1	1	0	1
024	0007752411c	137100	5	0	0	0	0	0	0	0	1	0	1	1	0	1
025	0007752412b	101600	5	0	0	0	0	0	0	0	0	0	1	1	0	1
026	0007752413a	071616	5	0	0	0	0	0	0	0	0	1	1	1	0	1
027	0007752413b	046067	5	0	0	0	0	0	0	0	1	0	1	1	0	1
030	0007752413c	015000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
031	0007752416c	121700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
032	0007752417b	040600	5	0	0	0	0	0	0	0	0	0	1	1	0	1
033	0007752420a	044076	5	0	0	0	0	0	0	0	1	0	1	1	0	1
034	0007752420b	015000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
035	0007752421a	042277	5	0	0	0	0	0	0	0	0	0	1	1	0	1
036	0007752421b	006000	5	0	0	0	0	0	0	0	0	0	0	1	0	1
037	0007752422b	020700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
040	0007752423a	023620	5	0	0	0	0	0	0	0	0	0	1	1	0	1
041	0007752423b	032567	5	0	0	0	0	0	0	0	0	1	1	1	0	1
042	0007752423c	024702	5	0	0	0	0	0	0	0	0	0	1	1	0	1
043	0007752423d	137200	5	0	0	0	0	0	0	0	0	0	1	1	0	1
044	0007752424c	023610	5	0	0	0	0	0	0	0	0	0	1	1	0	1
045	0007752424d	030456	5	0	0	0	0	0	0	0	0	1	1	1	0	1
046	0007752425a	104200	5	0	0	0	0	0	0	0	0	1	1	1	0	1
047	0007752425d	117200	5	0	0	0	0	0	0	0	0	1	1	1	0	1
050	0007752426c	071002	5	0	0	0	0	0	0	0	0	0	1	1	0	1
051	0007752426d	014000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
052	0007752427c	111200	5	0	0	0	0	0	0	0	0	0	1	1	0	1
053	0007752430b	102700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
054	0007752431a	111700	5	0	0	0	0	0	0	0	0	1	1	1	0	1
055	0007752431d	102700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
056	0007752432c	117100	5	0	0	0	0	0	0	0	0	1	1	1	0	1
057	0007752433b	112100	5	0	0	0	0	0	0	0	0	0	1	1	0	1
060	0007752434a	006000	5	0	0	0	0	0	0	0	0	0	0	1	0	1
061	0007752455a	022703	6	0	0	0	0	0	0	0	0	0	1	0	0	1
062	0007752455b	111700	6	0	0	0	0	0	0	0	0	0	1	0	0	1
063	0007752456a	074064	6	0	0	0	0	0	0	0	0	0	1	0	0	1
064	0007752456b	015000	6	0	0	0	0	0	0	0	1	0	1	0	0	1
065	0007752457a	024752	6	0	0	0	0	0	0	0	0	0	1	1	0	1
066	0007752457b	071017	6	0	0	0	0	0	0	0	0	0	1	1	0	1
067	0007752457c	014000	6	0	0	0	0	0	0	0	1	0	1	1	0	1
070	0007752522d	043700	7	0	0	0	0	0	0	0	0	0	1	0	0	1
071	0007752523a	024702	7	0	0	0	0	0	0	0	0	0	1	0	0	1
072	0007752523b	137700	7	0	0	0	0	0	0	0	0	0	1	0	0	1
073	0007752524a	024702	7	0	0	0	0	0	0	0	0	0	1	0	0	1
074	0007752524b	107100	7	0	0	0	0	0	0	0	0	0	1	0	0	1
075	0007752525a	121700	7	0	0	0	0	0	0	0	0	1	1	0	0	1
076	0005652547c	002770	0	0	0	0	0	0	0	0	0	0	1	0	0	1
077	0005652547d	001000	0	1	0	0	0	0	0	0	0	0	1	0	0	1

Figure 11. Most Recent Memory Reference Instruction

The data listed in the `Coincidence` column of the DM buffer data indicates the instruction issued from instruction buffer 7, as shown by the highlighted text in Figure 12.

```
Event   P Register    CIP    Coincidence   Hold Issue Conditions    IB Data  Fetch  Wait   CIP
                                          JB JA MEM SR FU BT V S A   Valid   Quiet  Exch  Valid

075     0007752525a  121700       7       0  0   0  0  0  0  0 0 1    1       0      0      1
076     0005652547c  002770       0       0  0   0  0  0  0  0 0 0    1       0      0      1
077     0005652547d  001000       0       1  0   0  0  0  0  0 0 0    1       0      0      1
```

Figure 12. Instruction Issued from Instruction Buffer 7

View the data from instruction buffer 7. The instruction buffer data indicates that a fetch problem caused the ORE interrupt. The CPU picked bit 3 when fetching data into instruction buffer number 7, indicated by the difference value of 000010 shown in Figure 13. This resulted in a reference to memory address 02001340075, which is greater than the data limit address (DLA) of 01777776000, shown by the highlighted text in Figure 14.

```
INSTRUCTION BUFFER 7    (Memory IBA 0000000000)
-----------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)                DIFFERENCE
0007752500  000171 006000 052513 000177  00   000171 006000 052513 000177    ------ ------ ------ ------
0007752501  024756 071017 014000 052513  01   024756 071017 014000 052513    ------ ------ ------ ------
0007752502  000177 003416 120000 025452  02   000177 003416 120000 025452    ------ ------ ------ ------
0007752503  000025 015000 052426 000177  03   000025 015000 052426 000177    ------ ------ ------ ------
0007752504  120000 025447 000025 014000  04   120000 025447 000025 014000    ------ ------ ------ ------
0007752505  052456 000177 020700 025445  05   052456 000177 020700 025445    ------ ------ ------ ------
0007752506  000025 025751 022710 025750  06   000025 025751 022710 025750    ------ ------ ------ ------
0007752507  043700 040740 002174 000000  07   043700 040740 002174 000000    ------ ------ ------ ------
0007752510  040600 155153 000037 051576  10   040600 155153 000037 051576    ------ ------ ------ ------
0007752511  075561 020600 155272 000037  11   075561 020600 155272 000037    ------ ------ ------ ------
0007752512  007000 110253 000133 006000  12   007000 110253 000133 006000    ------ ------ ------ ------
0007752513  052466 000177 024765 043701  13   052466 000177 024765 043701    ------ ------ ------ ------
0007752514  057707 130700 025447 000025  14   057707 130700 025447 000025    ------ ------ ------ ------
0007752515  002700 003616 024765 071717  15   002700 003616 024765 071717    ------ ------ ------ ------
0007752516  054771 043600 075605 040640  16   054771 043600 075605 040640    ------ ------ ------ ------
0007752517  000000 000400 051576 074705  17   000000 000400 051576 074705    ------ ------ ------ ------
0007752520  040740 002174 000000 051657  20   040740 002174 000000 051657    ------ ------ ------ ------
0007752521  040700 155153 000037 051567  21   040700 155153 000037 051567    ------ ------ ------ ------
0007752522  130500 025450 000025 043700  22   130500 025450 000025 043700    ------ ------ ------ ------
0007752523  024702 137700 000057 000000  23   024702 137700 000057 000000    ------ ------ ------ ------
0007752524  024702 107100 000057 000000  24   024702 107100 000057 000010    ------ ------ ------ 000010
0007752525  121700 025436 000025 024702  25   121700 025436 000025 024702    ------ ------ ------ ------
0007752526  040600 000020 000000 075605  26   040600 000020 000000 075605    ------ ------ ------ ------
0007752527  127600 000057 000000 074505  27   127600 000057 000000 074505    ------ ------ ------ ------
0007752530  027670 137700 000063 000000  30   027670 137700 000063 000000    ------ ------ ------ ------
0007752531  071716 061475 046375 137700  31   071716 061475 046375 137700    ------ ------ ------ ------
0007752532  000060 000000 050453 051004  32   000060 000000 050453 051004    ------ ------ ------ ------
0007752533  016000 056440 000177 020700  33   016000 056440 000177 020700    ------ ------ ------ ------
0007752534  001750 000000 022620 023560  34   001750 000000 022620 023560    ------ ------ ------ ------
0007752535  032656 032557 024702 107100  35   032656 032557 024702 107100    ------ ------ ------ ------
0007752536  000060 000000 075603 030761  36   000060 000000 075603 030761    ------ ------ ------ ------
0007752537  040700 000100 000000 127600  37   040700 000100 000000 127600    ------ ------ ------ ------
```

Figure 13. Instruction Buffer 7 Contents

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                        Failure Analysis
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

** Hardware failure occurred within the UNICOS kernel
   (UNICOS revision:   8.0.2.4 or beyond)


Failing Exchange Package (read from Cray memory @ 1100):
----------------------------------------------------------------
P    00007752525d  A0 007775 140113   IMODES 176000
IBA  00000000000   A1 000000 000000   IFLAGS 010000
ILA  01777776000   A2 000003 027606
DBA  00000000000   A3 000000 000200    *IRP   RPE
DLA  01777776000   A4 000000 002135    *IUM   MEU
                   A5 000000 001750    *IFP   FPE
PN 04 XA 1100      A6 000000 000165    *IOR  *ORE
CN 01 VL 200       A7 007775 140016    *IPR   PRE
                                       *FEX   EEX
MODES 17 - *C90  *ESL  *BDM  *MM        IBP   BPI
STATS 01 -  VNU   FPS   WS   *PS        ICM   MEC
                                        IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 000165          IIP   ICP
S2 000000 000000 000000 000001          IIO   IOI
S3 004211 137646 123450 164211          IPC   PCI
S4 000006 103030 000000 000000          IDL   DL
S5 004400 002010 000037 155153          IMI   MII
S6 000000 000000 000000 000040          FNX   NEX
S7 000000 000000 000000 000000
```

Figure 14. Data Limit Address

Software Trap in User Code

View the `Failure Analysis` information. SMON indicates a `Software failure` caused the trigger, as shown by the highlighted text in Figure 15.

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                    Failure Analysis
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

** Software failure occurred within a user job running under UNICOS
   (UNICOS revision:   8.0.2.4 or beyond)


Failing Exchange Package:
-------------------------
(For a SOFTWARE failure, the failing exchange package is the
 'EXCHANGE PACKAGE in the CPU before IB dump', which is shown
 in the 'Instruction Buffer Dump' section of this file.)
```

Figure 15. User Code Software Trap Failure Analysis Information

User software trigger sequences are compiled within a user program to trap a software problem. The output is meaningful only to the programmer or analyst who placed the trigger sequence in the code. Obtain the consent of the system administrator and Cray Research personnel responsible for the system before using the software trigger sequences.

Figure 16 shows the source code used in this example. This code illustrates how an analyst should first identify a failure condition and then strategically place the user software trigger in the code to troubleshoot the problem.

C Source Code:

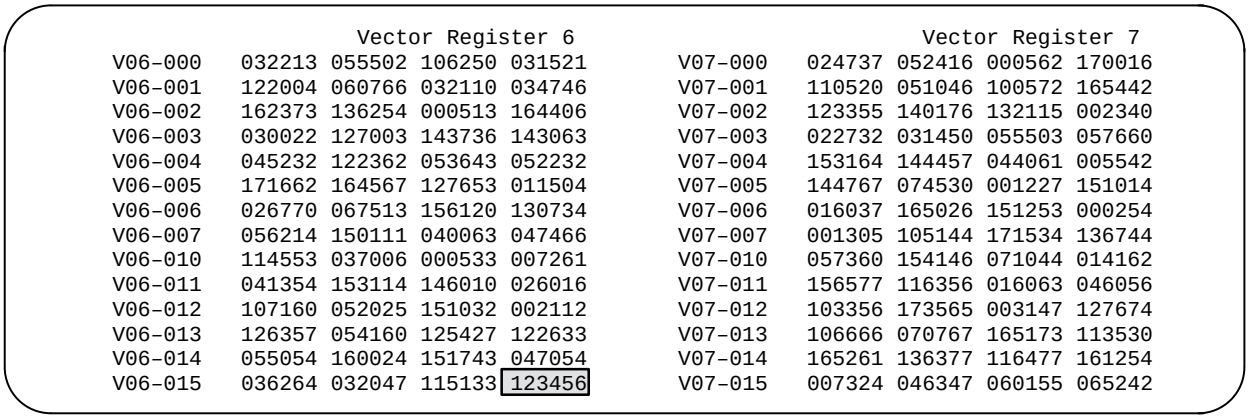
```
/*************************************************************
* USER_SW.C – Demonstrates use of the SMON software trap.    *
*             Two integer arrays are initialized to non–zero *
*             values.  The data in the arrays are randomized *
*             until the defined failure condition is met.    *
*************************************************************/
extern void SmonTrap();
#define FAILING_CONDITION ((Va[015] & 0177777) == 0123456)
#define VL 0155
main()
{
    int Element, Va[VL], Vb[VL];

    for(Element=0; Element<VL; Element++)
       Va[Element] = Vb[Element] = Element+1;

    while(! FAILING_CONDITION)
       for(Element=0; Element<VL; Element++)
       {
           Vb[Element] = (Va[Element]<<1) + (Vb[Element]>>1);
           Va[Element] = (Va[Element]>>1) + (Vb[Element]<<1);
       }

    SmonTrap();     /* issue user–software trigger sequence */
}
```

Assembly Source Code for Trap Routine:

```
*************************************************************
* SMON_TRAP.S –     SMON user–software trigger sequence.     *
*************************************************************
             IDENT    SmonTrap

SmonTrap     ENTER

             VWD      D'16/O'002740   ; DM trigger instruction
             VWD      D'16/O'001000   ; indicates online trap
             VWD      D'16/O'001000   ; extra pad for ibdump

             EXIT
```

Figure 16. User Source Code

The failing condition is shown in element 15 of vector register 6. Parcel 3 equals 123456. Refer to Figure 17.



	Vector Register 6					Vector Register 7			
V06–000	032213	055502	106250	031521	V07–000	024737	052416	000562	170016
V06–001	122004	060766	032110	034746	V07–001	110520	051046	100572	165442
V06–002	162373	136254	000513	164406	V07–002	123355	140176	132115	002340
V06–003	030022	127003	143736	143063	V07–003	022732	031450	055503	057660
V06–004	045232	122362	053643	052232	V07–004	153164	144457	044061	005542
V06–005	171662	164567	127653	011504	V07–005	144767	074530	001227	151014
V06–006	026770	067513	156120	130734	V07–006	016037	165026	151253	000254
V06–007	056214	150111	040063	047466	V07–007	001305	105144	171534	136744
V06–010	114553	037006	000533	007261	V07–010	057360	154146	071044	014162
V06–011	041354	153114	146010	026016	V07–011	156577	116356	016063	046056
V06–012	107160	052025	151032	002112	V07–012	103356	173565	003147	127674
V06–013	126357	054160	125427	122633	V07–013	106666	070767	165173	113530
V06–014	055054	160024	151743	047054	V07–014	165261	136377	116477	161254
V06–015	036264	032047	115133	123456	V07–015	007324	046347	060155	065242

Figure 17. Failing Condition in Element 15 of Vector Register 7

The scalar compare instruction (046057) recorded in the DM buffer is where the failing condition was flagged. Refer to Figure 18.

Event	P Register	CIP	Coincidence	Hold Issue Conditions									IB Data	Fetch	Wait	CIP
				JB	JA	MEM	SR	FU	BT	V	S	A	Valid	Quiet	Exch	Valid
000	0000001000a	176500	4	0	0	0	0	0	0	0	0	0	1	1	0	1
001	0000001000b	025003	4	0	1	0	0	0	0	0	0	0	1	1	0	1
002	0000001000c	150450	4	0	0	0	0	0	0	0	0	0	1	1	0	1
003	0000001000d	020600	4	0	0	0	0	0	0	0	0	0	1	1	0	1
004	0000001001c	030056	4	0	0	0	0	0	0	0	0	0	1	1	0	1
005	0000001001d	176300	4	0	0	0	0	0	0	0	0	1	1	1	0	1
006	0000001002a	042760	4	0	1	0	0	0	0	0	0	0	1	1	0	1
007	0000001002b	151230	4	0	0	0	0	1	0	0	0	0	1	1	0	1
010	0000001002c	155142	4	0	0	0	0	0	0	0	0	0	1	1	0	1
011	0000001002d	177010	4	0	0	0	0	0	0	0	0	0	1	1	0	1
012	0000001003a	024003	4	0	1	0	0	0	0	0	0	0	1	1	0	1
013	0000001003b	151050	4	0	0	0	0	1	0	0	0	0	1	1	0	1
014	0000001003c	150710	4	0	0	0	0	1	0	1	0	0	1	1	0	1
015	0000001003d	155607	4	0	0	0	0	0	0	0	0	0	1	1	0	1
016	0000001004a	177060	4	0	0	0	0	0	0	0	0	0	1	1	0	1
017	0000001004b	125600	4	0	1	1	0	0	0	0	0	0	1	1	0	1
020	0000001005a	044576	4	0	0	0	0	0	0	0	1	0	1	1	0	1
021	0000001005b	040700	4	0	0	0	0	0	0	0	0	0	1	1	0	1
022	0000001006a	046057	4	0	0	0	0	0	0	0	0	0	1	1	0	1
023	0000001006b	015000	4	0	0	0	0	0	0	0	1	0	1	1	0	1
024	0000000776b	020700	3	0	0	0	0	0	0	0	0	0	1	1	0	1
025	0000000777a	024502	3	0	0	0	0	0	0	0	0	0	1	1	0	1
026	0000000777b	022605	3	0	0	0	0	0	0	0	0	0	0	1	0	1
027	0000000777c	030056	4	0	0	0	0	0	0	0	0	0	0	1	0	1
030	0000000777d	002007	4	0	0	0	0	0	0	0	0	0	0	1	0	1
031	0000001000a	176500	4	0	0	0	0	0	0	0	0	0	1	1	0	1
032	0000001000b	025003	4	0	1	0	0	0	0	0	0	0	1	1	0	1
033	0000001000c	150450	4	0	0	0	0	0	0	0	0	0	1	1	0	1
034	0000001000d	020600	4	0	0	0	0	0	0	0	0	0	1	1	0	1
035	0000001001c	030056	4	0	0	0	0	0	0	0	0	0	1	1	0	1
036	0000001001d	176300	4	0	0	0	0	0	0	0	0	1	1	1	0	1
037	0000001002a	042760	4	0	1	0	0	0	0	0	0	0	1	1	0	1
040	0000001002b	151230	4	0	0	0	0	1	0	0	0	0	1	1	0	1
041	0000001002c	155142	4	0	0	0	0	0	0	0	0	0	1	1	0	1
042	0000001002d	177010	4	0	0	0	0	0	0	0	0	0	1	1	0	1
043	0000001003a	024003	4	0	1	0	0	0	0	0	0	0	1	1	0	1
044	0000001003b	151050	4	0	0	0	0	1	0	0	0	0	1	1	0	1
045	0000001003c	150710	4	0	0	0	0	1	0	1	0	0	1	1	0	1
046	0000001003d	155607	4	0	0	0	0	0	0	0	0	0	1	1	0	1
047	0000001004a	177060	4	0	0	0	0	0	0	0	0	0	1	1	0	1
050	0000001004b	125600	4	0	1	1	0	0	0	0	0	0	1	1	0	1
051	0000001005a	044576	4	0	0	0	0	0	0	0	1	0	1	1	0	1
052	0000001005b	040700	4	0	0	0	0	0	0	0	0	0	1	1	0	1
053	0000001006a	046057	4	0	0	0	0	0	0	0	0	0	1	1	0	1
054	0000001006b	015000	4	0	0	0	0	0	0	0	1	0	1	1	0	1
055	0000001007a	020600	4	0	0	0	0	0	0	0	0	0	1	1	0	1
056	0000001007d	007000	4	0	0	0	0	0	0	0	0	0	0	1	0	1
057	0000000744a	020000	3	0	0	0	0	0	0	0	0	0	1	1	0	1
060	0000000744d	025077	3	0	0	0	0	0	0	0	0	0	1	1	0	1
061	0000000745a	022504	3	0	0	0	0	0	0	0	0	0	1	1	0	1
062	0000000745b	024066	3	0	0	0	0	0	0	0	0	0	1	1	0	1
063	0000000745c	035577	3	0	0	0	0	0	0	0	0	0	1	1	0	1
064	0000000745d	024766	3	0	0	0	0	0	1	0	0	0	1	1	0	1
065	0000000746a	022504	3	0	0	0	0	0	0	0	0	0	1	1	0	1
066	0000000746b	030557	3	0	0	0	0	0	0	0	0	0	1	1	0	1
067	0000000746c	025601	3	0	0	0	0	0	0	0	0	0	1	1	0	1
070	0000000746d	025702	3	0	0	0	0	0	0	0	0	0	1	1	0	1
071	0000000747a	024767	3	0	0	0	0	0	1	0	0	0	1	1	0	1
072	0000000747b	031075	3	0	0	0	0	0	0	0	0	0	1	1	0	1
073	0000000747c	025566	3	0	0	0	0	0	0	0	0	0	1	1	0	1
074	0000000747d	024702	3	0	0	0	0	0	1	0	0	0	1	1	0	1
075	0000000750a	013000	3	0	0	0	0	0	0	0	0	1	1	1	0	1
076	0000000750d	002740	3	0	0	0	0	0	0	0	0	0	1	1	0	1
077	0000000751a	001000	3	1	0	0	0	0	0	0	0	0	1	1	0	1

Figure 18. 046057 Instruction in the DM Buffer

The CPU does not exchange before a software trap. The failing exchange package is actually the current exchange package, which is labeled `EXCHANGE PACKAGE in the CPU before IB dump`.

In the failing exchange package for this example, S5 equals the test pattern in S7. Refer to Figure 19.

```
EXCHANGE PACKAGE in the CPU before IB dump
------------------------------------------
P    00000000751c  A0 000000 003421   IMODES 176665
IBA  00050740000   A1 000000 000005   IFLAGS 000000
ILA  00051130000   A2 000000 107333
DBA  00050740000   A3 000000 107672    *IRP   RPE
DLA  00051130000   A4 000000 113317    *IUM   MEU
                   A5 000000 107676    *IFP   FPE
PN 11 XA 0000      A6 000000 040273    *IOR   ORE
CN 15 VL 155       A7 000000 107672    *IPR   PRE
                                       *FEX   EEX
MODES 16 - *C90  *ESL  *BDM   MM        IBP   BPI
STATS 00 -  VNU   FPS   WS    PS       *ICM   MEC
                                       *IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 163160         *IIP   ICP
S2 000000 000000 000000 034654         *IIO   IOI
S3 000000 000000 000000 163060          IPC   PCI
S4 000000 000000 000000 163514         *IDL   DL
S5 000000 000000 000000 123456          IMI   MII
S6 036264 032047 115133 123456         *FNX   NEX
S7 000000 000000 000000 123456
```

Figure 19. Failing Exchange Package

Tips for Using SMON to Detect Uncorrectable Memory Errors

The following tips apply to using SMON with uncorrectable memory errors:

- In cases where the MEU occurred during a scalar register memory read, you can find the failing data pattern in the `Failing Exchange Package` data. First, identify which reference caused the MEU by finding the reference that was addressing the failing bank.

  For user jobs, the expected data pattern in memory is overwritten unless you selected a trigger action that causes the CPU to permanently hold issue after a trigger sequence. Otherwise, you can manually read the expected data pattern from memory with the `View -> Memory` menu button command in the LME base window.

- In cases where the MEU occurred while reading into the vector registers, the B registers, or the T registers, the failing data pattern is recorded in the register dump. Isolation in these cases will be more difficult.

- Do not use the LME `View -> Memory` utility to view mainframe memory after an uncorrectable memory error failure occurs unless the system has already crashed. The memory viewer utility uses a CPU's maintenance channel DMA port to read memory. If a maintenance channel read results in an MEU interrupt while the CPU is in a kernel process, the system will panic.

  If the system has not crashed, use the UNIX octal dump (`od`) utility or `crash` utility to view mainframe memory.

- In cases where the MEU occurred during a channel transfer, it is very difficult to locate the failing data pattern when the MEU occurs during a channel transfer.

Appendix

This appendix contains the complete SMON output for the two examples included in this document:

- An ORE interrupt in the OS kernel
- A software trap in the user code

ORE Interrupt in the OS Kernel

```
*************************************************************************
               LME-C90 4.1.8    System Monitor Dump Summary
S/N 4027   CPU 04 (logical 04) triggered at:  Mon Feb 13 13:55:39 1995
*************************************************************************


@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
               CPU/System Status
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


CPU Status:      100040 000103 177777 000000


CPU-related Status                                    System-related Status
------------------                                    ---------------------
Memory:         256K mode          = 0                System I/O Master Clear         = 0
                Half memory mode   = 0                System CPU Master Clear         = 0
                Half upper select  = 0
                                                      Function Error                  = 0
CPU:            Idle               = 0                System Error                    = 0


                I/O ECC Enabled    = 0                Control Cable Enables    0      = 1
                Test Mode          = 0                                         1      = 0
                Maint Restricted   = 0
                                                      Memory Priority                 = 03
Diag Monitor:   Active             = 0
                Parity Error       = 0                CPUs Present Mask               = 177777


Shared Register Select             = 0                CPU Parity Errors Mask          = 000000


Master CPU Select                  = 00


Memory Priority Check
---------------------
Memory priority is NOT LOCKED


@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
      DM Params set by the System Monitor (SMON)
         and the resulting DM data buffer
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


DM Params:
----------
MODES     02     DISA  *HICU   HICD   TPD   IBD   ECHO                  00: 005000
DATA      20    [LWR P] [CIP] [UPPR P] [COIN/HOLD]                     01: 101001
TP SEL    00    OPT=YE0                                                02: 000200
                                                                       03: 002740
EVENT     01    *VCIP   CIPM   PLPM   TP   ~TP   LEAD                  04: 177747
TRIGGER   02     VCIP  *CIPM   PLPM   TP   ~TP   LEAD                  05: 000000
TR MODE   1     *CPCT   TRCT                                           06: 000000
TR RESET  0      CIPM   PLPM                                           07: 000000
                                                                       10: 000000
DTC       000200                                                       11: 000000
                                                                       12: 000000
CIP VAL   002740              P VAL   0000000000a                      13: 000000
CIP MASK  177747              P MASK       00000a
```

```
TP0 (YE /xx /HA /DA )  00      TP4 (YG /YK0/JC /xx )  00
TP1 (YF0/xx /HC /DB )  00      TP5 (YH /YK1/JQ /JQ )  00
TP2 (YF1/YM0/JA /DC )  00      TP6 (YJ0/xx /VQ0/xx )  00
TP3 (YF2/YM1/JB /DD )  00      TP7 (YJ1/xx /VQ1/SIE)  00
```

DM Data:

Buffer Contains 64 valid words of DM data

Event	P Register	CIP	Coincidence	Hold Issue Conditions									IB Data Valid	Fetch Quiet	Wait Exch	CIP Valid
				JB	JA	MEM	SR	FU	BT	V	S	A				
000	0007752400c	075605	5	0	0	0	0	0	0	0	0	0	1	0	0	1
001	0007752400d	040640	5	0	0	0	0	0	0	0	0	0	1	0	0	1
002	0007752401c	051576	5	0	0	0	0	0	0	0	0	0	1	0	0	1
003	0007752401d	074705	5	0	0	0	0	0	0	0	0	0	1	0	0	1
004	0007752402a	040740	5	0	0	0	0	0	0	0	0	0	1	0	0	1
005	0007752402d	051657	5	0	0	0	0	0	0	0	0	0	1	0	0	1
006	0007752403a	040700	5	0	0	0	0	0	0	0	0	0	1	0	0	1
007	0007752403d	051567	5	0	0	0	0	0	0	0	0	0	1	1	0	1
010	0007752404a	130500	5	0	0	0	0	0	0	0	0	0	1	1	0	1
011	0007752404d	024162	5	0	0	0	0	0	0	0	0	0	1	1	0	1
012	0007752405a	101700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
013	0007752405d	042775	5	0	0	0	0	0	0	0	0	0	1	1	0	1
014	0007752406a	071617	5	0	0	0	0	0	0	0	0	1	1	1	0	1
015	0007752406b	046067	5	0	0	0	0	0	0	0	1	0	1	1	0	1
016	0007752406c	015000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
017	0007752407b	024702	5	0	0	0	0	0	0	0	0	0	1	1	0	1
020	0007752407c	117100	5	0	0	0	0	0	0	0	0	0	1	1	0	1
021	0007752410b	101600	5	0	0	0	0	0	0	0	0	0	1	1	0	1
022	0007752411a	042776	5	0	0	0	0	0	0	0	0	0	1	1	0	1
023	0007752411b	071116	5	0	0	0	0	0	0	0	0	1	1	1	0	1
024	0007752411c	137100	5	0	0	0	0	0	0	0	1	0	1	1	0	1
025	0007752412b	101600	5	0	0	0	0	0	0	0	0	0	1	1	0	1
026	0007752413a	071616	5	0	0	0	0	0	0	0	0	1	1	1	0	1
027	0007752413b	046067	5	0	0	0	0	0	0	0	1	0	1	1	0	1
030	0007752413c	015000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
031	0007752416c	121700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
032	0007752417b	040600	5	0	0	0	0	0	0	0	0	0	1	1	0	1
033	0007752420a	044076	5	0	0	0	0	0	0	0	1	0	1	1	0	1
034	0007752420b	015000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
035	0007752421a	042277	5	0	0	0	0	0	0	0	0	0	1	1	0	1
036	0007752421b	006000	5	0	0	0	0	0	0	0	0	0	0	1	0	1
037	0007752422b	020700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
040	0007752423a	023620	5	0	0	0	0	0	0	0	0	0	1	1	0	1
041	0007752423b	032567	5	0	0	0	0	0	0	0	0	1	1	1	0	1
042	0007752423c	024702	5	0	0	0	0	0	0	0	0	0	1	1	0	1
043	0007752423d	137200	5	0	0	0	0	0	0	0	0	0	1	1	0	1
044	0007752424c	023610	5	0	0	0	0	0	0	0	0	0	1	1	0	1
045	0007752424d	030456	5	0	0	0	0	0	0	0	0	1	1	1	0	1
046	0007752425a	104200	5	0	0	0	0	0	0	0	0	1	1	1	0	1
047	0007752425d	117200	5	0	0	0	0	0	0	0	0	1	1	1	0	1
050	0007752426c	071002	5	0	0	0	0	0	0	0	0	0	1	1	0	1
051	0007752426d	014000	5	0	0	0	0	0	0	0	1	0	1	1	0	1
052	0007752427c	111200	5	0	0	0	0	0	0	0	0	0	1	1	0	1
053	0007752430b	102700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
054	0007752431a	111700	5	0	0	0	0	0	0	0	0	1	1	1	0	1
055	0007752431d	102700	5	0	0	0	0	0	0	0	0	0	1	1	0	1
056	0007752432c	117100	5	0	0	0	0	0	0	0	0	1	1	1	0	1
057	0007752433b	112100	5	0	0	0	0	0	0	0	0	0	1	1	0	1
060	0007752434a	006000	5	0	0	0	0	0	0	0	0	0	0	1	0	1
061	0007752455a	022703	6	0	0	0	0	0	0	0	0	0	1	0	0	1
062	0007752455b	111700	6	0	0	0	0	0	0	0	0	0	1	0	0	1
063	0007752456a	074064	6	0	0	0	0	0	0	0	0	0	1	0	0	1
064	0007752456b	015000	6	0	0	0	0	0	0	0	1	0	1	0	0	1
065	0007752457a	024752	6	0	0	0	0	0	0	0	0	0	1	1	0	1
066	0007752457b	071017	6	0	0	0	0	0	0	0	0	0	1	1	0	1
067	0007752457c	014000	6	0	0	0	0	0	0	0	1	0	1	1	0	1
070	0007752522d	043700	7	0	0	0	0	0	0	0	0	0	1	0	0	1
071	0007752523a	024702	7	0	0	0	0	0	0	0	0	0	1	0	0	1
072	0007752523b	137700	7	0	0	0	0	0	0	0	0	0	1	0	0	1
073	0007752524a	024702	7	0	0	0	0	0	0	0	0	0	1	0	0	1
074	0007752524b	107100	7	0	0	0	0	0	0	0	0	0	1	0	0	1
075	0007752525a	121700	7	0	0	0	0	0	0	0	0	1	1	0	0	1
076	0005652547c	002770	0	0	0	0	0	0	0	0	0	0	1	0	0	1
077	0005652547d	001000	0	1	0	0	0	0	0	0	0	0	1	0	0	1

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                   Failure Analysis
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
```

** Hardware failure occurred within the UNICOS kernel
(UNICOS revision: 8.0.2.4 or beyond)

```
Failing Exchange Package (read from Cray memory @ 1100):
----------------------------------------------------------------
P    00007752525d  A0 007775 140113   IMODES 176000
IBA  00000000000   A1 000000 000000   IFLAGS 010000
```

```
ILA  01777776000   A2 000003 027606
DBA  00000000000   A3 000000 000200    *IRP   RPE
DLA  01777776000   A4 000000 002135    *IUM   MEU
                   A5 000000 001750    *IFP   FPE
PN 04 XA 1100      A6 000000 000165    *IOR  *ORE
CN 01 VL 200       A7 007775 140016    *IPR   PRE
                                       *FEX   EEX
MODES 17 – *C90  *ESL  *BDM  *MM        IBP   BPI
STATS 01 –  VNU   FPS   WS   *PS        ICM   MEC
                                        IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 000165          IIP   ICP
S2 000000 000000 000000 000001          IIO   IOI
S3 004211 137646 123450 164211          IPC   PCI
S4 000006 103030 000000 000000          IDL   DL
S5 004400 002010 000037 155153          IMI   MII
S6 000000 000000 000000 000040          FNX   NEX
S7 000000 000000 000000 000000

User Job Exchange Package (read from Cray memory @ 1140):
---------------------------------------------------------------
P    00000003526b  A0 000000 000004   IMODES 156665
IBA  00044734000   A1 000000 000004   IFLAGS 000000
ILA  00045210000   A2 000000 000006
DBA  00044734000   A3 000000 000055    *IRP   RPE
DLA  00045210000   A4 177777 177777    *IUM   MEU
                   A5 000000 023573     IFP   FPE
PN 04 XA 1140      A6 000000 023776    *IOR   ORE
CN 15 VL 200       A7 000000 002003    *IPR   PRE
                                       *FEX   EEX
MODES 14 – *C90  *ESL   BDM   MM        IBP   BPI
STATS 04 –  VNU  *FPS   WS    PS       *ICM   MEC
                                       *IMC   MCU
S0 000000 000000 000000 000055          IRT   RTI
S1 000000 034250 102040 151622         *IIP   ICP
S2 000000 000000 000000 000055         *IIO   IOI
S3 177777 177777 177777 177777          IPC   PCI
S4 177777 177777 177777 177777         *IDL   DL
S5 000000 000700 000000 000000          IMI   MII
S6 000000 000000 000003 177777         *FNX   NEX
S7 000000 000000 000000 000077

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                Instruction Buffer Dump
          (with buffer–to–memory data compare)
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

INSTRUCTION BUFFER 0    (Memory IBA 0000000000)
----------------------------------------------
ADDRESS     EXPECTED (memory)                ACTUAL (IB data)               DIFFERENCE
0005652540  073701 054724 055704 023670  00  073701 054724 055704 023670    ------ ------ ------ ------
0005652541  020200 000133 000000 032662  01  020200 000133 000000 032662    ------ ------ ------ ------
0005652542  020200 010565 000001 030662  02  020200 010565 000001 030662    ------ ------ ------ ------
0005652543  106100 000104 000000 121500  03  106100 000104 000000 121500    ------ ------ ------ ------
0005652544  000006 000000 043720 045557  04  000006 000000 043720 045557    ------ ------ ------ ------
0005652545  131500 000006 000000 120300  05  131500 000006 000000 120300    ------ ------ ------ ------
0005652546  050247 000027 120400 050250  06  050247 000027 120400 050250    ------ ------ ------ ------
0005652547  000027 004000 002770 001000  07  000027 004000 002770 001000    ------ ------ ------ ------
0005652550  001000 002770 001000 001000  10  001000 002770 001000 001000    ------ ------ ------ ------
0005652551  100000 152005 000023 011000  11  100000 152005 000023 011000    ------ ------ ------ ------
0005652552  037463 000135 100000 023243  12  037463 000135 100000 023243    ------ ------ ------ ------
0005652553  000022 010000 052732 000135  13  000022 010000 052732 000135    ------ ------ ------ ------
0005652554  100100 016255 000022 001413  14  100100 016255 000022 001413    ------ ------ ------ ------
0005652555  020100 000500 000000 022720  15  020100 000500 000000 022720    ------ ------ ------ ------
0005652556  022404 032474 073701 054724  16  022404 032474 073701 054724    ------ ------ ------ ------
0005652557  055704 023770 032474 030114  17  055704 023770 032474 030114    ------ ------ ------ ------
0005652560  030501 040100 000021 000000  20  030501 040100 000021 000000    ------ ------ ------ ------
0005652561  071201 020600 050274 000027  21  071201 020600 050274 000027    ------ ------ ------ ------
0005652562  007000 175573 000133 024601  22  007000 175573 000133 024601    ------ ------ ------ ------
0005652563  024702 030105 073701 054724  23  024702 030105 073701 054724    ------ ------ ------ ------
0005652564  055704 023670 020700 000133  24  055704 023670 020700 000133    ------ ------ ------ ------
0005652565  000000 032667 020700 010565  25  000000 032667 020700 010565    ------ ------ ------ ------
0005652566  000001 030667 001302 073201  26  000001 030667 001302 073201    ------ ------ ------ ------
0005652567  054224 055204 022303 023420  27  054224 055204 022303 023420    ------ ------ ------ ------
0005652570  032334 121400 000000 000000  30  032334 121400 000000 000000    ------ ------ ------ ------
0005652571  133400 063522 000001 073671  31  133400 063522 000001 073671    ------ ------ ------ ------
0005652572  133600 063523 000001 002700  32  133600 063523 000001 002700    ------ ------ ------ ------
0005652573  073771 133700 063524 000001  33  073771 133700 063524 000001    ------ ------ ------ ------
0005652574  043300 073375 121100 000006  34  043300 073375 121100 000006    ------ ------ ------ ------
0005652575  000000 051201 055220 051301  35  000000 051201 055220 051301    ------ ------ ------ ------
0005652576  054260 051002 015000 053006  36  054260 051002 015000 053006    ------ ------ ------ ------
0005652577  000135 120500 050210 000027  37  000135 120500 050210 000027    ------ ------ ------ ------
```

```
INSTRUCTION BUFFER 1    (Memory IBA unknown)
-------------------------------------------------
ADDRESS     EXPECTED (memory)                ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  000177 121700 000005 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  043601 044076 015000 051057    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  000177 121000 000156 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  015000 051057 000177 121000    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  000155 000000 121100 000022    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  000000 015000 051057 000177    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  054160 053120 015000 051057    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  000177 121700 000022 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  054740 053720 121100 000005    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  000000 015000 051057 000177    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  040700 000200 000000 051617    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  131600 000005 000000 121000    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  000162 000000 015000 051142    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  000177 020700 002225 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  042777 024664 040740 000664    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  020000 030567 022716 024602    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  136700 000016 000000 116500    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  000017 000000 030676 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  035460 000133 024702 137100    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  000067 000000 024702 127000    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  000067 000000 014000 051142    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  000177 024702 127100 000056    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  000000 024002 024202 022110    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  025066 034177 030021 022106    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  036100 005000 024761 127200    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  000207 000000 024702 137200    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  000024 000000 051002 014000    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  051476 000177 061002 075200    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  017000 051222 000177 042776    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  024602 040740 000677 020000    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  040600 155161 000037 040500    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  155163 000037 040400 000677    ------ ------ ------ ------

INSTRUCTION BUFFER 2    (Memory IBA unknown)
-------------------------------------------------
ADDRESS     EXPECTED (memory)                ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  000000 044076 015000 051431    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  000177 101700 000004 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  042777 071617 046067 101200    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  000021 000000 015000 051476    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  000177 040700 000031 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  071612 061076 016000 051476    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  000177 040700 000000 000002    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  044017 014000 051463 000177    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  043700 040740 002000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  044017 014000 051463 000177    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  041700 000000 000002 024702    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  044117 137100 000025 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  006000 051473 000177 040700    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  000000 000002 024702 051117    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  137100 000025 000000 131100    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  000005 000000 024764 127000    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  003031 000000 017000 051561    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  000177 024762 107600 000012    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  000000 071006 015000 051677    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  000177 020700 000223 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  042777 024664 040740 000752    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  020000 030567 022716 024602    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  136700 000016 000000 116500    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  000017 000000 030676 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  036674 000133 120000 010533    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  000001 014000 051677 000177    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  020600 155267 000037 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  172713 000132 006000 051677    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  000177 024761 127700 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  000000 040600 100000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  044076 015000 051677 000177    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  024764 040700 000010 000000    ------ ------ ------ ------

INSTRUCTION BUFFER 3    (Memory IBA unknown)
-------------------------------------------------
ADDRESS     EXPECTED (memory)                ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  037043 000133 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  073163 060566 062440 020040    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  000000 000000 000005 000005    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  000000 000000 000133 036674    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  000400 000000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  000000 000000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  000000 000000 000000 000004    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  000000 000000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  073162 062563 072040 020040    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  000000 000000 000005 000005    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  000000 000000 000133 037020    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  000400 000000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  000000 000000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  000000 000000 000000 000004    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  000000 000000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  020000 147542 000026 025077    ------ ------ ------ ------
```

```
----------  ------ ------ ------ ------  20  022504 024066 035577 024766    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  022504 030557 025601 025702    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  024767 031075 025566 024702    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  013000 036554 000133 106100    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  000001 000000 024664 126000    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  003031 000000 126100 002224    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  000000 017000 037012 000133    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  024563 105300 000016 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  030113 002003 040200 000002    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  000000 061012 014000 036756    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  000133 016000 037012 000133    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  030001 177010 030113 030001    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  177020 143777 030113 030001    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  177030 143666 030113 030001    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  177040 030113 030001 177050    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  030113 030001 177060 001302    ------ ------ ------ ------

INSTRUCTION BUFFER 4    (Memory IBA unknown)
-------------------------------------------
ADDRESS     EXPECTED (memory)               ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  030113 030001 040100 000010    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  000000 001302 136100 002224    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  000000 177070 024702 030070    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  025766 022703 034700 005000    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  020000 147551 000026 025077    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  022504 024066 035577 024766    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  022504 030557 025601 025702    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  024767 031075 025566 024702    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  013000 036567 000133 024664    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  126000 003031 000000 126100    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  002224 000000 040200 000002    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  000000 017000 037131 000133    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  061012 017000 037131 000133    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  024563 105300 000016 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  020500 000223 000000 030165    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  030113 002003 030001 176100    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  014000 037125 000133 030113    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  030001 176200 030113 030001    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  176300 030113 030001 176400    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  030113 030001 176500 030113    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  030001 176600 030113 030001    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  176700 042177 136100 002224    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  000000 024702 030070 025766    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  022703 034700 005000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  020100 024043 024565 072163    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  027543 030457 066544 027541    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  072155 074143 064147 027163    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  020040 020040 020040 020070    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  030056 032440 020040 020060    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  034457 030062 027471 031040    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  030461 035061 033072 030066    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  000000 000000 000000 000000    ------ ------ ------ ------

INSTRUCTION BUFFER 5    (Memory IBA 0000000000)
-----------------------------------------------
ADDRESS     EXPECTED (memory)               ACTUAL (IB data)              DIFFERENCE
0007752400  054771 043600 075605 040640  00  054771 043600 075605 040640    ------ ------ ------ ------
0007752401  000000 000400 051576 074705  01  000000 000400 051576 074705    ------ ------ ------ ------
0007752402  040740 002010 000000 051657  02  040740 002010 000000 051657    ------ ------ ------ ------
0007752403  040700 155153 000037 051567  03  040700 155153 000037 051567    ------ ------ ------ ------
0007752404  130500 025450 000025 024162  04  130500 025450 000025 024162    ------ ------ ------ ------
0007752405  101700 000004 000000 042775  05  101700 000004 000000 042775    ------ ------ ------ ------
0007752406  071617 046067 015000 052270  06  071617 046067 015000 052270    ------ ------ ------ ------
0007752407  000177 024702 117100 000070  07  000177 024702 117100 000070    ------ ------ ------ ------
0007752410  000000 101600 000021 000000  10  000000 101600 000021 000000    ------ ------ ------ ------
0007752411  042776 071116 137100 000072  11  042776 071116 137100 000072    ------ ------ ------ ------
0007752412  000000 101600 000004 000000  12  000000 101600 000004 000000    ------ ------ ------ ------
0007752413  071616 046067 015000 052072  13  071616 046067 015000 052072    ------ ------ ------ ------
0007752414  000177 002700 004000 040700  14  000177 002700 004000 040700    ------ ------ ------ ------
0007752415  155167 000037 130700 005031  15  155167 000037 130700 005031    ------ ------ ------ ------
0007752416  000000 002700 121700 000005  16  000000 002700 121700 000005    ------ ------ ------ ------
0007752417  000000 040600 000040 000000  17  000000 040600 000040 000000    ------ ------ ------ ------
0007752420  044076 015000 052110 000177  20  044076 015000 052110 000177    ------ ------ ------ ------
0007752421  042277 006000 052111 000177  21  042277 006000 052111 000177    ------ ------ ------ ------
0007752422  043200 020700 001750 000000  22  043200 020700 001750 000000    ------ ------ ------ ------
0007752423  023620 032567 024702 137200  23  023620 032567 024702 137200    ------ ------ ------ ------
0007752424  000071 000000 023610 030456  24  000071 000000 023610 030456    ------ ------ ------ ------
0007752425  104200 021456 000025 117200  25  104200 021456 000025 117200    ------ ------ ------ ------
0007752426  000067 000000 071002 014000  26  000067 000000 071002 014000    ------ ------ ------ ------
0007752427  052163 000177 111200 000025  27  052163 000177 111200 000025    ------ ------ ------ ------
0007752430  000000 102700 000026 000000  30  000000 102700 000026 000000    ------ ------ ------ ------
0007752431  111700 000026 000000 102700  31  111700 000026 000000 102700    ------ ------ ------ ------
0007752432  000026 000000 117100 000025  32  000026 000000 117100 000025    ------ ------ ------ ------
0007752433  000000 112100 000026 000000  33  000000 112100 000026 000000    ------ ------ ------ ------
0007752434  006000 052264 000177 071730  34  006000 052264 000177 071730    ------ ------ ------ ------
0007752435  024702 040600 000100 000000  35  024702 040600 000100 000000    ------ ------ ------ ------
0007752436  061576 111100 000025 000000  36  061576 111100 000025 000000    ------ ------ ------ ------
0007752437  063675 061571 111100 000026  37  063675 061571 111100 000026    ------ ------ ------ ------
```

```
INSTRUCTION BUFFER 6    (Memory IBA 0000000000)
-----------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)                DIFFERENCE
0007752440  000000 107600 000071 000000  00  000000 107600 000071 000000    ------ ------ ------ ------
0007752441  070460 063375 071540 050510  01  070460 063375 071540 050510    ------ ------ ------ ------
0007752442  062253 022520 067564 042672  02  062253 022520 067564 042672    ------ ------ ------ ------
0007752443  044316 064545 061463 020400  03  044316 064545 061463 020400    ------ ------ ------ ------
0007752444  001750 000000 032365 023540  04  001750 000000 032365 023540    ------ ------ ------ ------
0007752445  064425 042577 126300 025436  05  064425 042577 126300 025436    ------ ------ ------ ------
0007752446  000025 075505 056505 063274  06  000025 075505 056505 063274    ------ ------ ------ ------
0007752447  061472 032564 023440 030234  07  061472 032564 023440 030234    ------ ------ ------ ------
0007752450  061764 122600 025376 000025  10  061764 122600 025376 000025    ------ ------ ------ ------
0007752451  023470 023310 074705 030553  11  023470 023310 074705 030553    ------ ------ ------ ------
0007752452  056704 115100 021456 000025  12  056704 115100 021456 000025    ------ ------ ------ ------
0007752453  051465 051637 132400 025376  13  051465 051637 132400 025376    ------ ------ ------ ------
0007752454  000025 136600 025436 000025  14  000025 136600 025436 000025    ------ ------ ------ ------
0007752455  022703 111700 000004 000000  15  022703 111700 000004 000000    ------ ------ ------ ------
0007752456  074064 015000 052301 000177  16  074064 015000 052301 000177    ------ ------ ------ ------
0007752457  024752 071017 014000 052513  17  024752 071017 014000 052513    ------ ------ ------ ------
0007752460  000177 120700 023334 000022  20  000177 120700 023334 000022    ------ ------ ------ ------
0007752461  024702 127200 000026 000000  21  024702 127200 000026 000000    ------ ------ ------ ------
0007752462  044072 120100 010541 000001  22  044072 120100 010541 000001    ------ ------ ------ ------
0007752463  015000 052323 000177 044012  23  015000 052323 000177 044012    ------ ------ ------ ------
0007752464  015000 052513 000177 024765  24  015000 052513 000177 024765    ------ ------ ------ ------
0007752465  127700 021436 000025 042677  25  127700 021436 000025 042677    ------ ------ ------ ------
0007752466  024661 060576 137500 021436  26  024661 060576 137500 021436    ------ ------ ------ ------
0007752467  000025 126700 000000 000000  27  000025 126700 000000 000000    ------ ------ ------ ------
0007752470  040600 100000 000000 044076  30  040600 100000 000000 044076    ------ ------ ------ ------
0007752471  015000 052513 000177 024162  31  015000 052513 000177 024162    ------ ------ ------ ------
0007752472  101700 000004 000000 042776  32  101700 000004 000000 042776    ------ ------ ------ ------
0007752473  071617 046067 015000 052513  33  071617 046067 015000 052513    ------ ------ ------ ------
0007752474  000177 042777 024602 040740  34  000177 042777 024602 040740    ------ ------ ------ ------
0007752475  001066 020000 022716 136700  35  001066 020000 022716 136700    ------ ------ ------ ------
0007752476  000016 000000 116100 000017  36  000016 000000 116100 000017    ------ ------ ------ ------
0007752477  000000 030676 007000 103623  37  000000 030676 007000 103623    ------ ------ ------ ------

INSTRUCTION BUFFER 7    (Memory IBA 0000000000)
-----------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)                DIFFERENCE
0007752500  000171 006000 052513 000177  00  000171 006000 052513 000177    ------ ------ ------ ------
0007752501  024756 071017 014000 052513  01  024756 071017 014000 052513    ------ ------ ------ ------
0007752502  000177 003416 120000 025452  02  000177 003416 120000 025452    ------ ------ ------ ------
0007752503  000025 015000 052426 000177  03  000025 015000 052426 000177    ------ ------ ------ ------
0007752504  120000 025447 000025 014000  04  120000 025447 000025 014000    ------ ------ ------ ------
0007752505  052456 000177 020700 025445  05  052456 000177 020700 025445    ------ ------ ------ ------
0007752506  000025 025751 022710 025750  06  000025 025751 022710 025750    ------ ------ ------ ------
0007752507  043700 040740 002174 000000  07  043700 040740 002174 000000    ------ ------ ------ ------
0007752510  040600 155153 000037 051576  10  040600 155153 000037 051576    ------ ------ ------ ------
0007752511  075561 020600 155272 000037  11  075561 020600 155272 000037    ------ ------ ------ ------
0007752512  007000 110253 000133 006000  12  007000 110253 000133 006000    ------ ------ ------ ------
0007752513  052466 000177 024765 043701  13  052466 000177 024765 043701    ------ ------ ------ ------
0007752514  057707 130700 025447 000025  14  057707 130700 025447 000025    ------ ------ ------ ------
0007752515  002700 003616 024765 071717  15  002700 003616 024765 071717    ------ ------ ------ ------
0007752516  054771 043600 075605 040640  16  054771 043600 075605 040640    ------ ------ ------ ------
0007752517  000000 000400 051576 074705  17  000000 000400 051576 074705    ------ ------ ------ ------
0007752520  040740 002174 000000 051657  20  040740 002174 000000 051657    ------ ------ ------ ------
0007752521  040700 155153 000037 051567  21  040700 155153 000037 051567    ------ ------ ------ ------
0007752522  130500 025450 000025 043700  22  130500 025450 000025 043700    ------ ------ ------ ------
0007752523  024702 137700 000057 000000  23  024702 137700 000057 000000    ------ ------ ------ ------
0007752524  024702 107100 000057 000000  24  024702 107100 000057 000010    ------ ------ ------ 000010
0007752525  121700 025436 000025 024702  25  121700 025436 000025 024702    ------ ------ ------ ------
0007752526  040600 000020 000000 075605  26  040600 000020 000000 075605    ------ ------ ------ ------
0007752527  127600 000057 000000 074505  27  127600 000057 000000 074505    ------ ------ ------ ------
0007752530  027670 137700 000063 000000  30  027670 137700 000063 000000    ------ ------ ------ ------
0007752531  071716 061475 046375 137700  31  071716 061475 046375 137700    ------ ------ ------ ------
0007752532  000060 000000 050453 051004  32  000060 000000 050453 051004    ------ ------ ------ ------
0007752533  016000 056440 000177 020700  33  016000 056440 000177 020700    ------ ------ ------ ------
0007752534  001750 000000 022620 023560  34  001750 000000 022620 023560    ------ ------ ------ ------
0007752535  032656 032557 024702 107100  35  032656 032557 024702 107100    ------ ------ ------ ------
0007752536  000060 000000 075603 030761  36  000060 000000 075603 030761    ------ ------ ------ ------
0007752537  040700 000100 000000 127600  37  040700 000100 000000 127600    ------ ------ ------ ------

EXCHANGE PACKAGE in the CPU before IB dump
------------------------------------------
P    00005652550b  A0 000000 000000   IMODES 000000
IBA  00000000000   A1 000000 001100   IFLAGS 000000
ILA  01777776000   A2 000000 000000
DBA  00000000000   A3 000000 000000     IRP   RPE
DLA  01777776000   A4 000000 000000     IUM   MEU
                   A5 000000 000000     IFP   FPE
PN 04 XA 0000      A6 000001 011341     IOR   ORE
CN 01 VL 200       A7 000000 000000     IPR   PRE
                                        FEX   EEX
MODES 11 - *C90   ESL   BDM  *MM        IBP   BPI
STATS 00 -  VNU   FPS   WS    PS        ICM   MEC
                                        IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 000000          IIP   ICP
S2 000000 000000 000000 000000          IIO   IOI
S3 000000 000000 000000 000000          IPC   PCI
S4 000000 000000 000000 000000          IDL   DL
```

```
S5 000000 000000 000000 000000          IMI   MII
S6 000000 000000 000000 000000          FNX   NEX
S7 000000 000000 000000 000000


RESTART EXCHANGE PACKAGE after IB dump
--------------------------------------
P    00005652550b  A0 000000 000000   IMODES 000000
IBA  00000000000   A1 000000 001100   IFLAGS 000000
ILA  01777776000   A2 000000 000000
DBA  00000000000   A3 000000 000000     IRP   RPE
DLA  01777776000   A4 000000 000000     IUM   MEU
                   A5 000000 000000     IFP   FPE
PN 04 XA 1100      A6 000001 011341     IOR   ORE
CN 01 VL 200       A7 000000 000000     IPR   PRE
                                        FEX   EEX
MODES 11 – *C90   ESL   BDM  *MM        IBP   BPI
STATS 00 –  VNU   FPS   WS    PS        ICM   MEC
                                        IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 000000          IIP   ICP
S2 000000 000000 000000 000000          IIO   IOI
S3 000000 000000 000000 000000          IPC   PCI
S4 000000 000000 000000 000000          IDL   DL
S5 000000 000000 000000 000000          IMI   MII
S6 000000 000000 000000 000000          FNX   NEX
S7 000000 000000 000000 000000

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                    Register Dump
        (V, B, T, SB, ST, SM, VM, and VM1 registers)
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

          Vector Register 0                          Vector Register 1
V00-000   000000 000000 000000 000000       V01-000   000000 000000 000000 000000
V00-001   000000 000000 000000 000000       V01-001   000000 000000 000000 000000
V00-002   000000 000000 000000 000000       V01-002   000000 000000 000000 000000
V00-003   000000 000000 000000 000000       V01-003   000000 000000 000000 000000
V00-004   000000 000000 000000 000000       V01-004   000000 000000 000000 000000
V00-005   000000 000000 000000 000000       V01-005   000000 000000 000000 000000
V00-006   000000 000000 000000 000000       V01-006   000000 000000 000000 000000
V00-007   000000 000000 000000 000000       V01-007   000000 000000 000000 000000
V00-010   000000 000000 000000 000000       V01-010   000000 000000 000000 000000
V00-011   000000 000000 000000 000000       V01-011   000000 000000 000000 000000
V00-012   000000 000000 000000 000000       V01-012   000000 000000 000000 000000
V00-013   000000 000000 000000 000000       V01-013   000000 000000 000000 000000
V00-014   000000 000000 000000 000000       V01-014   000000 000000 000000 000000
V00-015   000000 000000 000000 000000       V01-015   000000 000000 000000 000000
V00-016   000000 000000 000000 000000       V01-016   000000 000000 000000 000000
V00-017   000000 000000 000000 000000       V01-017   000000 000000 000000 000000
V00-020   000000 000000 000000 000000       V01-020   000000 000000 000000 000000
V00-021   000000 000000 000000 000000       V01-021   000000 000000 000000 000000
V00-022   000000 000000 000000 000000       V01-022   000000 000000 000000 000000
V00-023   000000 000000 000000 000000       V01-023   000000 000000 000000 000000
V00-024   000000 000000 000000 000000       V01-024   000000 000000 000000 000000
V00-025   000000 000000 000000 000000       V01-025   000000 000000 000000 000000
V00-026   000000 000000 000000 000000       V01-026   000000 000000 000000 000000
V00-027   000000 000000 000000 000000       V01-027   000000 000000 000000 000000
V00-030   000000 000000 000000 000000       V01-030   000000 000000 000000 000000
V00-031   000000 000000 000000 000000       V01-031   000000 000000 000000 000000
V00-032   000000 000000 000000 000000       V01-032   000000 000000 000000 000000
V00-033   000000 000000 000000 000000       V01-033   000000 000000 000000 000000
V00-034   000000 000000 000000 000000       V01-034   000000 000000 000000 000000
V00-035   000000 000000 000000 000000       V01-035   000000 000000 000000 000000
V00-036   000000 000000 000000 000000       V01-036   000000 000000 000000 000000
V00-037   000000 000000 000000 000000       V01-037   000000 000000 000000 000000
V00-040   000000 000000 000000 000000       V01-040   000000 000000 000000 000000
V00-041   000000 000000 000000 000000       V01-041   000000 000000 000000 000000
V00-042   000000 000000 000000 000000       V01-042   000000 000000 000000 000000
V00-043   000000 000000 000000 000000       V01-043   000000 000000 000000 000000
V00-044   000000 000000 000000 000000       V01-044   000000 000000 000000 000000
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V00-046   000000 000000 000000 000000       V01-046   000000 000000 000000 000000
V00-047   000000 000000 000000 000000       V01-047   000000 000000 000000 000000
V00-050   000000 000000 000000 000000       V01-050   000000 000000 000000 000000
V00-051   000000 000000 000000 000000       V01-051   000000 000000 000000 000000
V00-052   000000 000000 000000 000000       V01-052   000000 000000 000000 000000
V00-053   000000 000000 000000 000000       V01-053   000000 000000 000000 000000
V00-054   000000 000000 000000 000000       V01-054   000000 000000 000000 000000
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V00-056   000000 000000 000000 000000       V01-056   000000 000000 000000 000000
V00-057   000000 000000 000000 000000       V01-057   000000 000000 000000 000000
V00-060   000000 000000 000000 000000       V01-060   000000 000000 000000 000000
V00-061   000000 000000 000000 000000       V01-061   000000 000000 000000 000000
V00-062   000000 000000 000000 000000       V01-062   000000 000000 000000 000000
V00-063   000000 000000 000000 000000       V01-063   000000 000000 000000 000000
V00-064   000000 000000 000000 000000       V01-064   000000 000000 000000 000000
V00-065   000000 000000 000000 000000       V01-065   000000 000000 000000 000000
V00-066   000000 000000 000000 000000       V01-066   120614 040350 105514 052000
V00-067   000000 000000 000000 000000       V01-067   173062 144365 071563 016011
V00-070   000000 000000 000000 000000       V01-070   144355 110743 034474 002310
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V00-073   000000 000000 000000 000000      V01-073   070544 061746 064613 104366
V00-074   000000 000000 000000 000000      V01-074   007311 102577 067170 050712
V00-075   000000 000000 000000 000000      V01-075   104616 171614 023317 060243
V00-076   000000 000000 000000 000000      V01-076   047013 130067 030734 127313
V00-077   000000 000000 000000 000000      V01-077   041372 051223 140512 064663
V00-100   000000 000000 000000 000000      V01-100   177571 045026 056453 066164
V00-101   000000 000000 000000 000000      V01-101   006725 027755 156220 010174
V00-102   000000 000000 000000 000000      V01-102   122604 170605 044061 132252
V00-103   000000 000000 000000 000000      V01-103   115345 103361 015304 031002
V00-104   000000 000000 000000 000000      V01-104   153132 151612 052456 163074
V00-105   000000 000000 000000 000000      V01-105   126624 150151 002352 074152
V00-106   000000 000000 000000 000000      V01-106   041526 172543 062312 146510
V00-107   000000 000000 000000 000000      V01-107   165043 161210 143645 164420
V00-110   000000 000000 000000 000000      V01-110   146505 015523 007637 161273
V00-111   000000 000000 000000 000000      V01-111   164666 041135 112641 014655
V00-112   000000 000000 000000 000000      V01-112   166014 170723 044772 076507
V00-113   000000 000000 000000 000000      V01-113   112275 100733 005172 134615
V00-114   000000 000000 000000 000000      V01-114   051762 110405 165361 117050
V00-115   000000 000000 000000 000000      V01-115   052252 025577 143607 130677
V00-116   000000 000000 000000 000000      V01-116   011015 110602 006316 042310
V00-117   000000 000000 000000 000000      V01-117   103243 023266 137704 123625
V00-120   000000 000000 000000 000000      V01-120   152316 032405 141042 126515
V00-121   000000 000000 000000 000000      V01-121   113700 123574 072530 044543
V00-122   000000 000000 000000 000000      V01-122   075116 122640 060256 003211
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V00-124   000000 000000 000000 000000      V01-124   047170 175531 063621 033450
V00-125   000000 000000 000000 000000      V01-125   043301 061266 166451 111276
V00-126   000000 000000 000000 000000      V01-126   110536 114402 106257 004736
V00-127   000000 000000 000000 000000      V01-127   026376 171473 035171 144561
V00-130   000000 000000 000000 000000      V01-130   156433 137447 035330 103401
V00-131   000000 000000 000000 000000      V01-131   057112 145043 032045 140434
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V00-135   000000 000000 000000 000000      V01-135   156147 067567 165564 165664
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V00-141   000000 000000 000000 000000      V01-141   001621 006712 174465 052412
V00-142   000000 000000 000000 000000      V01-142   020453 122247 050640 003755
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V00-144   000000 000000 000000 000000      V01-144   142310 134277 157446 007176
V00-145   000000 000000 000000 000000      V01-145   023627 103703 065072 103221
V00-146   000000 000000 000000 000000      V01-146   026574 145150 046063 153050
V00-147   000000 000000 000000 000000      V01-147   145657 125576 073367 124663
V00-150   000000 000000 000000 000000      V01-150   135567 010626 041737 026162
V00-151   000000 000000 000000 000000      V01-151   120520 123554 163552 150050
V00-152   000000 000000 000000 000000      V01-152   176176 122034 062104 171661
V00-153   000000 000000 000000 000000      V01-153   020234 106401 145245 131110
V00-154   000000 000000 000000 000000      V01-154   066211 027420 120230 060035
V00-155   000000 000000 000000 000000      V01-155   014500 174276 166355 120436
V00-156   000000 000000 000000 000000      V01-156   072711 043732 116201 175066
V00-157   000000 000000 000000 000000      V01-157   066205 105422 104622 076217
V00-160   000000 000000 000000 000000      V01-160   014772 072213 047402 124430
V00-161   000000 000000 000000 000000      V01-161   075172 070563 054470 021154
V00-162   000000 000000 000000 000000      V01-162   175372 007472 130413 051435
V00-163   000000 000000 000000 000000      V01-163   073576 115461 045762 056033
V00-164   000000 000000 000000 000000      V01-164   052636 143715 036241 142502
V00-165   000000 000000 000000 000000      V01-165   005671 005355 065360 030766
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V00-167   000000 000000 000000 000000      V01-167   071025 073550 106415 076551
V00-170   000000 000000 000000 000000      V01-170   023703 052165 027653 135140
V00-171   000000 000000 000000 000000      V01-171   025152 014144 173432 135643
V00-172   000000 000000 000000 000000      V01-172   105517 066705 150121 125700
V00-173   000000 000000 000000 000000      V01-173   071534 002075 173545 017104
V00-174   000000 000000 000000 000000      V01-174   035304 067166 152326 032256
V00-175   000000 000000 000000 000000      V01-175   032451 023100 113250 131140
V00-176   000000 000000 000000 000000      V01-176   122240 036314 062067 061656
V00-177   000000 000000 000000 000000      V01-177   101342 067761 147224 101557

          Vector Register 2                           Vector Register 3
V02-000   060000 077774 001377 000000      V03-000   000000 000000 000000 000000
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V02-002   060000 077774 001377 000000      V03-002   000000 000000 000000 000000
V02-003   060000 077774 001377 000000      V03-003   000000 000000 000000 000000
V02-004   060000 077774 001377 000000      V03-004   000000 000000 000000 000000
V02-005   060000 077774 001377 000000      V03-005   000000 000000 000000 000000
V02-006   060000 077774 001377 000000      V03-006   000000 000000 000000 000000
V02-007   060000 077774 001377 000000      V03-007   000000 000000 000000 000000
V02-010   060000 077774 001377 000000      V03-010   000000 000000 000000 000000
V02-011   060000 077774 001377 000000      V03-011   000000 000000 000000 000000
V02-012   060000 077774 001377 000000      V03-012   000000 000000 000000 000000
V02-013   060000 077774 001377 000000      V03-013   000000 000000 000000 000000
V02-014   060000 077774 001377 000000      V03-014   000000 000000 000000 000000
V02-015   060000 077774 001377 000000      V03-015   000000 000000 000000 000000
V02-016   060000 077774 001377 000000      V03-016   000000 000000 000000 000000
V02-017   060000 077774 001377 000000      V03-017   000000 000000 000000 000000
V02-020   060000 077774 001377 000000      V03-020   000000 000000 000000 000000
V02-021   060000 077774 001377 000000      V03-021   000000 000000 000000 000000
V02-022   060000 077774 001377 000000      V03-022   000000 000000 000000 000000
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V02-026   060000 077774 001377 000000      V03-026   000000 000000 000000 000000
V02-027   060000 077774 001377 000000      V03-027   000000 000000 000000 000000
V02-030   060000 077774 001377 000000      V03-030   000000 000000 000000 000000
V02-031   060000 077774 001377 000000      V03-031   000000 000000 000000 000000
V02-032   060000 077774 001377 000000      V03-032   000000 000000 000000 000000
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V02-034   060000 077774 001377 000000      V03-034   000000 000000 000000 000000
V02-035   060000 077774 001377 000000      V03-035   000000 000000 000000 000000
V02-036   060000 077774 001377 000000      V03-036   000000 000000 000000 000000
V02-037   060000 077774 001377 000000      V03-037   000000 000000 000000 000000
V02-040   060000 077774 001377 000000      V03-040   000000 000000 000000 000000
V02-041   060000 077774 001377 000000      V03-041   000000 000000 000000 000000
V02-042   060000 077774 001377 000000      V03-042   000000 000000 000000 000000
V02-043   060000 077774 001377 000000      V03-043   000000 000000 000000 000000
V02-044   060000 077774 001377 000000      V03-044   000000 000000 000000 000000
V02-045   060000 077774 001377 000000      V03-045   000000 000000 000000 000000
V02-046   060000 077774 001377 000000      V03-046   000000 000000 000000 000000
V02-047   060000 077774 001377 000000      V03-047   000000 000000 000000 000000
V02-050   060000 077774 001377 000000      V03-050   000000 000000 000000 000000
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V02-052   060000 077774 001377 000000      V03-052   000000 000000 000000 000000
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V02-060   060000 077774 001377 000000      V03-060   000000 000000 000000 000000
V02-061   060000 077774 001377 000000      V03-061   000000 000000 000000 000000
V02-062   060000 077774 001377 000000      V03-062   000000 000000 000000 000000
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V02-064   060000 077774 001377 000000      V03-064   000000 000000 000000 000000
V02-065   060000 077774 001377 000000      V03-065   000000 000000 000000 000000
V02-066   024643 162103 166724 127711      V03-066   075360 004626 004576 140274
V02-067   126705 045345 102622 071215      V03-067   173620 147552 143631 047755
V02-070   042061 023132 175402 025451      V03-070   156473 156105 006765 050605
V02-071   127310 036627 062465 113255      V03-071   056457 041267 123340 063360
V02-072   064632 071564 152653 062112      V03-072   156377 174437 131045 171632
V02-073   067732 034566 104420 145053      V03-073   046400 051046 062436 130730
V02-074   031434 013507 041273 126627      V03-074   067407 042477 153075 040455
V02-075   176005 173607 174653 041570      V03-075   034507 132503 124171 154315
V02-076   022176 156310 056423 164713      V03-076   012616 020743 036331 021756
V02-077   004230 047637 157225 164265      V03-077   145001 071417 067060 042651
V02-100   152356 052643 077117 173455      V03-100   127037 036634 020326 134455
V02-101   112245 004711 112120 151303      V03-101   061453 071607 065245 110312
V02-102   051227 144217 055572 146552      V03-102   107221 030304 040233 035643
V02-103   045172 112436 100765 165110      V03-103   007051 155452 146307 025715
V02-104   025362 043077 111357 144033      V03-104   100651 003205 177402 117342
V02-105   103640 114105 007262 114510      V03-105   112443 053776 004472 135032
V02-106   147754 167267 106552 172423      V03-106   042112 034022 140461 137530
V02-107   150634 126434 025107 163227      V03-107   125054 004615 054704 147246
V02-110   163612 047007 104211 073171      V03-110   006724 147050 134047 146272
V02-111   066150 041114 052507 047326      V03-111   122627 140667 105452 175660
V02-112   010576 170163 000607 044253      V03-112   115572 052034 073207 065134
V02-113   127633 112075 013307 013033      V03-113   140771 016400 043704 044717
V02-114   072711 057176 160400 165501      V03-114   051122 017406 105052 004336
V02-115   066204 173232 035410 151736      V03-115   040507 024527 066616 151164
V02-116   014745 143334 022722 153563      V03-116   156602 122064 001010 141166
V02-117   075534 010107 016714 132471      V03-117   051270 107274 033323 071115
V02-120   161305 133200 012373 022433      V03-120   044605 006746 100331 020151
V02-121   016470 003601 152546 013104      V03-121   007367 123567 105060 062543
V02-122   016410 046221 101373 166255      V03-122   105737 122534 066325 151200
V02-123   017736 074046 137555 115116      V03-123   077547 110301 017215 145604
V02-124   021566 145465 146003 154101      V03-124   106355 035532 037444 134341
V02-125   044501 133654 172047 027335      V03-125   036215 021234 045003 100071
V02-126   002724 017535 177442 164137      V03-126   064454 055202 027040 101026
V02-127   076635 027326 005136 177755      V03-127   060323 111665 160555 133757
V02-130   131634 164252 164773 000600      V03-130   125321 011057 037000 014667
V02-131   070614 173006 165145 013204      V03-131   002352 102773 051001 076021
V02-132   003075 145122 145726 163754      V03-132   062303 177142 043037 122656
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V02-134   126162 022540 143723 067423      V03-134   002315 176474 143055 173143
V02-135   050045 011253 005730 034232      V03-135   063746 036557 014706 147610
V02-136   071426 104025 177452 002332      V03-136   164570 075070 074021 152120
V02-137   036347 054716 005216 063034      V03-137   163714 176014 144641 115570
V02-140   066146 134302 161407 175401      V03-140   065375 022277 106767 140715
V02-141   010765 101576 006510 062432      V03-141   043474 001704 023332 050351
V02-142   121352 124622 124435 153120      V03-142   101544 023057 030031 074356
V02-143   157300 027410 021025 126572      V03-143   124317 034773 150567 140254
V02-144   074503 174733 053711 045772      V03-144   031733 015157 167532 047126
V02-145   152744 054402 035205 036164      V03-145   173404 055461 137230 042443
V02-146   107513 131464 031765 060161      V03-146   150553 103704 157356 132107
V02-147   017472 077676 172342 122012      V03-147   167130 145046 075255 035211
V02-150   025472 103333 172030 106355      V03-150   122643 126476 170115 031515
V02-151   113463 150014 176545 036203      V03-151   114703 046533 113155 175543
V02-152   071767 170275 035325 064651      V03-152   174153 064211 067406 060204
V02-153   032330 117775 032202 066441      V03-153   046520 072506 034537 126752
V02-154   133044 120075 130663 006164      V03-154   064164 060630 012347 043713
V02-155   004402 161160 042175 130174      V03-155   076171 133751 152147 105261
V02-156   141476 011026 124260 052257      V03-156   120334 014751 114754 060505
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V02-160   037120 144516 113060 101246      V03-160   144263 166660 064444 170302
V02-161   052573 102516 064335 134275      V03-161   113565 100125 060005 115572
V02-162   001750 170507 071120 103777      V03-162   072552 103402 120173 140772
V02-163   022761 106605 020575 144012      V03-163   061103 140470 162356 051173
V02-164   017206 021364 077664 114357      V03-164   110346 054400 042245 041351
V02-165   037731 057770 103060 160273      V03-165   034175 131406 121221 177341
V02-166   041464 160105 154330 027643      V03-166   006260 076524 155042 015073
V02-167   167664 023275 021053 173705      V03-167   135524 134026 016527 056052
V02-170   133077 032774 052634 155070      V03-170   121023 104753 014066 143600
V02-171   004113 127043 005616 016010      V03-171   153620 045724 065201 006212
V02-172   157073 060515 174003 002322      V03-172   136466 037631 041633 134541
V02-173   070040 136546 044055 063302      V03-173   176610 042765 160712 113262
V02-174   011557 175374 015712 170567      V03-174   031136 137357 030242 062544
V02-175   114060 073445 047247 107535      V03-175   160775 155273 157323 151304
V02-176   165324 051021 046254 017327      V03-176   031065 010657 074327 146456
V02-177   142233 043655 075125 034272      V03-177   162246 122575 141272 166352

          Vector Register 4                           Vector Register 5
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V04-002   060000 061053 076730 000000      V05-002   060000 000000 026513 032610
V04-003   040642 135407 160650 000000      V05-003   021501 000000 122147 002553
V04-004   121637 100005 114210 000000      V05-004   000000 000000 000000 000000
V04-005   160000 012765 021130 000000      V05-005   060000 000000 001104 012457
V04-006   060000 150447 106530 000000      V05-006   060000 000000 146630 145351
V04-007   160000 111404 037150 000000      V05-007   060000 000000 062624 156545
V04-010   060000 014305 056560 000000      V05-010   060000 000000 001342 040710
V04-011   160000 116535 163050 000000      V05-011   060000 000000 072143 052014
V04-012   160000 135373 156440 000000      V05-012   060000 000000 122121 162572
V04-013   060000 105655 060460 000000      V05-013   060000 000000 055661 041312
V04-014   160000 112330 142450 000000      V05-014   060000 000000 064040 055240
V04-015   027633 064422 155460 000000      V05-015   000000 000000 000000 000000
V04-016   160000 153070 045330 000000      V05-016   060000 000000 153655 003622
V04-017   023014 162446 054220 000000      V05-017   000000 000000 000000 000000
V04-020   060000 143340 032230 000000      V05-020   060000 000000 134742 135502
V04-021   160000 100015 033170 000000      V05-021   060000 000000 046420 064377
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V04-023   160000 122301 152270 000000      V05-023   060000 000000 077623 111541
V04-024   026316 006332 074310 000000      V05-024   000000 000000 000000 000000
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V04-026   060000 104626 151360 000000      V05-026   060000 000000 054370 126717
V04-027   060000 046252 170440 000000      V05-027   060000 000000 015640 012451
V04-030   060000 104632 051340 000000      V05-030   060000 000000 054375 032222
V04-031   060000 104470 113240 000000      V05-031   060000 000000 054176 173711
V04-032   160000 152735 013560 000000      V05-032   060000 000000 153365 105173
V04-033   160000 151641 002300 000000      V05-033   060000 000000 151175 105324
V04-034   160000 120513 066610 000000      V05-034   060000 000000 075105 041477
V04-035   160000 025536 167030 000000      V05-035   060000 000000 004327 025641
V04-036   060000 001136 052370 000000      V05-036   060000 000000 000006 137726
V04-037   060000 002352 052130 000000      V05-037   060000 000000 000035 010655
V04-040   160000 121752 151040 000000      V05-040   060000 000000 077107 071130
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V04-043   160000 035034 016130 000000      V05-043   060000 000000 007736 140721
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V04-057   060000 103655 116010 000000      V05-057   060000 000000 053204 060110
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V04-067   054771 045621 123460 132171      V05-067   017225 047753 033604 015536
V04-070   135125 034445 121737 034334      V05-070   037101 050727 116355 041360
V04-071   134405 010031 143553 001113      V05-071   052334 060675 106211 177627
V04-072   111566 130570 002125 030071      V05-072   013101 132362 034512 002560
V04-073   014505 047710 065405 151022      V05-073   166324 032644 012456 071430
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V04-077   113045 057373 052153 120737      V05-077   053551 035631 151740 052746
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V04-104   006313 072615 141236 041470      V05-104   044425 177021 174330 145320
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V04-151   124643 141647 032246 070114      V05-151   005127 001140 105032 101671
V04-152   026706 061643 131276 013167      V05-152   164461 031655 067523 121233
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          Vector Register 6                           Vector Register 7
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V06-072   020070 036470 143774 121141      V07-072   136562 111345 154164 137427
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V06-100   166236 045714 176072 075725      V07-100   061747 142444 025406 126755
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V06-112   156553 162715 010264 015777      V07-112   065652 137746 042515 120266
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V06-141   162755 161155 124324 005553      V07-141   170137 013563 003060 024221
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V06-152   165472 077221 014110 177462      V07-152   074004 166430 072007 113377
V06-153   153472 117052 067021 005754      V07-153   051144 070300 107664 145152
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V06-175   105673 015303 001227 124164      V07-175   140022 032456 163415 006771
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V06-177   170213 001015 035213 060301       V07-177   153342 102313 132567 136415


      B Registers                          T Registers
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B01   000037 155152                T01    000000 000000 000000 000001
B02   007775 140016                T02    000000 000000 000000 000000
B03   000000 000000                T03    000000 000000 000000 000000
B04   000135 070000                T04    000000 000000 000000 006063
B05   000001 010306                T05    000000 000000 000000 000000
B06   000000 006063                T06    000000 000000 000000 000000
B07   000000 000000                T07    000000 000000 000000 000000
B10   000000 000000                T10    000000 000000 000000 000000
B11   000000 000000                T11    000000 000000 000000 000000
B12   000000 000000                T12    000000 000000 000000 000000
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B14   000000 000000                T14    000000 000000 000000 000000
B15   000000 000000                T15    000000 000000 000000 000000
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B35   000000 000000                T35    000000 000000 000000 000000
B36   000000 000000                T36    000000 000000 000000 000000
B37   000000 000000                T37    000000 000000 000000 000000
B40   000000 000000                T40    000000 000000 000000 000000
B41   000000 000000                T41    000000 000000 000000 000000
B42   000000 000000                T42    000000 000000 000000 000000
B43   000000 000000                T43    000000 000000 000000 000000
B44   000000 000000                T44    000000 000000 000000 000000
B45   000000 000000                T45    000000 000000 000000 000000
B46   000000 000000                T46    000000 000000 000000 000000
B47   000000 000000                T47    000000 000000 000000 000000
B50   000000 000000                T50    000000 000000 000000 000000
B51   000000 000000                T51    000000 000000 000000 000000
B52   000000 000000                T52    000000 000000 000000 000000
B53   000000 000000                T53    000000 000000 000000 000000
B54   000000 001140                T54    000000 000000 000000 000000
B55   000001 011341                T55    000000 000000 000000 000000
B56   000000 000017                T56    000000 000000 000000 000000
B57   000000 000001                T57    000000 000000 000000 000000
B60   000000 000000                T60    000000 000000 000000 000000
B61   000003 041610                T61    000000 000000 000000 000000
B62   000003 041414                T62    000000 000000 000000 000000
B63   000223 124000                T63    000000 000000 000000 000000
B64   000223 130000                T64    000000 000000 000000 000000
B65   000000 000004                T65    177777 177777 177777 177777
B66   007775 140112                T66    000000 000000 000000 000000
B67   007775 142733                T67    000000 000000 000000 000000
B70   000000 123505                T70    101721 172223 010101 152623
B71   116033 156076                T71    123742 170034 133321 105423
B72   102517 043121                T72    124437 110413 000346 072223
B73   170537 116547                T73    021045 025765 004176 070036
B74   106345 115350                T74    052424 116347 156226 010465
B75   036133 153362                T75    003320 106153 044153 124647
B76   061617 121654                T76    050375 030523 016533 026646
B77   000026 147542                T77    074475 146134 014206 140676

SHARED REGISTERS for Cluster 1

       Shared B Registers              Shared T Registers
SB00   000000 000000            ST00   000000 000000 000000 000000
SB01   000000 000000            ST01   000000 000000 000000 000000
SB02   000000 000000            ST02   001113 000000 000000 000000
SB03   000000 000000            ST03   000000 000000 000000 000000
SB04   000000 000000            ST04   000000 000000 000000 000000
SB05   000000 000000            ST05   000000 000000 000000 000000
SB06   000000 000000            ST06   000001 000000 000000 000000
SB07   000000 000000            ST07   000000 000000 000000 000000


SM     000000 000000


VM     177777 177777 177777 176000
VM1    060000 173065 124136 054146
```

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                A-register Memory Dump
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


Memory from A0 (A0 + DBA = 1777340113)
---------------------------------------
1777340113    000000 000000 000177 051542
1777340114    000000 000000 000037 155152
1777340115    000000 000000 007775 140016
1777340116    000000 000000 000000 001750
1777340117    000000 000000 000000 001750
1777340120    000000 000000 000000 000020
1777340121    000000 000000 000003 001542
1777340122    000000 000000 000003 001346
1777340123    000000 000000 000000 000000
1777340124    040060 140000 000000 000000
1777340125    000000 000000 000003 001346
1777340126    000000 000000 000000 000047
1777340127    000000 000000 000000 000000
1777340130    020000 002010 000000 000001
1777340131    000000 000000 003732 066225
1777340132    000000 000000 000000 000070
1777340133    000000 000000 000047 016550
1777340134    000000 000000 000000 000000
1777340135    000000 000000 000000 000000
1777340136    000000 000000 000005 140000
1777340137    000000 000000 000000 000000
1777340140    020000 003526 000000 000001
1777340141    000000 004000 000000 020005
1777340142    000000 000000 000000 127620
1777340143    000000 000000 000000 045145
1777340144    000000 000000 000000 037262
1777340145    000000 000000 000000 000004
1777340146    000000 000000 000000 002665
1777340147    000000 000000 000000 000044
1777340150    000000 000000 000000 000000
1777340151    000000 000000 000000 000000
1777340152    000000 000000 000000 017004
1777340153    000000 000000 000000 012671
1777340154    000000 000000 000000 000000
1777340155    000000 000000 000000 000314
1777340156    000000 000000 000000 000000
1777340157    000000 000000 000000 000000
1777340160    000000 000000 000000 000000
1777340161    000000 000000 000000 006614
1777340162    000000 000000 000000 000000
1777340163    000000 000000 000000 004711
1777340164    000000 000000 000000 012003
1777340165    000000 000000 000000 000000
1777340166    000000 000000 000000 005072
1777340167    000000 000000 000000 016252
1777340170    000000 000000 000000 000000
1777340171    000000 000000 000000 002665
1777340172    000000 000000 000000 000000
1777340173    000000 000000 000000 000000
1777340174    000000 000000 000000 000000
1777340175    000000 000000 000000 000000
1777340176    000000 000000 000000 000000
1777340177    000000 000000 000000 000000
1777340200    000000 000000 000000 000000
1777340201    000000 000000 000000 000000
1777340202    000000 000000 000150 011663
1777340203    000000 000000 007775 140116
1777340204    000000 000000 007775 140123
1777340205    000000 000000 000046 034507
1777340206    000000 000000 000026 125134
1777340207    000000 000000 000132 142173
1777340210    000000 000000 007775 140034
1777340211    000000 000000 007775 140112
1777340212    020000 002444 000000 000001
1777340213    000000 000000 000000 174306
1777340214    000000 000000 000000 000001
1777340215    000000 000000 000000 000000
1777340216    000000 000000 000026 146246
1777340217    000000 000000 000177 002356
1777340220    000000 000000 000026 146326
1777340221    000000 000000 007775 140206
1777340222    000000 000000 000000 000000
1777340223    000000 000000 000000 000000
1777340224    000000 000000 000002 033514
1777340225    000000 000000 000000 000000
1777340226    000000 000000 000036 061175
1777340227    000000 000000 000177 031463
1777340230    000000 000000 007775 140140
1777340231    000000 000000 007775 140201
1777340232    000000 000000 000000 000000
1777340233    000000 000000 000036 061175
1777340234    000000 000000 000177 031463
1777340235    000000 000000 007775 140171
1777340236    000000 000000 007775 140206
1777340237    000000 000000 000000 000000
1777340240    000000 000000 000000 000001
```

```
1777340241    020000 000223 000000 000001
1777340242    000010 000000 000000 000000
1777340243    000000 000000 000000 000014
1777340244    000000 000000 000000 000000
1777340245    000000 000000 000036 015705
1777340246    000000 000000 000026 162651
1777340247    000000 000000 000177 061033
1777340250    000000 000000 007775 140213
1777340251    000000 000000 007775 140226
1777340252    000000 000000 000003 054534
1777340253    000000 000000 000026 162651
1777340254    000000 000000 000177 061033
1777340255    000000 000000 007775 140220
1777340256    000000 000000 007775 140233
1777340257    000000 000000 000002 033514
1777340260    000000 000000 000000 000047
1777340261    000000 000000 000000 000001
1777340262    000000 000000 000002 034116
1777340263    000000 000000 000002 034116
1777340264    000000 000000 000000 000000
1777340265    000011 171377 000000 000000
1777340266    000000 000000 000000 000377
1777340267    000000 000000 000000 000000
1777340270    000000 000000 000000 000030
1777340271    000000 000000 000000 000000
1777340272    000000 000000 000036 061175
1777340273    000000 000000 000177 031463
1777340274    000000 000000 007775 140230
1777340275    000000 000000 007775 140245
1777340276    000000 000000 000000 000000
1777340277    000000 000000 000000 000001
1777340300    020000 000223 000000 000001
1777340301    010000 000000 000000 000000
1777340302    000000 000000 000000 000003
1777340303    000000 000000 000000 000000
1777340304    000000 000000 000000 000000
1777340305    000000 000000 000017 075706
1777340306    000000 000000 000000 000000
1777340307    000000 000000 000036 015743
1777340310    000000 000000 000155 107513
1777340311    000000 000000 007775 140236
1777340312    000000 000000 007775 140254

Memory from A1 (A1 + DBA = 0000000000)
---------------------------------------
0000000000    000000 000000 000000 000000
0000000001    000000 000000 000000 000000
0000000002    000000 000000 000000 000000
0000000003    000000 000000 000000 000000
0000000004    000000 000000 000000 000000
0000000005    000000 000000 000000 000000
0000000006    000000 000000 000000 000000
0000000007    000000 000000 000000 000000
0000000010    000000 000000 000000 000000
0000000011    000000 000000 000000 000000
0000000012    001113 000000 000000 000000
0000000013    000000 000000 000000 000000
0000000014    000000 000000 000000 000000
0000000015    000000 000000 000000 000000
0000000016    000001 000000 000000 000000
0000000017    000000 000000 000000 000000
0000000020    000000 000000 000000 000000
0000000021    177777 177777 177777 176000
0000000022    060000 173065 124136 054146
0000000023    000000 000000 000000 000000
0000000024    000000 000000 000000 000000
0000000025    000000 000000 000000 000000
0000000026    000000 000000 000000 000000
0000000027    000000 000000 000000 000000
0000000030    000000 000000 000000 000000
0000000031    000000 000000 000000 000000
0000000032    000000 000000 000000 000000
0000000033    000000 000000 000000 000000
0000000034    000000 000000 000000 000000
0000000035    000000 000000 000000 000000
0000000036    000000 000000 000000 000000
0000000037    000000 000000 000000 000000
0000000040    000000 000000 000000 000000
0000000041    000000 000000 000000 000000
0000000042    000000 000000 000000 000000
0000000043    000000 000000 000000 000000
0000000044    000000 000000 000000 000000
0000000045    000000 000000 000000 000000
0000000046    000000 000000 000000 000000
0000000047    000000 000000 000000 000000
0000000050    000000 000000 000000 000000
0000000051    000000 000000 000000 000000
0000000052    000000 000000 000000 000000
0000000053    000000 000000 000000 000000
0000000054    000000 000000 000000 000000
0000000055    000000 000000 000000 000000
0000000056    000000 000000 000000 000000
```

```
0000000057    000000 000000 000000 000000
0000000060    000000 000000 000000 000000
0000000061    000000 000000 000000 000000
0000000062    000000 000000 000000 000000
0000000063    000000 000000 000000 000000
0000000064    000000 000000 000000 000000
0000000065    177777 177777 177777 177777
0000000066    000000 000000 000000 000000
0000000067    000000 000000 000000 000000
0000000070    101721 172223 010101 152623
0000000071    123742 170034 133321 105423
0000000072    124437 110413 000346 072223
0000000073    021045 025765 004176 070036
0000000074    052424 116347 156226 010465
0000000075    003320 106153 044153 124647
0000000076    050375 030523 016533 026646
0000000077    074475 146134 014206 140676
0000000100    006000 000334 000000 120100
0000000101    000047 000000 060441 060771
0000000102    100100 000046 000000 025100
0000000103    100000 000112 000000 100100
0000000104    000113 000000 100200 000114
0000000105    000000 100300 000115 000000
0000000106    120000 000116 000000 120100
0000000107    000117 000000 120200 000120
0000000110    000000 005000 006000 157164
0000000111    000000 000000 000000 000000
0000000112    000000 000000 000000 000000
0000000113    000000 000000 000000 000000
0000000114    000000 000000 000000 000000
0000000115    000000 000000 000000 000000
0000000116    000000 000000 000000 000000
0000000117    000000 000000 000000 000000
0000000120    000000 000000 000000 000000
0000000121    000000 000000 000000 000000
0000000122    000000 000000 000000 000000
0000000123    000000 000000 000000 000000
0000000124    000000 000000 000000 000000
0000000125    000000 000000 000000 000000
0000000126    000000 000000 000000 000000
0000000127    000000 000000 000000 000000
0000000130    000000 000000 000000 000000
0000000131    000000 000000 000000 000000
0000000132    000000 000000 000000 000000
0000000133    000000 000000 000000 000000
0000000134    000000 000000 000000 000000
0000000135    000000 000000 000000 000000
0000000136    000000 000000 000000 000000
0000000137    000000 000000 000000 000000
0000000140    000000 000000 000000 000000
0000000141    000000 000000 000000 000000
0000000142    000000 000000 000000 000000
0000000143    000000 000000 000000 000000
0000000144    000000 000000 000000 000000
0000000145    000000 000000 000000 000000
0000000146    000000 000000 000000 000000
0000000147    000000 000000 000000 000000
0000000150    000000 000000 000000 000000
0000000151    000000 000000 000000 000000
0000000152    000000 000000 000000 000000
0000000153    000000 000000 000000 000000
0000000154    000000 000000 000000 000000
0000000155    000000 000002 000000 000000
0000000156    000000 000000 000000 000000
0000000157    000000 000000 000000 000000
0000000160    000000 000000 000000 000000
0000000161    000000 000000 000000 000000
0000000162    000000 000000 000000 000000
0000000163    000000 000000 000000 000000
0000000164    000000 000000 000000 000000
0000000165    000000 000000 000000 000000
0000000166    000000 000000 000000 000000
0000000167    000000 000000 000000 000000
0000000170    000000 000000 000000 000000
0000000171    000000 000000 000000 000000
0000000172    000000 000000 000000 000000
0000000173    000000 000000 000000 000000
0000000174    000000 000000 000000 000000
0000000175    000000 000000 000000 000000
0000000176    000000 000000 000000 000000
0000000177    000000 000000 000000 000000

Memory from A2 (A2 + DBA = 0000627606)
--------------------------------------
0000627606    000000 000000 000000 000000
0000627607    000000 000000 000000 000000
0000627610    067554 061546 070164 000001
0000627611    000000 000000 000000 000000
0000627612    000000 000000 000000 000003
0000627613    000000 000000 000000 000000
0000627614    000000 000000 000000 042264
0000627615    000000 000000 000003 027606
```

```
0000627616    000000 000000 000003 030002
0000627617    000000 000000 000000 000000
0000627620    000000 000000 000000 000000
0000627621    000000 000000 000000 010011
0000627622    000000 000000 000001 072020
0000627623    000000 000000 000000 000000
0000627624    000000 000000 000003 040647
0000627625    000000 000000 000002 142045
0000627626    000000 000000 000000 000000
0000627627    000000 000000 000000 000165
0000627630    000000 000000 000000 000000
0000627631    000000 000000 000000 000025
0000627632    000000 000000 000000 000000
0000627633    000000 000000 000003 041414
0000627634    000000 000000 000003 041414
0000627635    000000 000000 000000 000010
0000627636    000000 000000 000000 000003
0000627637    000000 000000 000000 000000
0000627640    000000 000001 035565 124531
0000627641    000000 000000 000410 041447
0000627642    000000 000000 000165 171421
0000627643    000000 000000 000000 000000
0000627644    000000 000001 035565 124531
0000627645    000000 000000 000000 000000
0000627646    000000 000000 000000 000000
0000627647    000000 000000 000000 161562
0000627650    000000 000000 000000 000000
0000627651    000000 000000 000000 000000
0000627652    000000 000000 000000 161561
0000627653    000000 100001 002107 100007
0000627654    177777 077772 001070 070400
0000627655    000000 000014 000600 007370
0000627656    000001 000000 002100 040000
0000627657    000000 000000 154000 000000
0000627660    000000 000000 020000 000000
0000627661    000000 000000 000000 000000
0000627662    000000 000000 000001 000634
0000627663    000000 000000 000001 004627
0000627664    000000 000000 000000 000016
0000627665    000000 000000 000000 000000
0000627666    000000 000000 000000 000000
0000627667    000000 000000 000000 000000
0000627670    000000 000000 000000 000000
0000627671    000000 000000 000000 000000
0000627672    000000 000000 000000 000000
0000627673    000000 000000 000000 000000
0000627674    000000 000000 000000 000000
0000627675    000000 000000 000000 000000
0000627676    000000 000000 000000 000000
0000627677    000211 137646 015440 177446
0000627700    000000 000000 000000 000001
0000627701    000000 000000 000000 000000
0000627702    000000 000000 000000 000000
0000627703    000000 000000 000000 000000
0000627704    000000 000000 000000 000000
0000627705    000000 000000 000000 000000
0000627706    000000 000000 000022 030263
0000627707    040010 130430 121161 004247
0000627710    000000 000000 000000 000165
0000627711    000000 000000 000000 000000
0000627712    000211 137617 047627 002042
0000627713    000211 137617 047623 133745
0000627714    000211 137646 015440 175616
0000627715    000000 000000 000000 000000
0000627716    000000 000000 000000 000000
0000627717    000000 000000 000000 000000
0000627720    000000 000000 000000 000000
0000627721    000000 000000 000000 000000
0000627722    000000 000000 000000 000000
0000627723    000000 000000 000000 000000
0000627724    000000 000000 000000 000000
0000627725    000000 000000 000000 000000
0000627726    000000 000000 000000 000000
0000627727    000000 000000 000000 000000
0000627730    000000 000000 000000 000000
0000627731    000000 000000 000000 000000
0000627732    000000 000000 000000 000000
0000627733    000000 000000 000000 000000
0000627734    000000 000000 000000 000000
0000627735    000000 000000 000000 000000
0000627736    000000 000000 000000 000000
0000627737    000000 000000 000000 000000
0000627740    000000 000000 000000 000000
0000627741    000000 000000 000000 000000
0000627742    000000 000000 000000 000000
0000627743    000000 000000 000000 000000
0000627744    000000 000000 000000 000000
0000627745    000000 000000 000000 000000
0000627746    000000 000000 000000 000000
0000627747    000000 000000 000000 000000
0000627750    000000 000000 000000 000000
0000627751    000000 000001 035565 124531
```

```
0000627752    000000 000001 034501 110757
0000627753    000000 000000 000407 020117
0000627754    000000 000000 000000 000000
0000627755    000000 000000 000000 000000
0000627756    000000 000000 000000 000000
0000627757    000000 000000 000000 000000
0000627760    000000 000000 000000 000000
0000627761    000000 000000 000000 000000
0000627762    000000 000000 000000 000000
0000627763    000000 000000 000000 000000
0000627764    000000 000000 000000 000000
0000627765    000000 000000 177777 177777
0000627766    177777 177777 177777 177777
0000627767    000000 000000 000000 000000
0000627770    000000 000000 000133 002157
0000627771    000000 000000 000000 000000
0000627772    000000 000000 000000 000000
0000627773    000000 000000 000000 000000
0000627774    000000 000000 000000 000000
0000627775    000000 000000 000000 000000
0000627776    000000 000000 000000 000000
0000627777    000000 000000 000000 000000
0000630000    000000 000000 000000 000000
0000630001    000000 000000 000000 000000
0000630002    000000 000000 000000 020001
0000630003    000000 000000 000000 042260
0000630004    000000 000000 000000 000250
0000630005    000000 000000 000000 000010

Memory from A3 (A3 + DBA = 0000000200)
---------------------------------------
0000000200    000000 000000 000000 000000
0000000201    000105 160000 000000 005672
0000000202    051524 040503 045514 044515
0000000203    000000 000000 007772 154000
0000000204    043525 042523 052124 040502
0000000205    000105 165670 000000 000002
0000000206    000000 000000 000000 000000
0000000207    000000 000000 000000 000000
0000000210    000000 000000 000000 000000
0000000211    000000 000000 000000 000000
0000000212    000000 000000 000000 000000
0000000213    000000 000000 000000 000000
0000000214    000000 000000 000000 000000
0000000215    000000 000000 000000 000000
0000000216    000000 000000 000000 000000
0000000217    000000 000000 000000 000000
0000000220    000000 000000 000000 000000
0000000221    000000 000000 000000 000000
0000000222    000000 000000 000000 000000
0000000223    000000 000000 000000 000000
0000000224    000000 000000 000000 000000
0000000225    000000 000000 000000 000000
0000000226    000000 000000 000000 000000
0000000227    000000 000000 000000 000000
0000000230    000000 000000 000000 000000
0000000231    000000 000000 000000 000000
0000000232    000000 000000 000000 000000
0000000233    000000 000000 000000 000000
0000000234    000000 000000 000000 000000
0000000235    000000 000000 000000 000000
0000000236    000000 000000 000000 000000
0000000237    000000 000000 000000 000000
0000000240    000000 000000 000000 000000
0000000241    000000 000000 000000 000000
0000000242    000000 000000 000000 000000
0000000243    000000 000000 000000 000000
0000000244    000000 000000 000000 000000
0000000245    000000 000000 000000 000000
0000000246    000000 000000 000000 000000
0000000247    000000 000000 000000 000000
0000000250    000000 000000 000000 000000
0000000251    000000 000000 000000 000000
0000000252    000000 000000 000000 000000
0000000253    000000 000000 000000 000000
0000000254    000000 000000 000000 000000
0000000255    000000 000000 000000 000000
0000000256    000000 000000 000000 000000
0000000257    000000 000000 000000 000000
0000000260    000000 000000 000000 000000
0000000261    000000 000000 000000 000000
0000000262    000000 000000 000000 000000
0000000263    000000 000000 000000 000000
0000000264    000000 000000 000000 000000
0000000265    000000 000000 000000 000000
0000000266    000000 000000 000000 000000
0000000267    000000 000000 000000 000000
0000000270    000000 000000 000000 000000
0000000271    000000 000000 000000 000000
0000000272    000000 000000 000000 000000
0000000273    000000 000000 000000 000000
0000000274    000000 000000 000000 000000
```

```
0000000275    000000 000000 000000 000000
0000000276    000000 000000 000000 000000
0000000277    000000 000000 000000 000000
0000000300    000000 000000 000000 000000
0000000301    000000 000000 000000 000000
0000000302    000000 000000 000000 000000
0000000303    000000 000000 000000 000000
0000000304    000000 000000 000000 000000
0000000305    000000 000000 000000 000000
0000000306    000000 000000 000000 000000
0000000307    000000 000000 000000 000000
0000000310    000000 000000 000000 000000
0000000311    000000 000000 000000 000000
0000000312    000000 000000 000000 000000
0000000313    000000 000000 000000 000000
0000000314    000000 000000 000000 000000
0000000315    000000 000000 000000 000000
0000000316    000000 000000 000000 000000
0000000317    000000 000000 000000 000000
0000000320    000000 000000 000000 000000
0000000321    000000 000000 000000 000000
0000000322    000000 000000 000000 000000
0000000323    000000 000000 000000 000000
0000000324    000000 000000 000000 000000
0000000325    000000 000000 000000 000000
0000000326    000000 000000 000000 000000
0000000327    000000 000000 000000 000000
0000000330    000000 000000 000000 000000
0000000331    000000 000000 000000 000000
0000000332    000000 000000 000000 000000
0000000333    000000 000000 000000 000000
0000000334    000000 000000 000000 000000
0000000335    000000 000000 000000 000000
0000000336    000000 000000 000000 000000
0000000337    000000 000000 000000 000000
0000000340    000000 000000 000000 000000
0000000341    000000 000000 000000 000000
0000000342    025154 067567 066545 066452
0000000343    000000 000000 000000 001360
0000000344    061541 061550 062440 020040
0000000345    000000 000000 000020 154115
0000000346    061541 066154 067565 072040
0000000347    000000 000000 000021 105374
0000000350    061550 060556 067145 066040
0000000351    000000 000000 000023 022303
0000000352    061554 067543 065440 020040
0000000353    000000 000000 000022 017510
0000000354    062551 067546 071145 062440
0000000355    000000 000000 000001 020015
0000000356    062551 067560 060543 065440
0000000357    000000 000000 000001 020021
0000000360    062551 067560 065545 067144
0000000361    000000 000000 000001 020023
0000000362    066551 067560 020040 020040
0000000363    000000 000000 000001 020013
0000000364    062556 062157 063144 060564
0000000365    000000 000000 000023 022245
0000000366    062562 071056 064040 020040
0000000367    000000 000000 000022 004144
0000000370    063151 066145 027150 020040
0000000371    000000 000000 000011 147575
0000000372    063154 067543 065456 064040
0000000373    000000 000000 000020 152123
0000000374    063163 066157 063456 064040
0000000375    000000 000000 000022 011242
0000000376    063163 072141 061154 062563
0000000377    000000 000000 000023 013415

Memory from A4 (A4 + DBA = 0000002135)
---------------------------------------
0000002135    000000 000000 000000 000000
0000002136    000000 000000 000000 000000
0000002137    000000 000000 000000 000000
0000002140    000001 106152 000012 120517
0000002141    000003 011460 000012 120501
0000002142    000003 012742 000012 120502
0000002143    000003 011460 000012 120517
0000002144    000003 012742 000012 124327
0000002145    176665 000004 000012 120523
0000002146    000000 000000 000012 120511
0000002147    006016 043100 000012 120517
0000002150    000000 000000 000000 000000
0000002151    000000 000000 000012 120512
0000002152    000000 000000 000000 000001
0000002153    000211 137646 123450 156735
0000002154    000000 000000 000001 171235
0000002155    020000 000041 000000 000002
0000002156    000000 000000 000000 000002
0000002157    020000 000041 000000 000000
0000002160    000000 000000 000000 000000
0000002161    000000 000000 000000 000000
0000002162    000000 000000 000000 000000
```

```
0000002163    000000 000000 000000 000000
0000002164    000000 000000 000000 000000
0000002165    000000 000000 000000 000000
0000002166    000000 000000 000000 000000
0000002167    000000 000000 000000 000000
0000002170    000000 000000 000000 000000
0000002171    000000 000000 000000 000000
0000002172    000000 000000 000000 000000
0000002173    000000 000000 000000 000000
0000002174    000000 000000 000000 000000
0000002175    000000 000000 000000 000000
0000002176    000000 000000 000000 000000
0000002177    000000 000000 000000 000000
0000002200    000135 052636 000000 000000
0000002201    000000 000000 000000 002200
0000002202    000003 177777 000000 000000
0000002203    000000 000000 000000 000000
0000002204    000003 177777 000000 000000
0000002205    000000 000011 000000 000000
0000002206    000000 000000 000001 013024
0000002207    006401 044000 000000 000000
0000002210    000000 000000 000000 000000
0000002211    000000 000000 000000 000000
0000002212    000000 000000 000000 000000
0000002213    000000 000000 000000 000000
0000002214    000000 000000 000000 000000
0000002215    000000 000000 000000 000000
0000002216    000000 000000 000000 000000
0000002217    000000 000000 000000 000000
0000002220    000000 000000 000000 000000
0000002221    000000 000000 000000 000000
0000002222    000000 000000 000000 000000
0000002223    000000 000000 000000 000000
0000002224    000000 000000 000000 000000
0000002225    000000 000000 000000 000000
0000002226    000000 000000 000000 000000
0000002227    000000 000000 000000 000000
0000002230    000000 000000 000000 000000
0000002231    000000 000000 000000 000000
0000002232    000000 000000 000000 000000
0000002233    000000 000000 000000 000000
0000002234    000000 000000 000000 000000
0000002235    000000 000000 000000 000000
0000002236    000000 000000 000000 000000
0000002237    000000 000000 000000 000000
0000002240    000135 070673 000000 004745
0000002241    000000 000000 000000 002240
0000002242    000003 177777 000003 053767
0000002243    000000 000000 004025 014000
0000002244    000003 177777 000022 063460
0000002245    176000 000017 004025 020000
0000002246    000000 000000 000001 013024
0000002247    006401 045200 000000 002200
0000002250    000000 000000 000000 000000
0000002251    000000 000000 000000 000133
0000002252    000000 000000 000000 000000
0000002253    000000 000000 007116 073564
0000002254    000211 137646 133362 125475
0000002255    000000 000001 065376 042321
0000002256    000211 137646 124244 031711
0000002257    000000 000000 000000 000001
0000002260    000000 000000 000000 000000
0000002261    000000 000000 000000 000000
0000002262    000000 000000 000000 000000
0000002263    000000 000000 000000 000000
0000002264    000000 000000 000000 000000
0000002265    000000 000000 000000 000000
0000002266    000000 000000 000000 000000
0000002267    000000 000000 000000 000000
0000002270    000000 000000 000000 000000
0000002271    000000 000000 000000 000000
0000002272    000000 000000 000000 000000
0000002273    000000 000000 000000 000000
0000002274    000000 000000 000000 000000
0000002275    000000 000000 000000 000000
0000002276    000000 000000 000000 000000
0000002277    000000 000000 000000 000000
0000002300    000135 052636 000000 000000
0000002301    000000 000000 000000 002300
0000002302    000003 177777 000000 000000
0000002303    000000 000000 000000 000000
0000002304    000003 177777 000000 000000
0000002305    000000 000011 000000 000000
0000002306    000000 000000 000001 013157
0000002307    007001 046000 000000 000000
0000002310    000000 000000 000000 000000
0000002311    000000 000000 000000 000000
0000002312    000000 000000 000000 000000
0000002313    000000 000000 000000 000000
0000002314    000000 000000 000000 000000
0000002315    000000 000000 000000 000000
0000002316    000000 000000 000000 000000
```

```
0000002317    000000 000000 000000 000000
0000002320    000000 000000 000000 000000
0000002321    000000 000000 000000 000000
0000002322    000000 000000 000000 000000
0000002323    000000 000000 000000 000000
0000002324    000000 000000 000000 000000
0000002325    000000 000000 000000 000000
0000002326    000000 000000 000000 000000
0000002327    000000 000000 000000 000000
0000002330    000000 000000 000000 000000
0000002331    000000 000000 000000 000000
0000002332    000000 000000 000000 000000
0000002333    000000 000000 000000 000000
0000002334    000000 000000 000000 000000


Memory from A5 (A5 + DBA = 0000001750)
------------------------------------------
0000001750    000000 000000 000000 000000
0000001751    000000 000000 000000 000156
0000001752    000000 000000 076070 140345
0000001753    000000 000000 005635 040000
0000001754    000211 137646 133362 123117
0000001755    000000 000000 017057 175631
0000001756    000211 137646 133362 122620
0000001757    000000 000000 000000 000277
0000001760    000000 000000 000000 000000
0000001761    000000 000000 000000 000000
0000001762    000000 000000 000000 000000
0000001763    000000 000000 000000 000000
0000001764    000000 000000 000000 000000
0000001765    000000 000000 000000 000000
0000001766    000000 000000 000000 000000
0000001767    000000 000000 000000 000000
0000001770    000000 000000 000000 000000
0000001771    000000 000000 000000 000000
0000001772    000000 000000 000000 000000
0000001773    000000 000000 000000 000000
0000001774    000000 000000 000000 000000
0000001775    000000 000000 000000 000000
0000001776    000000 000000 000000 000000
0000001777    000000 000000 000000 000000
0000002000    000135 052636 000000 000000
0000002001    000000 000000 000000 002000
0000002002    000003 177777 000000 000000
0000002003    000000 000000 000000 000000
0000002004    000003 177777 000000 000000
0000002005    000000 000011 000000 000000
0000002006    000000 000000 000001 012536
0000002007    005401 040000 000000 000000
0000002010    000000 000000 000000 000000
0000002011    000000 000000 000000 000000
0000002012    000000 000000 000000 000000
0000002013    000000 000000 000000 000000
0000002014    000000 000000 000000 000000
0000002015    000000 000000 000000 000000
0000002016    000000 000000 000000 000000
0000002017    000000 000000 000000 000000
0000002020    000000 000000 000000 000000
0000002021    000000 000000 000000 000000
0000002022    000000 000000 000000 000000
0000002023    000000 000000 000000 000000
0000002024    000000 000000 000000 000000
0000002025    000000 000000 000000 000000
0000002026    000000 000000 000000 000000
0000002027    000000 000000 000000 000000
0000002030    000000 000000 000000 000000
0000002031    000000 000000 000000 000000
0000002032    000000 000000 000000 000000
0000002033    000000 000000 000000 000000
0000002034    000000 000000 000000 000000
0000002035    000000 000000 000000 000000
0000002036    000000 000000 000000 000000
0000002037    000000 000000 000000 000000
0000002040    000135 070673 000001 035454
0000002041    000000 000000 000000 002040
0000002042    000003 177777 000003 045552
0000002043    000000 000000 000423 030000
0000002044    000003 177777 000022 063460
0000002045    176000 000017 000423 034000
0000002046    000000 000000 000001 012536
0000002047    005401 041200 000000 002000
0000002050    000000 000000 000000 000000
0000002051    000000 000000 000000 000132
0000002052    000000 000000 000000 000000
0000002053    000000 000000 000000 005750
0000002054    000211 137646 155772 072451
0000002055    000000 000001 100052 021313
0000002056    000211 137646 155772 064501
0000002057    000000 000000 000000 000001
0000002060    000000 000000 000000 000000
0000002061    000000 000000 000000 000000
0000002062    000000 000000 000000 000000
```

```
0000002063    000000 000000 000000 000000
0000002064    000000 000000 000000 000000
0000002065    000000 000000 000000 000000
0000002066    000000 000000 000000 000000
0000002067    000000 000000 000000 000000
0000002070    000000 000000 000000 000000
0000002071    000000 000000 000000 000000
0000002072    000000 000000 000000 000000
0000002073    000000 000000 000000 000000
0000002074    000000 000000 000000 000000
0000002075    000000 000000 000000 000000
0000002076    000000 000000 000000 000000
0000002077    000000 000000 000000 000000
0000002100    000135 052636 000000 000000
0000002101    000000 000000 000000 002100
0000002102    000003 177777 000000 000000
0000002103    000000 000000 000000 000000
0000002104    000003 177777 000000 000000
0000002105    000000 000011 000000 000000
0000002106    000000 000000 000001 012671
0000002107    006001 042000 000000 000000
0000002110    000000 000000 000000 000000
0000002111    000000 000000 000000 000000
0000002112    000000 000000 000000 000000
0000002113    000000 000000 000000 000000
0000002114    000000 000000 000000 000000
0000002115    000000 000000 000000 000000
0000002116    000000 000000 000000 000000
0000002117    000000 000000 000000 000000
0000002120    000000 000000 000000 000000
0000002121    000000 000000 000000 000000
0000002122    000000 000000 000000 000000
0000002123    000000 000000 000000 000000
0000002124    000000 000000 000000 000000
0000002125    000000 000000 000000 000000
0000002126    000000 000000 000000 000000
0000002127    000000 000000 000000 000000
0000002130    000000 000000 000000 000000
0000002131    000000 000000 000000 000000
0000002132    000000 000000 000000 000000
0000002133    000000 000000 000000 000000
0000002134    000000 000000 000000 000000
0000002135    000000 000000 000000 000000
0000002136    000000 000000 000000 000000
0000002137    000000 000000 000000 000000
0000002140    000001 106152 000012 120517
0000002141    000003 011460 000012 120501
0000002142    000003 012742 000012 120502
0000002143    000003 011460 000012 120517
0000002144    000003 012742 000012 124327
0000002145    176665 000004 000012 120523
0000002146    000000 000000 000012 120511
0000002147    006016 043100 000012 120517

Memory from A6 (A6 + DBA = 0000000165)
---------------------------------------
0000000165    000000 000000 000000 000000
0000000166    000000 000000 000000 000000
0000000167    000000 000000 000000 000000
0000000170    000000 000000 000000 000000
0000000171    000000 000000 000000 000000
0000000172    000000 000000 000000 000000
0000000173    000000 000000 000000 000000
0000000174    000000 000000 000000 000000
0000000175    000000 000000 000000 000000
0000000176    000000 000000 000000 000000
0000000177    000000 000000 000000 000000
0000000200    000000 000000 000000 000000
0000000201    000105 160000 000000 005672
0000000202    051524 040503 045514 044515
0000000203    000000 000000 007772 154000
0000000204    043525 042523 052124 040502
0000000205    000105 165670 000000 000002
0000000206    000000 000000 000000 000000
0000000207    000000 000000 000000 000000
0000000210    000000 000000 000000 000000
0000000211    000000 000000 000000 000000
0000000212    000000 000000 000000 000000
0000000213    000000 000000 000000 000000
0000000214    000000 000000 000000 000000
0000000215    000000 000000 000000 000000
0000000216    000000 000000 000000 000000
0000000217    000000 000000 000000 000000
0000000220    000000 000000 000000 000000
0000000221    000000 000000 000000 000000
0000000222    000000 000000 000000 000000
0000000223    000000 000000 000000 000000
0000000224    000000 000000 000000 000000
0000000225    000000 000000 000000 000000
0000000226    000000 000000 000000 000000
0000000227    000000 000000 000000 000000
0000000230    000000 000000 000000 000000
```

```
0000000231    000000 000000 000000 000000
0000000232    000000 000000 000000 000000
0000000233    000000 000000 000000 000000
0000000234    000000 000000 000000 000000
0000000235    000000 000000 000000 000000
0000000236    000000 000000 000000 000000
0000000237    000000 000000 000000 000000
0000000240    000000 000000 000000 000000
0000000241    000000 000000 000000 000000
0000000242    000000 000000 000000 000000
0000000243    000000 000000 000000 000000
0000000244    000000 000000 000000 000000
0000000245    000000 000000 000000 000000
0000000246    000000 000000 000000 000000
0000000247    000000 000000 000000 000000
0000000250    000000 000000 000000 000000
0000000251    000000 000000 000000 000000
0000000252    000000 000000 000000 000000
0000000253    000000 000000 000000 000000
0000000254    000000 000000 000000 000000
0000000255    000000 000000 000000 000000
0000000256    000000 000000 000000 000000
0000000257    000000 000000 000000 000000
0000000260    000000 000000 000000 000000
0000000261    000000 000000 000000 000000
0000000262    000000 000000 000000 000000
0000000263    000000 000000 000000 000000
0000000264    000000 000000 000000 000000
0000000265    000000 000000 000000 000000
0000000266    000000 000000 000000 000000
0000000267    000000 000000 000000 000000
0000000270    000000 000000 000000 000000
0000000271    000000 000000 000000 000000
0000000272    000000 000000 000000 000000
0000000273    000000 000000 000000 000000
0000000274    000000 000000 000000 000000
0000000275    000000 000000 000000 000000
0000000276    000000 000000 000000 000000
0000000277    000000 000000 000000 000000
0000000300    000000 000000 000000 000000
0000000301    000000 000000 000000 000000
0000000302    000000 000000 000000 000000
0000000303    000000 000000 000000 000000
0000000304    000000 000000 000000 000000
0000000305    000000 000000 000000 000000
0000000306    000000 000000 000000 000000
0000000307    000000 000000 000000 000000
0000000310    000000 000000 000000 000000
0000000311    000000 000000 000000 000000
0000000312    000000 000000 000000 000000
0000000313    000000 000000 000000 000000
0000000314    000000 000000 000000 000000
0000000315    000000 000000 000000 000000
0000000316    000000 000000 000000 000000
0000000317    000000 000000 000000 000000
0000000320    000000 000000 000000 000000
0000000321    000000 000000 000000 000000
0000000322    000000 000000 000000 000000
0000000323    000000 000000 000000 000000
0000000324    000000 000000 000000 000000
0000000325    000000 000000 000000 000000
0000000326    000000 000000 000000 000000
0000000327    000000 000000 000000 000000
0000000330    000000 000000 000000 000000
0000000331    000000 000000 000000 000000
0000000332    000000 000000 000000 000000
0000000333    000000 000000 000000 000000
0000000334    000000 000000 000000 000000
0000000335    000000 000000 000000 000000
0000000336    000000 000000 000000 000000
0000000337    000000 000000 000000 000000
0000000340    000000 000000 000000 000000
0000000341    000000 000000 000000 000000
0000000342    025154 067567 066545 066452
0000000343    000000 000000 000000 001360
0000000344    061541 061550 062440 020040
0000000345    000000 000000 000020 154115
0000000346    061541 066154 067565 072040
0000000347    000000 000000 000021 105374
0000000350    061550 060556 067145 066040
0000000351    000000 000000 000023 022303
0000000352    061554 067543 065440 020040
0000000353    000000 000000 000022 017510
0000000354    062551 067546 071145 062440
0000000355    000000 000000 000001 020015
0000000356    062551 067560 060543 065440
0000000357    000000 000000 000001 020021
0000000360    062551 067560 065545 067144
0000000361    000000 000000 000001 020023
0000000362    066551 067560 020040 020040
0000000363    000000 000000 000001 020013
0000000364    062556 062157 063144 060564
```

```
Memory from A7 (A7 + DBA = 1777340016)
---------------------------------------
1777340016    000000 000000 000037 155276
1777340017    000000 000000 000177 045665
1777340020    000000 000000 000027 055340
1777340021    000000 000000 007775 140010
1777340022    000000 000000 000000 000000
1777340023    000000 000000 000135 070000
1777340024    000000 000000 000001 010306
1777340025    000000 000000 000000 006063
1777340026    000000 000000 000000 000020
1777340027    000000 000000 000000 000001
1777340030    000000 000000 000000 000000
1777340031    000000 000000 000000 000000
1777340032    000000 000000 000000 006063
1777340033    000000 000000 000000 000000
1777340034    020000 000752 000000 000001
1777340035    000000 000000 000223 130223
1777340036    000000 000000 000000 000000
1777340037    000000 000000 000000 000020
1777340040    000000 000000 000000 000000
1777340041    000000 000000 000000 123620
1777340042    000000 000000 000000 000000
1777340043    000000 000000 000133 002140
1777340044    000000 000000 000000 000020
1777340045    000000 000000 000000 000000
1777340046    000000 000000 000003 001542
1777340047    000000 000000 000000 050365
1777340050    000000 000000 000000 130335
1777340051    000000 000000 000000 000000
1777340052    000000 000000 000003 001542
1777340053    000000 000000 000155 112641
1777340054    000000 000000 007775 140010
1777340055    000000 000000 000000 000000
1777340056    000000 000000 000000 000001
1777340057    020000 000727 000000 000001
1777340060    000000 000000 000020 154276
1777340061    000000 000000 000047 016550
1777340062    000000 000000 000000 000000
1777340063    000000 000000 000036 015743
1777340064    000000 000000 000153 171035
1777340065    000000 000000 007775 140030
1777340066    000000 000000 000000 000000
1777340067    000000 000000 000047 016550
1777340070    000000 000000 000047 017226
1777340071    004000 000000 000000 000000
1777340072    000010 000000 000000 000000
1777340073    000000 000000 000153 170523
1777340074    000000 000000 000000 000000
1777340075    000000 000000 000000 000000
1777340076    000000 000000 000000 000000
1777340077    000000 000000 000000 000047
1777340100    000000 000000 000400 000000
1777340101    177707 000000 000000 000000
1777340102    000000 000000 000000 000047
1777340103    000000 000000 000000 000001
1777340104    000000 000000 000000 000000
1777340105    000000 000000 000003 027606
1777340106    000000 000000 000003 041414
1777340107    000000 000000 000000 000001
1777340110    000000 000000 000000 000165
1777340111    000000 000000 000000 000000
1777340112    000000 000000 000026 147542
1777340113    000000 000000 000177 051542
1777340114    000000 000000 000037 155152
1777340115    000000 000000 007775 140016
1777340116    000000 000000 000000 001750
1777340117    000000 000000 000000 001750
1777340120    000000 000000 000000 000020
1777340121    000000 000000 000003 001542
1777340122    000000 000000 000003 001346
1777340123    000000 000000 000000 000000
1777340124    040060 140000 000000 000000
1777340125    000000 000000 000003 001346
1777340126    000000 000000 000000 000047
1777340127    000000 000000 000000 000000
1777340130    020000 002010 000000 000001
1777340131    000000 000000 003732 066225
1777340132    000000 000000 000000 000070
1777340133    000000 000000 000047 016550
1777340134    000000 000000 000000 000000
1777340135    000000 000000 000000 000000
1777340136    000000 000000 000005 140000
1777340137    000000 000000 000000 000000
1777340140    020000 003526 000000 000001
1777340141    000000 004000 000000 020005
1777340142    000000 000000 000000 127620
1777340143    000000 000000 000000 045145
1777340144    000000 000000 000000 037262
1777340145    000000 000000 000000 000004
1777340146    000000 000000 000000 002665
1777340147    000000 000000 000000 000044
```

```
1777340150    000000 000000 000000 000000
1777340151    000000 000000 000000 000000
1777340152    000000 000000 000000 017004
1777340153    000000 000000 000000 012671
1777340154    000000 000000 000000 000000
1777340155    000000 000000 000000 000314
1777340156    000000 000000 000000 000000
1777340157    000000 000000 000000 000000
1777340160    000000 000000 000000 000000
1777340161    000000 000000 000000 006614
1777340162    000000 000000 000000 000000
1777340163    000000 000000 000000 004711
1777340164    000000 000000 000000 012003
1777340165    000000 000000 000000 000000
1777340166    000000 000000 000000 005072
1777340167    000000 000000 000000 016252
1777340170    000000 000000 000000 000000
1777340171    000000 000000 000000 002665
1777340172    000000 000000 000000 000000
1777340173    000000 000000 000000 000000
1777340174    000000 000000 000000 000000
1777340175    000000 000000 000000 000000
1777340176    000000 000000 000000 000000
1777340177    000000 000000 000000 000000
1777340200    000000 000000 000000 000000
1777340201    000000 000000 000000 000000
1777340202    000000 000000 000150 011663
1777340203    000000 000000 007775 140116
1777340204    000000 000000 007775 140123
1777340205    000000 000000 000046 034507
1777340206    000000 000000 000026 125134
1777340207    000000 000000 000132 142173
1777340210    000000 000000 007775 140034
1777340211    000000 000000 007775 140112
1777340212    020000 002444 000000 000001
1777340213    000000 000000 000000 174306
1777340214    000000 000000 000000 000001
1777340215    000000 000000 000000 000000

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                    Test Point Dump
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

    TP-> 0        1        2        3        4        5        6        7
OPT      01234567 01234567 01234567 01234567 01234567 01234567 01234567 01234567


YE0      00110111 11100011 11100111 00100111 00110111 10010111 00000001 00000001
YF0      11101111 11111000 00010111 11100101 11010000 11111000 00010111 11000001
YF1      11101111 11111000 00010111 11100101 11010000 11111000 00010111 11000001
YF2      11101111 11111000 00010111 11100101 11010000 11111000 00010111 11000001
YG0      00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000001
YH0      11111111 11111111 11111111 11110000 11000000 11111111 11111111 11111111
YJ0      11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
YJ1      11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
YM0      11111111 11111111 11111111 11111111 00000001 00000011 11111111 11111111
YM1      11111111 11111111 11111111 11111111 00000000 00000011 11111111 11111111
YK0      00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000001
YK1      00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000001
HA0      00001000 00110000 00001000 01111111 00001000 00110000 00001000 01111111
HC0      00000000 00000000 00000000 00000000 00011000 00000001 00100100 10010001
JA0      11111111 11111111 00000000 00000000 11110010 00000110 00000000 00000001
JB0      00000000 00000000 00000000 00000000 00000000 00000000 00000010 00000001
JC0      00000000 00000000 00100000 00010000 00000000 01000000 00000000 00000001
JQ0      11111111 11111111 11100100 00101101 11111101 11111111 11111111 11111111
VQ0      00000000 00000000 00000000 00000000 11111111 11111111 11110000 00000001
VQ1      00000000 00000000 00000000 00000000 11111111 11111111 11110000 00000001
DA0      10000000 11010111 10000000 00000001 00000001 10101111 00000000 00000011
DC0      00000000 00010011 00000000 00100011 01100000 01000010 00000000 00000001
DD0      00001010 00000000 00001000 00001010 00000000 00001000 11111111 11111111
DD1      10000000 00000000 00000010 00000000 00000000 00001111 11111111 11111111
JQ1      00000000 00000000 11111111 11111111 11111111 11111111 11111111 11111111
SIE      11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111


****
**** the 'bin/.smon_trigger_cmd' script could not be executed
****


*******************************************************************************
   System Monitor Dump completed at:   Mon Feb 13 13:55:42 1995
*******************************************************************************
```

Software Trap in the User Code

```
*************************************************************************
               LME-C90 4.1.8    System Monitor Dump Summary
S/N 4027   CPU 11 (logical 11) triggered at:  Mon Feb 13 13:52:28 1995
*************************************************************************


@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                CPU/System Status
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


CPU Status:      100040 000117 177777 000000


CPU-related Status                                    System-related Status
------------------                                    ---------------------
Memory:         256K mode          = 0                System I/O Master Clear         = 0
                Half memory mode   = 0                System CPU Master Clear         = 0
                Half upper select  = 0
                                                      Function Error                  = 0
CPU:            Idle               = 0                System Error                    = 0


                I/O ECC Enabled    = 0                Control Cable Enables    0      = 1
                Test Mode          = 0                                         1      = 0
                Maint Restricted   = 0
                                                      Memory Priority                 = 17
Diag Monitor:   Active             = 0
                Parity Error       = 0                CPUs Present Mask               = 177777


Shared Register Select             = 0                CPU Parity Errors Mask          = 000000


Master CPU Select                  = 00


Memory Priority Check
---------------------
Memory priority is NOT LOCKED


@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
      DM Params set by the System Monitor (SMON)
         and the resulting DM data buffer
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


DM Params:
---------
MODES     02     DISA  *HICU   HICD   TPD   IBD   ECHO                  00: 005000
DATA      20    [LWR P] [CIP] [UPPR P] [COIN/HOLD]                     01: 101001
TP SEL    00    OPT=YE0                                                02: 000200
                                                                       03: 002740
EVENT     01    *VCIP   CIPM   PLPM   TP   ~TP   LEAD                  04: 177747
TRIGGER   02     VCIP  *CIPM   PLPM   TP   ~TP   LEAD                  05: 000000
TR MODE   1     *CPCT   TRCT                                           06: 000000
TR RESET  0      CIPM   PLPM                                           07: 000000
                                                                       10: 000000
DTC       000200                                                       11: 000000
                                                                       12: 000000
CIP VAL   002740               P VAL   0000000000a                     13: 000000
CIP MASK  177747               P MASK       00000a


TP0 (YE /xx /HA /DA )  00      TP4 (YG /YK0/JC /xx )  00
TP1 (YF0/xx /HC /DB )  00      TP5 (YH /YK1/JQ /JQ )  00
TP2 (YF1/YM0/JA /DC )  00      TP6 (YJ0/xx /VQ0/xx )  00
TP3 (YF2/YM1/JB /DD )  00      TP7 (YJ1/xx /VQ1/SIE)  00


DM Data:
-------


Buffer Contains 64 valid words of DM data


Event   P Register    CIP    Coincidence   Hold Issue Conditions    IB Data  Fetch  Wait   CIP
                                          JB JA MEM SR FU BT V S A   Valid   Quiet  Exch  Valid
000     0000001000a  176500       4       0  0   0  0  0  0  0 0 0    1       1     0      1
001     0000001000b  025003       4       0  1   0  0  0  0  0 0 0    1       1     0      1
002     0000001000c  150450       4       0  0   0  0  0  0  0 0 0    1       1     0      1
003     0000001000d  020600       4       0  0   0  0  0  0  0 0 0    1       1     0      1
004     0000001001c  030056       4       0  0   0  0  0  0  0 0 0    1       1     0      1
005     0000001001d  176300       4       0  0   0  0  0  0  0 0 1    1       1     0      1
006     0000001002a  042760       4       0  1   0  0  0  0  0 0 0    1       1     0      1
007     0000001002b  151230       4       0  0   0  0  1  0  0 0 0    1       1     0      1
010     0000001002c  155142       4       0  0   0  0  0  0  0 0 0    1       1     0      1
011     0000001002d  177010       4       0  0   0  0  0  0  0 0 0    1       1     0      1
012     0000001003a  024003       4       0  1   0  0  0  0  0 0 0    1       1     0      1
```

```
013     0000001003b  151050       4       0  0   0  0  1  0  0 0 0     1       1     0      1
014     0000001003c  150710       4       0  0   0  0  1  0  1 0 0     1       1     0      1
015     0000001003d  155607       4       0  0   0  0  0  0  0 0 0     1       1     0      1
016     0000001004a  177060       4       0  0   0  0  0  0  0 0 0     1       1     0      1
017     0000001004b  125600       4       0  1   1  0  0  0  0 0 0     1       1     0      1
020     0000001005a  044576       4       0  0   0  0  0  0  0 1 0     1       1     0      1
021     0000001005b  040700       4       0  0   0  0  0  0  0 0 0     1       1     0      1
022     0000001006a  046057       4       0  0   0  0  0  0  0 0 0     1       1     0      1
023     0000001006b  015000       4       0  0   0  0  0  0  0 1 0     1       1     0      1
024     0000000776b  020700       3       0  0   0  0  0  0  0 0 0     1       1     0      1
025     0000000777a  024502       3       0  0   0  0  0  0  0 0 0     1       1     0      1
026     0000000777b  022605       3       0  0   0  0  0  0  0 0 0     0       1     0      1
027     0000000777c  030056       4       0  0   0  0  0  0  0 0 0     0       1     0      1
030     0000000777d  002007       4       0  0   0  0  0  0  0 0 0     0       1     0      1
031     0000001000a  176500       4       0  0   0  0  0  0  0 0 0     1       1     0      1
032     0000001000b  025003       4       0  1   0  0  0  0  0 0 0     1       1     0      1
033     0000001000c  150450       4       0  0   0  0  0  0  0 0 0     1       1     0      1
034     0000001000d  020600       4       0  0   0  0  0  0  0 0 0     1       1     0      1
035     0000001001c  030056       4       0  0   0  0  0  0  0 0 0     1       1     0      1
036     0000001001d  176300       4       0  0   0  0  0  0  0 0 1     1       1     0      1
037     0000001002a  042760       4       0  1   0  0  0  0  0 0 0     1       1     0      1
040     0000001002b  151230       4       0  0   0  0  1  0  0 0 0     1       1     0      1
041     0000001002c  155142       4       0  0   0  0  0  0  0 0 0     1       1     0      1
042     0000001002d  177010       4       0  0   0  0  0  0  0 0 0     1       1     0      1
043     0000001003a  024003       4       0  1   0  0  0  0  0 0 0     1       1     0      1
044     0000001003b  151050       4       0  0   0  0  1  0  0 0 0     1       1     0      1
045     0000001003c  150710       4       0  0   0  0  1  0  1 0 0     1       1     0      1
046     0000001003d  155607       4       0  0   0  0  0  0  0 0 0     1       1     0      1
047     0000001004a  177060       4       0  0   0  0  0  0  0 0 0     1       1     0      1
050     0000001004b  125600       4       0  1   1  0  0  0  0 0 0     1       1     0      1
051     0000001005a  044576       4       0  0   0  0  0  0  0 1 0     1       1     0      1
052     0000001005b  040700       4       0  0   0  0  0  0  0 0 0     1       1     0      1
053     0000001006a  046057       4       0  0   0  0  0  0  0 0 0     1       1     0      1
054     0000001006b  015000       4       0  0   0  0  0  0  0 1 0     1       1     0      1
055     0000001007a  020600       4       0  0   0  0  0  0  0 0 0     1       1     0      1
056     0000001007d  007000       4       0  0   0  0  0  0  0 0 0     0       1     0      1
057     0000000744a  020000       3       0  0   0  0  0  0  0 0 0     1       1     0      1
060     0000000744d  025077       3       0  0   0  0  0  0  0 0 0     1       1     0      1
061     0000000745a  022504       3       0  0   0  0  0  0  0 0 0     1       1     0      1
062     0000000745b  024066       3       0  0   0  0  0  0  0 0 0     1       1     0      1
063     0000000745c  035577       3       0  0   0  0  0  0  0 0 0     1       1     0      1
064     0000000745d  024766       3       0  0   0  0  0  1  0 0 0     1       1     0      1
065     0000000746a  022504       3       0  0   0  0  0  0  0 0 0     1       1     0      1
066     0000000746b  030557       3       0  0   0  0  0  0  0 0 0     1       1     0      1
067     0000000746c  025601       3       0  0   0  0  0  0  0 0 0     1       1     0      1
070     0000000746d  025702       3       0  0   0  0  0  0  0 0 0     1       1     0      1
071     0000000747a  024767       3       0  0   0  0  0  1  0 0 0     1       1     0      1
072     0000000747b  031075       3       0  0   0  0  0  0  0 0 0     1       1     0      1
073     0000000747c  025566       3       0  0   0  0  0  0  0 0 0     1       1     0      1
074     0000000747d  024702       3       0  0   0  0  0  1  0 0 0     1       1     0      1
075     0000000750a  013000       3       0  0   0  0  0  0  0 0 1     1       1     0      1
076     0000000750d  002740       3       0  0   0  0  0  0  0 0 0     1       1     0      1
077     0000000751a  001000       3       1  0   0  0  0  0  0 0 0     1       1     0      1
```

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                    Failure Analysis
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
```

```
** Software failure occurred within a user job running under UNICOS
   (UNICOS revision:   8.0.2.4 or beyond)
```

```
Failing Exchange Package:
-------------------------
(For a SOFTWARE failure, the failing exchange package is the
 'EXCHANGE PACKAGE in the CPU before IB dump', which is shown
 in the 'Instruction Buffer Dump' section of this file.)
```

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                  Instruction Buffer Dump
          (with buffer-to-memory data compare)
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
```

```
INSTRUCTION BUFFER 0    (Memory IBA unknown)
-------------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  061072 016000 003246 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  042777 024602 040740 000456    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  020000 022710 136700 000010    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  000000 136100 000011 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  030676 075102 007000 020060    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  000000 042777 024602 040740    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  000460 020000 022710 136700    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  000010 000000 074702 136700    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  000011 000000 030676 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  017344 000000 020700 163110    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  000000 074701 071117 061017    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  051201 051102 017000 003266    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  000000 074700 061072 016000    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  003306 000000 042777 024602    ------ ------ ------ ------
```

```
----------  ------ ------ ------ ------  16  040740 000466 020000 022710    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  136700 000010 000000 136100    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  000011 000000 030676 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  020060 000000 120700 040201    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  000000 024602 042677 040640    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  000513 020000 022710 136600    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  000010 000000 030676 024702    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  137700 000011 000000 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  143010 000000 020700 163120    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  000000 074701 071117 061017    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  017000 003350 000000 074700    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  061071 016000 003371 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  042777 024602 040740 000517    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  020000 022710 043600 136700    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  000010 000000 136600 000011    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  000000 030676 007000 163120    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  000000 020700 163130 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  074701 071117 061017 017000    ------ ------ ------ ------

INSTRUCTION BUFFER 1    (Memory IBA unknown)
-------------------------------------------
ADDRESS     EXPECTED (memory)               ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  003407 000000 074700 061071    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  016000 003415 000000 020600    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  040246 000000 007000 163130    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  000000 020600 040247 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  007000 045001 000000 020700    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  163140 000000 074701 071117    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  061017 017000 003441 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  074700 061071 016000 003455    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  000000 120000 055521 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  014000 003455 000000 020600    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  040250 000000 007000 163140    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  000000 020700 163150 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  074701 071117 061017 017000    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  003473 000000 074700 061071    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  016000 003501 000000 020600    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  040251 000000 007000 163150    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  000000 020700 163160 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  074701 071117 061017 017000    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  003517 000000 074700 061071    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  016000 003525 000000 020600    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  040252 000000 007000 163160    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  000000 120700 037451 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  100700 037452 000000 100600    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  037453 000000 024402 042676    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  040640 000550 020000 022510    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  134600 000010 000000 025603    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  030654 134700 000011 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  114700 000012 000000 024703    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  114700 000013 000000 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  003705 000000 042777 024602    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  040740 000550 020000 022710    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  136700 000010 000000 136100    ------ ------ ------ ------

INSTRUCTION BUFFER 2    (Memory IBA unknown)
-------------------------------------------
ADDRESS     EXPECTED (memory)               ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  000000 020000 043741 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  025077 024066 024266 024467    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  022104 035177 030321 031043    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  013000 044764 000000 025202    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  025366 025601 043100 024002    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  022104 025066 034177 005000    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  030012 022501 025202 025366    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  037500 025601 020700 045075    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  000000 025700 020600 043747    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  000000 006000 146300 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  020000 043757 000000 025077    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  024066 024266 024467 022104    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  035177 022711 030327 031043    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  013000 045030 000000 030012    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  022501 025202 037500 025366    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  025601 024701 127700 000001    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  000000 024502 042677 040640    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  000030 020000 022605 135600    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  000005 000000 030665 135700    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  000006 000000 075700 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  154400 000000 024701 127700    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  000002 000000 024502 074600    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  022603 056666 040500 000002    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  000000 060461 040540 000030    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  020000 057446 022605 135500    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  000005 000000 135400 000006    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  000000 030665 135700 000007    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  000000 007000 154000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  074100 024002 024202 022104    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  025066 034177 030021 022101    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  036100 005000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  030012 022514 025202 025366    ------ ------ ------ ------
```

```
INSTRUCTION BUFFER 3    (Memory IBA 0050740000)
-----------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)                DIFFERENCE
0000000740  000011 000000 030676 007000  00  000011 000000 030676 007000    ------ ------ ------ ------
0000000741  040730 000000 043100 024002  01  040730 000000 043100 024002    ------ ------ ------ ------
0000000742  024202 022105 025066 034177  02  024202 022105 025066 034177    ------ ------ ------ ------
0000000743  030021 022103 036100 005000  03  030021 022103 036100 005000    ------ ------ ------ ------
0000000744  020000 040264 000000 025077  04  020000 040264 000000 025077    ------ ------ ------ ------
0000000745  022504 024066 035577 024766  05  022504 024066 035577 024766    ------ ------ ------ ------
0000000746  022504 030557 025601 025702  06  022504 030557 025601 025702    ------ ------ ------ ------
0000000747  024767 031075 025566 024702  07  024767 031075 025566 024702    ------ ------ ------ ------
0000000750  013000 003654 000000 002740  10  013000 003654 000000 002740    ------ ------ ------ ------
0000000751  001000 001000 024702 030070  11  001000 001000 024702 030070    ------ ------ ------ ------
0000000752  025766 022703 034700 005000  12  025766 022703 034700 005000    ------ ------ ------ ------
0000000753  020600 040262 000000 007000  13  020600 040262 000000 007000    ------ ------ ------ ------
0000000754  146300 000000 024601 024702  14  146300 000000 024601 024702    ------ ------ ------ ------
0000000755  006000 003643 000000 000000  15  006000 003643 000000 000000    ------ ------ ------ ------
0000000756  025202 025366 025601 020700  16  025202 025366 025601 020700    ------ ------ ------ ------
0000000757  003731 000000 025700 020600  17  003731 000000 025700 020600    ------ ------ ------ ------
0000000760  040272 000000 006000 146300  20  040272 000000 006000 146300    ------ ------ ------ ------
0000000761  000000 020000 040275 000000  21  000000 020000 040275 000000    ------ ------ ------ ------
0000000762  025077 022105 024066 024266  22  025077 022105 024066 024266    ------ ------ ------ ------
0000000763  024467 035177 020700 000337  23  024467 035177 020700 000337    ------ ------ ------ ------
0000000764  000000 030327 031043 013000  24  000000 030327 031043 013000    ------ ------ ------ ------
0000000765  003670 000000 025202 025366  25  003670 000000 025202 025366    ------ ------ ------ ------
0000000766  025601 020700 000155 000000  26  025601 020700 000155 000000    ------ ------ ------ ------
0000000767  020000 053602 000000 002007  27  020000 053602 000000 002007    ------ ------ ------ ------
0000000770  176700 024502 042777 154677  30  176700 024502 042777 154677    ------ ------ ------ ------
0000000771  022605 030056 177060 125700  31  022605 030056 177060 125700    ------ ------ ------ ------
0000000772  000022 000000 020600 000162  32  000022 000000 020600 000162    ------ ------ ------ ------
0000000773  000000 030056 042660 044567  33  000000 030056 042660 044567    ------ ------ ------ ------
0000000774  040700 123456 000000 046057  34  040700 123456 000000 046057    ------ ------ ------ ------
0000000775  177060 014000 004034 000000  35  177060 014000 004034 000000    ------ ------ ------ ------
0000000776  002704 020700 000155 000000  36  002704 020700 000155 000000    ------ ------ ------ ------
0000000777  024502 022605 030056 002007  37  024502 022605 030056 002007    ------ ------ ------ ------

INSTRUCTION BUFFER 4    (Memory IBA 0050740000)
-----------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)                DIFFERENCE
0000001000  176500 025003 150450 020600  00  176500 025003 150450 020600    ------ ------ ------ ------
0000001001  000162 000000 030056 176300  01  000162 000000 030056 176300    ------ ------ ------ ------
0000001002  042760 151230 155142 177010  02  042760 151230 155142 177010    ------ ------ ------ ------
0000001003  024003 151050 150710 155607  03  024003 151050 150710 155607    ------ ------ ------ ------
0000001004  177060 125600 000022 000000  04  177060 125600 000022 000000    ------ ------ ------ ------
0000001005  044576 040700 123456 000000  05  044576 040700 123456 000000    ------ ------ ------ ------
0000001006  046057 015000 003771 000000  06  046057 015000 003771 000000    ------ ------ ------ ------
0000001007  020600 040273 000000 007000  07  020600 040273 000000 007000    ------ ------ ------ ------
0000001010  003620 000000 043100 024002  10  003620 000000 043100 024002    ------ ------ ------ ------
0000001011  022105 025066 034177 005000  11  022105 025066 034177 005000    ------ ------ ------ ------
0000001012  000000 000000 000000 000000  12  000000 000000 000000 000000    ------ ------ ------ ------
0000001013  000000 000000 000000 000000  13  000000 000000 000000 000000    ------ ------ ------ ------
0000001014  000000 000000 000000 000000  14  000000 000000 000000 000000    ------ ------ ------ ------
0000001015  000000 000000 000000 000000  15  000000 000000 000000 000000    ------ ------ ------ ------
0000001016  000000 000000 000000 000000  16  000000 000000 000000 000000    ------ ------ ------ ------
0000001017  000000 000000 000000 000000  17  000000 000000 000000 000000    ------ ------ ------ ------
0000001020  000000 000000 000000 000000  20  000000 000000 000000 000000    ------ ------ ------ ------
0000001021  000000 000000 000000 000000  21  000000 000000 000000 000000    ------ ------ ------ ------
0000001022  000000 000000 000000 000000  22  000000 000000 000000 000000    ------ ------ ------ ------
0000001023  000000 000000 000000 000000  23  000000 000000 000000 000000    ------ ------ ------ ------
0000001024  000000 000000 000000 000000  24  000000 000000 000000 000000    ------ ------ ------ ------
0000001025  000000 000000 000000 000000  25  000000 000000 000000 000000    ------ ------ ------ ------
0000001026  000000 000000 000000 000000  26  000000 000000 000000 000000    ------ ------ ------ ------
0000001027  000000 000000 000000 000000  27  000000 000000 000000 000000    ------ ------ ------ ------
0000001030  000000 000000 000000 000000  30  000000 000000 000000 000000    ------ ------ ------ ------
0000001031  000000 000000 000000 000000  31  000000 000000 000000 000000    ------ ------ ------ ------
0000001032  000000 000000 000000 000000  32  000000 000000 000000 000000    ------ ------ ------ ------
0000001033  000000 000000 000000 000000  33  000000 000000 000000 000000    ------ ------ ------ ------
0000001034  000000 000000 000000 000000  34  000000 000000 000000 000000    ------ ------ ------ ------
0000001035  000000 000000 000000 000000  35  000000 000000 000000 000000    ------ ------ ------ ------
0000001036  000000 000000 000000 000000  36  000000 000000 000000 000000    ------ ------ ------ ------
0000001037  000000 000000 000000 000000  37  000000 000000 000000 000000    ------ ------ ------ ------

INSTRUCTION BUFFER 5    (Memory IBA unknown)
-----------------------------------------------
ADDRESS     EXPECTED (memory)                 ACTUAL (IB data)                DIFFERENCE
----------  ------ ------ ------ ------  00  000000 025700 020600 047652    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  000000 006000 146300 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  020000 047723 000000 025077    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  024066 024266 024467 022104    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  035177 022775 030327 031043    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  013000 142770 000000 030012    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  022501 025202 037500 025366    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  025601 024701 127100 000001    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  000000 042700 046017 014000    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  143130 000000 040700 000002    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  000000 024602 022710 040740    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  000042 020000 030567 022705    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  136700 000005 000000 136100    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  000006 000000 116500 000007    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  000000 030676 007000 164330    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  000000 024702 075100 127100    ------ ------ ------ ------
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----------  ------ ------ ------ ------  20  000012 000000 074000 015000    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  143130 000000 040700 170000    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  000000 024701 044617 040700    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  010000 000000 046067 127100    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  000001 000000 015000 143130    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  000000 130100 075316 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  120700 075316 000000 042600    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  046076 015000 143167 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  042777 024502 040740 000044    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  020000 020700 163260 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  022605 135700 000005 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  115700 000006 000000 030665    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  007000 044415 000000 051001    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  014000 143231 000000 042777    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  024502 040740 000045 020000    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  020700 143264 000000 022605    ------ ------ ------ ------

INSTRUCTION BUFFER 6    (Memory IBA unknown)
-------------------------------------------
ADDRESS     EXPECTED (memory)               ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  025202 025366 025601 020700    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  044436 000000 025700 020600    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  043663 000000 006000 146300    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  000000 020000 043673 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  025077 024066 024266 024467    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  022104 035177 030321 031043    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  013000 044400 000000 025202    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  025366 025601 024701 127200    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  000001 000000 120100 076051    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  000000 051002 014000 044500    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  000000 055140 055276 023710    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  071707 061027 120100 076051    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  000000 017000 044474 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  054140 055140 023710 071707    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  061072 016000 044500 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  042177 006000 044501 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  043100 024002 022104 025066    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  034177 005000 000000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  025202 025366 025601 020700    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  044546 000000 025700 020600    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  043701 000000 006000 146300    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  000000 020000 043704 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  025077 024066 024266 024467    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  022104 035177 030321 031043    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  013000 044510 000000 025202    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  025366 025601 024701 127000    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  000001 000000 014000 044561    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  000000 042177 006000 044562    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  000000 043100 024002 022104    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  025066 034177 005000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  030012 022501 025202 025366    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  037500 025601 020700 044635    ------ ------ ------ ------

INSTRUCTION BUFFER 7    (Memory IBA unknown)
-------------------------------------------
ADDRESS     EXPECTED (memory)               ACTUAL (IB data)              DIFFERENCE
----------  ------ ------ ------ ------  00  135700 000005 000000 115700    ------ ------ ------ ------
----------  ------ ------ ------ ------  01  000006 000000 030665 007000    ------ ------ ------ ------
----------  ------ ------ ------ ------  02  020060 000000 042700 046017    ------ ------ ------ ------
----------  ------ ------ ------ ------  03  015000 143231 000000 042100    ------ ------ ------ ------
----------  ------ ------ ------ ------  04  024002 024202 022104 025066    ------ ------ ------ ------
----------  ------ ------ ------ ------  05  034177 030021 022101 036100    ------ ------ ------ ------
----------  ------ ------ ------ ------  06  005000 043100 024002 024202    ------ ------ ------ ------
----------  ------ ------ ------ ------  07  022104 025066 034177 030021    ------ ------ ------ ------
----------  ------ ------ ------ ------  10  022101 036100 005000 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  11  030012 022502 025202 025366    ------ ------ ------ ------
----------  ------ ------ ------ ------  12  037500 025601 020700 143311    ------ ------ ------ ------
----------  ------ ------ ------ ------  13  000000 025700 020600 047731    ------ ------ ------ ------
----------  ------ ------ ------ ------  14  000000 006000 146300 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  15  020000 047733 000000 025077    ------ ------ ------ ------
----------  ------ ------ ------ ------  16  024066 024266 024467 022104    ------ ------ ------ ------
----------  ------ ------ ------ ------  17  035177 022761 030327 031043    ------ ------ ------ ------
----------  ------ ------ ------ ------  20  013000 143244 000000 030012    ------ ------ ------ ------
----------  ------ ------ ------ ------  21  022502 025202 037500 025366    ------ ------ ------ ------
----------  ------ ------ ------ ------  22  025601 120700 075316 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  23  042600 043500 046076 075500    ------ ------ ------ ------
----------  ------ ------ ------ ------  24  014000 144021 000000 040700    ------ ------ ------ ------
----------  ------ ------ ------ ------  25  000002 000000 024602 040740    ------ ------ ------ ------
----------  ------ ------ ------ ------  26  000077 020000 040600 047662    ------ ------ ------ ------
----------  ------ ------ ------ ------  27  000000 022706 043500 136700    ------ ------ ------ ------
----------  ------ ------ ------ ------  30  000006 000000 136600 000007    ------ ------ ------ ------
----------  ------ ------ ------ ------  31  000000 136500 000010 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  32  030676 007000 165160 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  33  024702 137100 000012 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  34  051001 016000 143435 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  35  042776 024602 040740 000100    ------ ------ ------ ------
----------  ------ ------ ------ ------  36  020000 040600 000002 000000    ------ ------ ------ ------
----------  ------ ------ ------ ------  37  040500 047664 000000 040400    ------ ------ ------ ------
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EXCHANGE PACKAGE in the CPU before IB dump
------------------------------------------
P    00000000751c  A0 000000 003421   IMODES 176665
IBA  00050740000   A1 000000 000005   IFLAGS 000000
ILA  00051130000   A2 000000 107333
DBA  00050740000   A3 000000 107672    *IRP   RPE
DLA  00051130000   A4 000000 113317    *IUM   MEU
                   A5 000000 107676    *IFP   FPE
PN 11 XA 0000      A6 000000 040273    *IOR   ORE
CN 15 VL 155       A7 000000 107672    *IPR   PRE
                                       *FEX   EEX
MODES 16 - *C90  *ESL  *BDM   MM        IBP   BPI
STATS 00 -  VNU   FPS   WS    PS       *ICM   MEC
                                       *IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 163160         *IIP   ICP
S2 000000 000000 000000 034654         *IIO   IOI
S3 000000 000000 000000 163060          IPC   PCI
S4 000000 000000 000000 163514         *IDL   DL
S5 000000 000000 000000 123456          IMI   MII
S6 036264 032047 115133 123456         *FNX   NEX
S7 000000 000000 000000 123456

RESTART EXCHANGE PACKAGE after IB dump
--------------------------------------
P    00000000751c  A0 000000 003421   IMODES 176665
IBA  00050740000   A1 000000 000005   IFLAGS 000000
ILA  00051130000   A2 000000 107333
DBA  00050740000   A3 000000 107672    *IRP   RPE
DLA  00051130000   A4 000000 113317    *IUM   MEU
                   A5 000000 107676    *IFP   FPE
PN 11 XA 1640      A6 000000 040273    *IOR   ORE
CN 15 VL 155       A7 000000 107672    *IPR   PRE
                                       *FEX   EEX
MODES 16 - *C90  *ESL  *BDM   MM        IBP   BPI
STATS 00 -  VNU   FPS   WS    PS       *ICM   MEC
                                       *IMC   MCU
S0 000000 000000 000000 000000          IRT   RTI
S1 000000 000000 000000 163160         *IIP   ICP
S2 000000 000000 000000 034654         *IIO   IOI
S3 000000 000000 000000 163060          IPC   PCI
S4 000000 000000 000000 163514         *IDL   DL
S5 000000 000000 000000 123456          IMI   MII
S6 036264 032047 115133 123456         *FNX   NEX
S7 000000 000000 000000 123456

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                    Register Dump
        (V, B, T, SB, ST, SM, VM, and VM1 registers)
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@

          Vector Register 0                              Vector Register 1
V00-000   005254 003064 105465 041503       V01-000   112357 125207 000271 074007
V00-001   011264 007717 131315 047304       V01-001   144250 024423 040275 072621
V00-002   037015 176055 046376 162046       V01-002   051566 160077 055046 101160
V00-003   005070 075333 066233 063203       V01-003   111355 014624 026641 127730
V00-004   072045 155703 007562 044470       V01-004   165472 062227 122030 102661
V00-005   024673 070037 126423 040470       V01-005   162373 136254 000513 164406
V00-006   010730 102465 004645 130460       V01-006   107017 172413 064525 100126
V00-007   054707 042744 046326 110522       V01-007   100542 142462 074656 057362
V00-010   035172 062637 107466 173077       V01-010   027570 066063 034422 006071
V00-011   062555 034536 127724 157740       V01-011   167277 147167 007031 123027
V00-012   003601 056240 145662 052216       V01-012   041567 075672 101463 153736
V00-013   017470 163170 140234 007103       V01-013   143333 034373 172475 145654
V00-014   067573 021425 033243 065600       V01-014   172530 157177 147237 170526
V00-015   026737 163500 034756 036214       V01-015   003552 023163 130066 132521
V00-016   075266 144222 143203 147175       V01-016   047265 023706 103517 104604
V00-017   062665 032057 171613 001735       V01-017   176662 125005 005147 142607
V00-020   035574 054162 154105 054734       V01-020   005144 132533 066010 010540
V00-021   075402 073722 077651 005665       V01-021   061042 057647 105573 003433
V00-022   011077 150500 041457 161213       V01-022   133554 175551 161510 160030
V00-023   070124 155415 171325 061701       V01-023   173330 101707 153705 137501
V00-024   032275 110061 055017 164424       V01-024   156226 013557 051626 063624
V00-025   055031 017322 155073 124325       V01-025   136316 130146 011616 017130
V00-026   046050 156666 153047 130300       V01-026   042312 004637 070632 053450
V00-027   020637 163233 157771 126743       V01-027   105743 027635 114454 123724
V00-030   077620 146427 072611 105223       V01-030   062134 064626 150712 142505
V00-031   013211 074575 145305 001262       V01-031   146635 060537 022241 014243
V00-032   061555 116175 175236 162726       V01-032   126357 054160 125427 122633
V00-033   014135 152256 115224 056205       V01-033   152637 106414 170600 177553
V00-034   041642 016064 127210 005117       V01-034   066154 175346 152013 131140
V00-035   045242 074056 025677 145324       V01-035   105356 055334 035370 124034
V00-036   041627 016604 164645 044235       V01-036   056127 031137 156767 013016
V00-037   075753 040413 061640 151452       V01-037   063263 177774 137100 144454
V00-040   056611 127731 177271 155336       V01-040   104215 022660 073065 057134
V00-041   060375 062652 027654 126543       V01-041   166046 022116 167566 025573
V00-042   046122 165754 156642 164442       V01-042   044736 141054 112202 047524
V00-043   020765 165561 111365 073224       V01-043   141204 017113 013606 063214
V00-044   065114 015265 054220 103405       V01-044   155260 033130 036662 013671
V00-045   007647 013040 156320 071340       V01-045   134056 121272 135054 033730
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V00-046   025770 163037 135347 176073      V01-046   177346 040070 054500 004076
V00-047   020025 062237 102243 155755      V01-047   102377 061403 002541 124770
V00-050   036235 101465 005451 155513      V01-050   035167 035113 173414 106412
V00-051   031207 122633 143466 016274      V01-051   020034 115301 124520 064305
V00-052   012252 151062 165166 151176      V01-052   150557 117011 005366 173231
V00-053   043133 137557 007356 045702      V01-053   062720 160135 046556 132143
V00-054   074260 040547 123561 075300      V01-054   017030 022006 070340 035440
V00-055   043364 124777 161342 035777      V01-055   063654 055721 110123 161450
V00-056   045463 021540 067130 017742      V01-056   106472 100717 050504 162355
V00-057   067640 077305 057134 154305      V01-057   171145 013223 106252 004604
V00-060   054571 115145 162430 033503      V01-060   077722 022440 051033 150475
V00-061   050146 141242 056047 171615      V01-061   045453 143755 157653 022546
V00-062   004772 176443 104222 072115      V01-062   111205 105353 172630 123104
V00-063   055644 012523 000654 140632      V01-063   077061 117742 065063 144746
V00-064   074340 052615 075236 074505      V01-064   001051 157116 052436 067635
V00-065   072746 175026 043713 042336      V01-065   007651 102646 174175 066715
V00-066   054131 172331 154462 163175      V01-066   067020 044570 121262 131201
V00-067   003213 012047 024404 067744      V01-067   112574 171133 136642 031327
V00-070   011121 057573 121547 014141      V01-070   072020 131442 051375 042437
V00-071   027147 046562 000077 037301      V01-071   005456 055353 133600 135734
V00-072   043247 062210 136615 047567      V01-072   074412 056752 070106 052404
V00-073   062460 164022 065213 120231      V01-073   177373 044723 004554 046623
V00-074   020721 001322 117245 053145      V01-074   176033 020742 034574 001260
V00-075   043117 125037 136513 112173      V01-075   017114 054434 003066 075367
V00-076   033512 174351 076762 102360      V01-076   164226 114314 144022 155421
V00-077   062147 033072 134506 051066      V01-077   174143 052745 025763 123154
V00-100   036253 143127 050164 001676      V01-100   171356 134430 064605 043516
V00-101   000651 165175 010420 075232      V01-101   042046 111341 010036 000573
V00-102   004436 074221 047656 004154      V01-102   120362 166647 116611 135471
V00-103   043623 171613 023725 070513      V01-103   077031 147617 025153 063706
V00-104   002342 023131 173047 121723      V01-104   047270 162462 077570 017520
V00-105   015440 162756 031076 035266      V01-105   157434 164365 175366 033421
V00-106   040134 046744 077456 006736      V01-106   055306 144640 012007 036754
V00-107   000611 033071 135515 017652      V01-107   034220 007541 127176 115110
V00-110   056612 174737 031455 051420      V01-110   147663 106340 175711 170543
V00-111   054360 007677 116465 120456      V01-111   076576 136405 114520 127451
V00-112   063760 173712 043712 066656      V01-112   140101 127713 106776 124723
V00-113   074424 106062 063131 030116      V01-113   001757 064554 053422 020536
V00-114   024274 014720 050750 067316      V01-114   015061 015623 123271 114576
V00-115   010027 135315 042624 102713      V01-115   103430 137230 011546 115676
V00-116   043346 026273 143474 034737      V01-116   036662 145475 055540 043456
V00-117   043501 155054 030530 006051      V01-117   074647 065450 010141 122023
V00-120   020332 100525 142553 123545      V01-120   102210 016244 017164 145551
V00-121   055110 047267 047437 117520      V01-121   147114 004747 114021 030745
V00-122   015052 162036 043073 147171      V01-122   156357 132075 053267 110122
V00-123   064151 121545 143270 161653      V01-123   143267 160466 017621 125002
V00-124   047362 104474 143372 172377      V01-124   114117 132152 176161 176137
V00-125   053743 045253 056430 161222      V01-125   142672 154771 057704 111410
V00-126   001047 076606 021676 132271      V01-126   077341 162303 145371 116073
V00-127   032173 117306 035225 162017      V01-127   155545 145050 041377 157770
V00-130   033715 010351 106542 125645      V01-130   160246 121425 077260 035370
V00-131   056076 017647 142115 070373      V01-131   142740 025760 166417 142512
V00-132   040332 130143 162204 064112      V01-132   004354 072431 134412 113670
V00-133   002454 055212 042061 124015      V01-133   052670 026422 035553 107020
V00-134   012774 111541 005312 123053      V01-134   117074 036623 170216 040521
V00-135   046247 050501 162166 000756      V01-135   054074 011126 145705 176342
V00-136   065540 145131 001260 103600      V01-136   156476 071542 111321 032717
V00-137   040455 111051 022653 050456      V01-137   022072 130326 170670 002060
V00-140   047337 045712 016177 057466      V01-140   053445 014147 062002 004335
V00-141   041116 017727 142103 115706      V01-141   051473 160070 153647 157503
V00-142   035575 066353 103161 063000      V01-142   167035 153573 063041 144451
V00-143   037175 025142 115744 022213      V01-143   051312 113517 135044 170734
V00-144   047537 142471 175267 123132      V01-144   051430 166142 117417 177550
V00-145   031143 075747 153613 004640      V01-145   151215 173413 155322 133116
V00-146   073303 100317 137003 075463      V01-146   174313 002123 116011 106173
V00-147   047725 046123 162415 063337      V01-147   111331 024372 015033 153606
V00-150   013347 046464 172127 025535      V01-150   057112 030122 046066 004274
V00-151   043020 030566 012672 007720      V01-151   061641 120437 152151 134077
V00-152   030014 131050 032267 114407      V01-152   000417 133626 121203 000026
V00-153   033031 067271 023437 122361      V01-153   011564 133425 011504 007404
V00-154   015132 167654 013121 053774      V01-154   066635 073604 121647 074234
V00-155   000000 000000 000000 000000      V01-155   000000 000000 000000 000000
V00-156   000000 000000 000000 000000      V01-156   000000 000000 000000 000000
V00-157   000000 000000 000000 000000      V01-157   000000 000000 000000 000000
V00-160   000000 000000 000000 000000      V01-160   000000 000000 000000 000000
V00-161   000000 000000 000000 000000      V01-161   000000 000000 000000 000000
V00-162   000000 000000 000000 000000      V01-162   000000 000000 000000 000000
V00-163   000000 000000 000000 000000      V01-163   000000 000000 000000 000000
V00-164   000000 000000 000000 000000      V01-164   000000 000000 000000 000000
V00-165   000000 000000 000000 000000      V01-165   000000 000000 000000 000000
V00-166   000000 000000 000000 000000      V01-166   000000 000000 000000 000000
V00-167   000000 000000 000000 000000      V01-167   000000 000000 000000 000000
V00-170   000000 000000 000000 000000      V01-170   000000 000000 000000 000000
V00-171   000000 000000 000000 000000      V01-171   000000 000000 000000 000000
V00-172   000000 000000 000000 000000      V01-172   000000 000000 000000 000000
V00-173   000000 000000 000000 000000      V01-173   000000 000000 000000 000000
V00-174   000000 000000 000000 000000      V01-174   000000 000000 000000 000000
V00-175   000000 000000 000000 000000      V01-175   000000 000000 000000 000000
V00-176   000000 000000 000000 000000      V01-176   000000 000000 000000 000000
V00-177   000000 000000 000000 000000      V01-177   000000 000000 000000 000000
```

	Vector Register 2					Vector Register 3			
V02-000	065077	110664	151744	065371	V03-000	152177	021551	123710	152763
V02-001	076727	164724	072610	035201	V03-001	175657	151650	165420	072403
V02-002	055476	167612	023052	170726	V03-002	133175	157424	046125	161655
V02-003	065013	027046	075464	012714	V03-003	152026	056114	173150	025631
V02-004	015242	172613	063117	060321	V03-004	032505	165426	146236	140642
V02-005	037015	176055	046376	162046	V03-005	076033	174132	114775	144115
V02-006	043255	160067	041276	135624	V03-006	106533	140156	102575	073451
V02-007	015105	126641	043124	014650	V03-007	032213	055502	106250	031521
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          Vector Register 4                           Vector Register 5
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V04-152   140062 144240 151336 062036      V05-152   060031 062120 064557 031017
V04-153   154145 135344 116176 111706      V05-153   066062 156562 047077 044743
V04-154   064553 137260 054505 057760      V05-154   032265 157530 026242 127770
V04-155   000000 000000 000000 000000      V05-155   000000 000000 000000 000000
V04-156   000000 000000 000000 000000      V05-156   000000 000000 000000 000000
V04-157   000000 000000 000000 000000      V05-157   000000 000000 000000 000000
V04-160   000000 000000 000000 000000      V05-160   000000 000000 000000 000000
V04-161   000000 000000 000000 000000      V05-161   000000 000000 000000 000000
V04-162   000000 000000 000000 000000      V05-162   000000 000000 000000 000000
V04-163   000000 000000 000000 000000      V05-163   000000 000000 000000 000000
V04-164   000000 000000 000000 000000      V05-164   000000 000000 000000 000000
V04-165   000000 000000 000000 000000      V05-165   000000 000000 000000 000000
V04-166   000000 000000 000000 000000      V05-166   000000 000000 000000 000000
V04-167   000000 000000 000000 000000      V05-167   000000 000000 000000 000000
V04-170   000000 000000 000000 000000      V05-170   000000 000000 000000 000000
V04-171   000000 000000 000000 000000      V05-171   000000 000000 000000 000000
V04-172   000000 000000 000000 000000      V05-172   000000 000000 000000 000000
V04-173   000000 000000 000000 000000      V05-173   000000 000000 000000 000000
V04-174   000000 000000 000000 000000      V05-174   000000 000000 000000 000000
V04-175   000000 000000 000000 000000      V05-175   000000 000000 000000 000000
V04-176   000000 000000 000000 000000      V05-176   000000 000000 000000 000000
V04-177   000000 000000 000000 000000      V05-177   000000 000000 000000 000000

          Vector Register 6                           Vector Register 7
V06-000   032213 055502 106250 031521      V07-000   024737 052416 000562 170016
V06-001   122004 060766 032110 034746      V07-001   110520 051046 100572 165442
V06-002   162373 136254 000513 164406      V07-002   123355 140176 132115 002340
V06-003   030022 127003 143736 143063      V07-003   022732 031450 055503 057660
V06-004   045232 122362 053643 052232      V07-004   153164 144457 044061 005542
V06-005   171662 164567 127653 011504      V07-005   144767 074530 001227 151014
V06-006   026770 067513 156120 130734      V07-006   016037 165026 151253 000254
V06-007   056214 150111 040063 047466      V07-007   001305 105144 171534 136744
V06-010   114553 037006 000533 007261      V07-010   057360 154146 071044 014162
V06-011   041354 153114 146010 026016      V07-011   156577 116356 016063 046056
V06-012   107160 052025 151032 002112      V07-012   103356 173565 003147 127674
V06-013   126357 054160 125427 122633      V07-013   106666 070767 165173 113530
V06-014   055054 160024 151743 047054      V07-014   165261 136377 116477 161254
V06-015   036264 032047 115133 123456      V07-015   007324 046347 060155 065242
V06-016   014041 014037 152442 160605      V07-016   116552 047615 007237 011410
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V06-017   060432 104072 004132 107353      V07-017   175545 052012 012317 105416
V06-020   050105 141451 130125 076234      V07-020   012311 065266 154020 021300
V06-021   037507 033441 113237 014753      V07-021   142104 137517 013366 007066
V06-022   100431 144024 004701 121273      V07-022   067331 173323 143221 140060
V06-023   057005 161235 121140 161103      V07-023   166661 003617 127613 077202
V06-024   166751 137420 000474 134074      V07-024   134454 027336 123454 147450
V06-025   151666 077637 000527 162605      V07-025   074635 060314 023434 036260
V06-026   152674 170365 134534 057420      V07-026   104624 011476 161464 127120
V06-027   034546 042727 011122 176613      V07-027   013706 057473 031131 047650
V06-030   044111 120105 014437 012435      V07-030   144270 151455 121625 105212
V06-031   130704 036074 012007 031770      V07-031   115472 141276 044502 030506
V06-032   136514 046537 050316 030414      V07-032   054736 130341 053057 045466
V06-033   141634 167310 076626 055533      V07-033   125477 015031 161401 177326
V06-034   016174 011002 053237 067417      V07-034   154331 172715 124027 062300
V06-035   060177 026746 120661 015414      V07-035   012734 132670 072761 050070
V06-036   176105 101104 122623 072271      V07-036   134256 062277 135756 026034
V06-037   044523 040404 160042 062602      V07-037   146547 177771 076201 111130
V06-040   067243 175472 165444 113626      V07-040   010432 045540 166152 136270
V06-041   034511 127110 007231 002131      V07-041   154114 044235 157354 053366
V06-042   160020 070106 003247 103712      V07-042   111675 102131 024404 117250
V06-043   123376 024007 141002 041654      V07-043   102410 036226 027414 146430
V06-044   017654 103545 151764 133167      V07-044   132540 066260 075544 027562
V06-045   100004 055626 050450 161220      V07-045   070135 042565 072130 067660
V06-046   024705 063220 066550 006267      V07-046   176714 100160 131200 010174
V06-047   025024 025245 107547 027735      V07-047   004776 143006 005303 051760
V06-050   130613 173714 174502 172537      V07-050   072356 072227 167031 015024
V06-051   071300 155437 014726 167106      V07-051   040071 032603 051240 150612
V06-052   133612 007105 000144 137660      V07-052   121337 036022 012755 166462
V06-053   010775 100051 124713 132210      V07-053   145641 140272 115335 064306
V06-054   132340 104564 104461 170400      V07-054   036060 044014 160700 073100
V06-055   013115 060643 001612 001117      V07-055   147530 133643 020247 143120
V06-056   062650 023377 010341 164674      V07-056   015165 001636 121211 144732
V06-057   052152 125754 073660 165715      V07-057   162312 026447 014524 011410
V06-060   054435 162246 104517 154675      V07-060   177644 045100 122067 121172
V06-061   163276 051176 015576 037131      V07-061   113127 107733 137526 045314
V06-062   027406 011373 071703 140325      V07-062   022413 012727 165461 046210
V06-063   054007 052427 153024 052546      V07-063   176143 037704 152147 111714
V06-064   076464 011052 022333 054177      V07-064   002123 136234 125074 157472
V06-065   112472 002544 034306 020170      V07-065   017523 005515 170372 155632
V06-066   032172 103713 017230 045577      V07-066   156040 111361 042545 062402
V06-067   030604 174336 122110 152622      V07-067   025371 162267 075504 062656
V06-070   175162 142700 044541 121237      V07-070   164041 063104 122772 105076
V06-071   042304 001511 067500 133171      V07-071   013134 132727 067401 073670
V06-072   034274 020135 117031 174577      V07-072   171024 135724 160214 125010
V06-073   061447 075670 076544 035677      V07-073   176766 111646 011330 115446
V06-074   015007 043227 010635 055705      V07-074   174066 041704 071370 002540
V06-075   101350 056127 144670 105151      V07-075   036230 131070 006154 172756
V06-076   004170 025203 007030 035422      V07-076   150455 030631 110045 133042
V06-077   052455 161005 010455 117416      V07-077   170306 125712 053747 046330
V06-100   021211 034210 021576 111132      V07-100   162735 071060 151412 107234
V06-101   104767 010077 030514 076620      V07-101   104115 022702 020074 001366
V06-102   045404 051740 105301 077336      V07-102   040745 155517 035423 073162
V06-103   041707 111251 076254 040327      V07-103   176063 117436 052326 147614
V06-104   121123 170276 172427 161163      V07-104   116561 145144 177360 037240
V06-105   154532 133732 024052 124330      V07-105   137071 150753 172754 067042
V06-106   172751 160444 123474 104666      V07-106   132615 111500 024016 075730
V06-107   071251 052375 014112 052072      V07-107   070440 017303 056375 032220
V06-110   176362 011641 025301 032726      V07-110   117547 014701 173623 161306
V06-111   051755 104712 147726 177600      V07-111   175375 075013 031241 057122
V06-112   164164 053541 061707 140524      V07-112   100203 057627 015775 051646
V06-113   100363 057413 012175 071412      V07-113   003736 151330 127044 041274
V06-114   056436 050367 117533 120712      V07-114   032142 033447 046563 031374
V06-115   017111 033775 066141 136507      V07-115   007061 076460 023315 033574
V06-116   141113 141466 076774 144073      V07-116   075545 113172 133300 107134
V06-117   035220 130174 051033 052117      V07-117   171516 153120 020303 044046
V06-120   024752 135236 001125 037067      V07-120   004420 034510 036351 113322
V06-121   173340 061206 077502 001432      V07-121   116230 011717 030042 061712
V06-122   152012 046230 171652 167435      V07-122   134737 064172 126557 020244
V06-123   172731 062722 002734 033657      V07-123   106557 141154 037443 052004
V06-124   077621 171022 137736 166675      V07-124   030237 064325 174343 174276
V06-125   161530 177236 016242 004242      V07-125   105565 131762 137611 023020
V06-126   177753 043415 134661 166457      V07-126   176703 144607 112763 034166
V06-127   165507 031426 140225 121777      V07-127   133313 112120 102777 137760
V06-130   174432 053424 105303 020625      V07-130   140515 043052 176540 072760
V06-131   163776 073611 117154 175617      V07-131   105700 053741 155037 105224
V06-132   051263 115227 053231 113672      V07-132   010730 165063 071025 027560
V06-133   130234 132256 135410 142055      V07-133   125560 055044 073327 016040
V06-134   051165 007210 165747 024315      V07-134   036170 075447 160434 101242
V06-135   176437 072757 076001 175662      V07-135   130170 022255 113613 174704
V06-136   022735 130436 024122 171436      V07-136   135174 163305 022642 065636
V06-137   104642 171727 004433 054616      V07-137   044165 060655 161560 004140
V06-140   176451 076230 162203 070360      V07-140   127112 030316 144004 010672
V06-141   164305 160111 071623 055114      V07-141   123167 140161 127517 137206
V06-142   013671 015742 051264 174122      V07-142   156073 127366 146103 111122
V06-143   162022 054402 010056 004103      V07-143   122625 027237 072111 161670
V06-144   172621 116777 034327 122452      V07-144   123061 154305 037037 177320
V06-145   153577 064777 106460 073074      V07-145   122433 167027 132645 066234
V06-146   064131 104566 173026 112051      V07-146   170626 004247 034023 014366
V06-147   072607 117110 014505 012753      V07-147   022662 050764 032067 127414
V06-150   151573 126731 106303 036325      V07-150   136224 060244 114154 010570
V06-151   006523 071665 137215 100116      V07-151   143503 041077 124323 070176
V06-152   031054 020525 074675 114463      V07-152   001037 067455 042406 000054
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V06-153   056402 156343 046647 141371      V07-153   023351 067052 023210 017010
V06-154   172625 157265 056640 044464      V07-154   155472 167411 043516 170470
V06-155   000000 000000 000000 000000      V07-155   060551 066057 067563 072145
V06-156   000000 000000 000000 000000      V07-156   071000 050123 030475 071556
V06-157   000000 000000 000000 000000      V07-157   032060 031067 022040 000120
V06-160   000000 000000 000000 000000      V07-160   051111 047124 042522 036555
V06-161   000000 000000 000000 000000      V07-161   073563 061564 030400 050123
V06-162   000000 000000 000000 000000      V07-162   031075 037056 027150 072550
V06-163   000000 000000 000000 000000      V07-163   037440 020000 046120 050075
V06-164   000000 000000 000000 000000      V07-164   034460 000104 044523 050114
V06-165   000000 000000 000000 000000      V07-165   040531 036472 030056 030000
V06-166   000000 000000 000000 000000      V07-166   047520 042516 053511 047110
V06-167   000000 000000 000000 000000      V07-167   047515 042475 027565 071562
V06-170   000000 000000 000000 000000      V07-170   027557 070145 067167 064556
V06-171   000000 000000 000000 000000      V07-171   000124 042522 046475 074164
V06-172   000000 000000 000000 000000      V07-172   062562 066563 000120 053504
V06-173   000000 000000 000000 000000      V07-173   036457 064157 066545 027556
V06-174   000000 000000 000000 000000      V07-174   067461 071565 067057 067563
V06-175   000000 000000 000000 000000      V07-175   072145 071057 071555 067556
V06-176   000000 000000 000000 000000      V07-176   027542 064556 000124 055075
V06-177   000000 000000 000000 000000      V07-177   041523 052066 041504 052000
```

```
      B Registers                           T Registers
B00   000000 004042                 T00   000000 000000 000000 163514
B01   000000 040273                 T01   000000 000000 000000 163060
B02   000000 107672                 T02   000000 000000 000000 134754
B03   000000 107340                 T03   000000 000000 000000 000000
B04   000000 000000                 T04   000000 000000 000000 000000
B05   000000 000000                 T05   000000 000000 000000 000000
B06   000000 000000                 T06   000000 000000 000000 000000
B07   000000 000000                 T07   000000 000000 000000 000000
B10   000000 000000                 T10   000000 000000 000000 000000
B11   000000 000000                 T11   000000 000000 000000 000000
B12   000000 000000                 T12   000000 000000 000000 000000
B13   000000 000000                 T13   000000 000000 000000 000000
B14   000000 000000                 T14   000000 000000 000000 000000
B15   000000 000000                 T15   000000 000000 000000 000000
B16   000000 000000                 T16   000000 000000 000000 000000
B17   000000 000000                 T17   000000 000000 000000 000000
B20   000000 000000                 T20   000000 000000 000000 000000
B21   000000 000000                 T21   000000 000000 000000 000000
B22   000000 000000                 T22   000000 000000 000000 000000
B23   000000 000000                 T23   000000 000000 000000 000000
B24   000000 000000                 T24   000000 000000 000000 000000
B25   000000 000000                 T25   000000 000000 000000 000000
B26   000000 000000                 T26   000000 000000 000000 000000
B27   000000 000000                 T27   000000 000000 000000 000000
B30   000000 000000                 T30   000000 000000 000000 000000
B31   000000 000000                 T31   000000 000000 000000 000000
B32   000000 000000                 T32   000000 000000 000000 000000
B33   000000 000000                 T33   000000 000000 000000 000000
B34   000000 000000                 T34   000000 000000 000000 000000
B35   000000 000000                 T35   000000 000000 000000 000000
B36   000000 000000                 T36   000000 000000 000000 000000
B37   000000 000000                 T37   000000 000000 000000 000000
B40   000000 000000                 T40   000000 000000 000000 000000
B41   000000 000000                 T41   000000 000000 000000 000000
B42   000000 000000                 T42   000000 000000 000000 000000
B43   000000 000000                 T43   000000 000000 000000 000000
B44   000000 000000                 T44   000000 000000 000000 000000
B45   000000 000000                 T45   000000 000000 000000 000000
B46   000000 000000                 T46   000000 000000 000000 000000
B47   000000 000000                 T47   000000 000000 000000 000000
B50   000000 000000                 T50   000000 000000 000000 000000
B51   000000 000000                 T51   000000 000000 000000 000000
B52   000000 000000                 T52   000000 000000 000000 000000
B53   000000 000000                 T53   000000 000000 000000 000000
B54   000000 000000                 T54   000000 000000 000000 000000
B55   000000 000000                 T55   000000 000000 000000 000000
B56   000000 000000                 T56   000000 000000 000000 000000
B57   000000 000000                 T57   000000 000000 000000 000000
B60   000000 000000                 T60   000000 000000 000000 000000
B61   000000 000000                 T61   000000 000000 000000 000000
B62   000000 000000                 T62   000000 000000 000000 000000
B63   000000 000000                 T63   000000 000000 000000 000000
B64   000000 000000                 T64   000000 000000 000000 000000
B65   000000 000000                 T65   000000 000000 000000 000000
B66   000000 107676                 T66   000000 000000 000000 000000
B67   000000 113317                 T67   000000 000000 000000 000000
B70   000000 000000                 T70   000211 137634 071171 012215
B71   000000 165335                 T71   000000 000000 000000 165553
B72   000000 000001                 T72   000000 000000 000000 000000
B73   000000 076065                 T73   000000 000000 000000 000000
B74   000000 000000                 T74   000000 000000 000000 000000
B75   000000 076065                 T75   000000 000000 000000 000000
B76   000000 002777                 T76   000000 000000 000000 000000
B77   000000 040264                 T77   000000 000000 000000 000000
```

```
SHARED REGISTERS for Cluster 15

       Shared B Registers               Shared T Registers
SB00   000000 000000             ST00   000000 000000 000000 000000
SB01   000000 000000             ST01   000000 000000 000000 000000
SB02   000000 000000             ST02   000000 000000 000000 000000
SB03   000000 000000             ST03   000000 000000 000000 000000
SB04   000000 000000             ST04   000000 000000 000000 000000
SB05   000000 000000             ST05   000000 000000 000000 000000
SB06   000000 000000             ST06   000000 000000 000000 000000
SB07   000000 000000             ST07   000000 000000 000000 000000


SM     000002 000000


VM     000000 000000 000000 000000
VM1    000000 000000 000000 000000


@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                A-register Memory Dump
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


Memory from A0 (A0 + DBA = 0050743421)
_______________________________________
0050743421    013320 000000 024601 024702
0050743422    024002 022504 034577 024101
0050743423    043101 043201 025101 005000
0050743424    030012 022502 037500 025202
0050743425    025366 025601 020700 016167
0050743426    000000 025700 020600 042656
0050743427    000000 006000 146300 000000
0050743430    020000 042712 000000 025077
0050743431    022104 024066 024266 024467
0050743432    035177 020700 000100 000000
0050743433    030327 031043 013000 016120
0050743434    000000 030012 022502 037500
0050743435    025202 025366 025601 024701
0050743436    127700 000000 000000 127100
0050743437    000002 000000 042640 042577
0050743440    044467 061754 046654 050756
0050743441    051007 016000 016245 000000
0050743442    051001 016000 016241 000000
0050743443    042777 024602 040740 000047
0050743444    020000 040600 000010 000000
0050743445    022706 136700 000006 000000
0050743446    136600 000007 000000 030676
0050743447    075100 007000 165425 000000
0050743450    074100 061001 017000 016600
0050743451    000000 040700 000002 000000
0050743452    024602 040740 000052 020000
0050743453    040600 042667 000000 022706
0050743454    043500 136700 000006 000000
0050743455    136600 000007 000000 136500
0050743456    000010 000000 030676 007000
0050743457    027214 000000 024701 075100
0050743460    127100 000001 000000 074700
0050743461    061007 016000 016424 000000
0050743462    040700 000016 000000 024102
0050743463    040600 000005 000000 071501
0050743464    060457 040640 000055 020000
0050743465    040700 000310 000000 022706
0050743466    042377 131600 000006 000000
0050743467    074600 131600 000007 000000
0050743470    131300 000010 000000 131100
0050743471    000011 000000 131400 000012
0050743472    000000 131700 000013 000000
0050743473    030671 007000 022140 000000
0050743474    040700 000002 000000 024602
0050743475    040740 000056 020000 040600
0050743476    042670 000000 022706 136700
0050743477    000006 000000 136100 000007
0050743500    000000 136600 000010 000000
0050743501    030676 075101 007000 153400
0050743502    000000 051001 074101 015000
0050743503    016427 000000 040100 042671
0050743504    000000 006000 016427 000000
0050743505    040100 042677 000000 024701
0050743506    127700 000001 000000 024102
0050743507    040600 000047 000000 042575
0050743510    071401 060346 040540 000064
0050743511    020000 040600 042704 000000
0050743512    040200 042705 000000 040000
0050743513    042706 000000 040400 000310
0050743514    000000 022606 131500 000006
0050743515    000000 131600 000007 000000
0050743516    131200 000010 000000 131700
0050743517    000011 000000 131000 000012
0050743520    000000 131100 000013 000000
0050743521    131300 000014 000000 131400
0050743522    000015 000000 030661 007000
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```
0050743523    024260 000000 040700 000002
0050743524    000000 020700 061310 000000
0050743525    022614 040740 000064 020000
0050743526    030576 022706 024602 136700
0050743527    000006 000000 116500 000007
0050743530    000000 136100 000010 000000
0050743531    030676 007000 133131 000000
0050743532    042777 024602 040740 000066
0050743533    020000 022706 136700 000006
0050743534    000000 074700 136700 000007
0050743535    000000 030676 007000 021210
0050743536    000000 020600 042657 000000
0050743537    002706 007000 016634 000000
0050743540    043100 024002 024202 022104
0050743541    025066 034177 030021 022102
0050743542    036100 005000 000000 000000
0050743543    030012 022501 025202 025366
0050743544    037500 025601 020700 016661
0050743545    000000 025700 020600 042726
0050743546    000000 006000 146300 000000
0050743547    020000 042740 000000 025077
0050743550    024066 024266 024467 022105
0050743551    035177 022716 030327 031043
0050743552    013000 016614 000000 030012
0050743553    022501 025202 037500 025366
0050743554    025601 022712 024602 042777
0050743555    040740 000034 020000 030567
0050743556    022706 136700 000006 000000
0050743557    116500 000007 000000 030676
0050743560    025503 007000 141455 000000
0050743561    040700 000002 000000 024503
0050743562    024602 040740 000035 020000
0050743563    040600 000006 000000 022706
0050743564    136700 000006 000000 116500
0050743565    000007 000000 136600 000010
0050743566    000000 030676 007000 141665
0050743567    000000 022713 024602 042776
0050743570    040740 000036 020000 040600
0050743571    000006 000000 030567 022706
0050743572    022400 136700 000006 000000
0050743573    136600 000007 000000 116400
0050743574    000010 000000 116500 000011
0050743575    000000 030676 007000 166310
0050743576    000000 042776 024403 024502
0050743577    040740 000037 020000 040600
0050743600    000002 000000 022706 022600
0050743601    135700 000006 000000 135600
0050743602    000007 000000 115400 000010
0050743603    000000 115600 000011 000000
0050743604    030675 007000 167340 000000
0050743605    024702 127200 000013 000000
0050743606    043100 046021 014000 017067
0050743607    000000 042777 046027 014000
0050743610    017067 000000 042777 024602
0050743611    040740 000044 020000 040600
0050743612    000006 000000 022706 136700
0050743613    000006 000000 136600 000007
0050743614    000000 030676 075100 007000
0050743615    165425 000000 074100 120700
0050743616    042736 000000 042677 060576
0050743617    046056 130500 042736 000000
0050743620    015000 017113 000000 020600

Memory from A1 (A1 + DBA = 0050740005)
---------------------------------------
0050740005    000000 000000 000000 000000
0050740006    000000 000000 000000 000000
0050740007    000000 000000 000000 000000
0050740010    072100 075170 075771 025171
0050740011    043200 073202 020200 000000
0050740012    000000 030002 010000 000060
0050740013    000000 007000 163070 000000
0050740014    120000 037451 000000 020100
0050740015    076030 000000 121200 000022
0050740016    000000 121300 000011 000000
0050740017    023220 015000 000124 000000
0050740020    030002 010000 000115 000000
0050740021    006000 000711 000000 020100
0050740022    076030 000000 121300 000011
0050740023    000000 051003 014000 000124
0050740024    000000 006000 001410 000000
0050740025    024671 126400 000000 000000
0050740026    126500 000001 000000 126600
0050740027    000002 000000 074771 020100
0050740030    055127 000000 131700 000000
0050740031    000000 020100 055130 000000
0050740032    131700 000000 000000 020100
0050740033    055131 000000 131700 000000
0050740034    000000 074170 130100 037455
0050740035    000000 071306 061373 130400
0050740036    037451 000000 130500 037452
0050740037    000000 130600 037453 000000
```

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0050740040    020100 076030 000000 121400
0050740041    000017 000000 121500 000016
0050740042    000000 121700 000020 000000
0050740043    020200 037463 000000 020300
0050740044    101274 000000 112300 000210
0050740045    000000 020400 103730 000000
0050740046    113400 002432 000000 121600
0050740047    000023 000000 023770 055740
0050740050    071207 020300 037457 000000
0050740051    133700 000000 000000 133200
0050740052    000001 000000 023440 023550
0050740053    031365 055440 071505 071204
0050740054    030004 010000 000265 000000
0050740055    071403 020300 104030 000000
0050740056    133500 000000 000000 133400
0050740057    000001 000000 133200 000002
0050740060    000000 023760 055640 071707
0050740061    051007 014000 000327 000000
0050740062    061063 016000 000322 000000
0050740063    006000 000650 000000 006000
0050740064    000327 000000 051406 051507
0050740065    006000 000427 000000 061043
0050740066    016000 000402 000000 030004
0050740067    011000 000377 000000 040100
0050740070    000002 000000 130100 040147
0050740071    000000 040100 040123 000000
0050740072    130100 040150 000000 040100
0050740073    000155 000000 130100 040151
0050740074    000000 040000 000004 000000
0050740075    040100 040147 000000 003616
0050740076    003614 004000 003716 000000
0050740077    006000 000402 000000 006000
0050740100    000650 000000 030004 011000
0050740101    000407 000000 061443 051603
0050740102    054640 051665 131600 000023
0050740103    000000 020300 104030 000000
0050740104    060753 133700 000000 000000
0050740105    133400 000001 000000 071606
0050740106    030306 023450 023530 022601
0050740107    042271 071705 044227 051002
0050740110    020200 000200 000000 014000
0050740111    000447 000000 023220 030003
0050740112    002002 176606 031552 030004
0050740113    030332 177066 030005 030442
0050740114    020200 000200 000000 010000
0050740115    000505 000000 030003 002002
0050740116    176706 031552 030004 030332
0050740117    177076 030005 030442 020200
0050740120    000200 000000 011000 000447
0050740121    000000 023260 023330 022401
0050740122    043200 022600 020500 000200
0050740123    000000 002005 042700 003070
0050740124    003071 146121 031363 042771
0050740125    071203 045272 023620 030760
0050740126    002007 030002 177014 032674
0050740127    030337 020700 000200 000000
0050740130    030226 002007 030003 013000
0050740131    000531 000000 051105 023350
0050740132    123300 000000 000000 123200
0050740133    000001 000000 123500 000002
0050740134    000000 061461 130300 037451
0050740135    000000 061224 133200 000001
0050740136    000000 130200 037452 000000
0050740137    023120 121700 000000 000000
0050740140    061554 133500 000002 000000
0050740141    130500 037453 000000 023250
0050740142    122600 000000 000000 051007
0050740143    043240 014000 000641 000000
0050740144    121100 000001 000000 023670
0050740145    071506 044772 061554 051775
0050740146    131700 000000 000000 030110
0050740147    051001 051701 015000 000620
0050740150    000000 051006 051706 030102
0050740151    043600 015000 000620 000000
0050740152    043000 130000 052645 000000
0050740153    073101 055120 042277 044312
0050740154    130300 055507 000000 055177
0050740155    044312 130300 055511 000000
0050740156    055177 044312 130300 055510
0050740157    000000 020200 037463 000000
0050740160    025202 025266 025267 022000
0050740161    025000 006000 002434 000000
0050740162    000000 121200 000015 000000
0050740163    121300 000012 000000 121500
0050740164    000013 000000 055240 023420
0050740165    031440 023330 023550 030434
0050740166    030553 031550 122100 000000
0050740167    000000 023110 025170 122600
0050740170    000001 000000 023660 025672
0050740171    030660 030662 031746 030007
0050740172    010000 001057 000000 031557
0050740173    030550 030660 071307 025273
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0050740174    030306 030405 030507 030235
0050740175    071604 071702 031034 061067
0050740176    022601 042671 071705 044667
0050740177    012000 001006 000000 016000
0050740200    001006 000000 031320 030445
0050740201    031440 031600 051006 020200
0050740202    000200 000000 014000 001016
0050740203    000000 023260 030003 002002
0050740204    176606 031552 032226 030004


Memory from A2 (A2 + DBA = 0051047333)
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0051047333    000000 000000 000000 040275
0051047334    000000 000000 000000 003566
0051047335    000000 000000 000000 165551
0051047336    000000 000000 000000 107317
0051047337    000000 000000 000000 104417
0051047340    032213 055502 106250 031521
0051047341    122004 060766 032110 034746
0051047342    162373 136254 000513 164406
0051047343    030022 127003 143736 143063
0051047344    045232 122362 053643 052232
0051047345    171662 164567 127653 011504
0051047346    026770 067513 156120 130734
0051047347    056214 150111 040063 047466
0051047350    114553 037006 000533 007261
0051047351    041354 153114 146010 026016
0051047352    107160 052025 151032 002112
0051047353    126357 054160 125427 122633
0051047354    055054 160024 151743 047054
0051047355    036264 032047 115133 123456
0051047356    014041 014037 152442 160605
0051047357    060432 104072 004132 107353
0051047360    050105 141451 130125 076234
0051047361    037507 033441 113237 014753
0051047362    100431 144024 004701 121273
0051047363    057005 161235 121140 161103
0051047364    166751 137420 000474 134074
0051047365    151666 077637 000527 162605
0051047366    152674 170365 134534 057420
0051047367    034546 042727 011122 176613
0051047370    044111 120105 014437 012435
0051047371    130704 036074 012007 031770
0051047372    136514 046537 050316 030414
0051047373    141634 167310 076626 055533
0051047374    016174 011002 053237 067417
0051047375    060177 026746 120661 015414
0051047376    176105 101104 122623 072271
0051047377    044523 040404 160042 062602
0051047400    067243 175472 165444 113626
0051047401    034511 127110 007231 002131
0051047402    160020 070106 003247 103712
0051047403    123376 024007 141002 041654
0051047404    017654 103545 151764 133167
0051047405    100004 055626 050450 161220
0051047406    024705 063220 066550 006267
0051047407    025024 025245 107547 027735
0051047410    130613 173714 174502 172537
0051047411    071300 155437 014726 167106
0051047412    133612 007105 000144 137660
0051047413    010775 100051 124713 132210
0051047414    132340 104564 104461 170400
0051047415    013115 060643 001612 001117
0051047416    062650 023377 010341 164674
0051047417    052152 125754 073660 165715
0051047420    054435 162246 104517 154675
0051047421    163276 051176 015576 037131
0051047422    027406 011373 071703 140325
0051047423    054007 052427 153024 052546
0051047424    076464 011052 022333 054177
0051047425    112472 002544 034306 020170
0051047426    032172 103713 017230 045577
0051047427    030604 174336 122110 152622
0051047430    175162 142700 044541 121237
0051047431    042304 001511 067500 133171
0051047432    034274 020135 117031 174577
0051047433    061447 075670 076544 035677
0051047434    015007 043227 010635 055705
0051047435    101350 056127 144670 105151
0051047436    004170 025203 007030 035422
0051047437    052455 161005 010455 117416
0051047440    021211 034210 021576 111132
0051047441    104767 010077 030514 076620
0051047442    045404 051740 105301 077336
0051047443    041707 111251 076254 040327
0051047444    121123 170276 172427 161163
0051047445    154532 133732 024052 124330
0051047446    172751 160444 123474 104666
0051047447    071251 052375 014112 052072
0051047450    176362 011641 025301 032726
0051047451    051755 104712 147726 177600
0051047452    164164 053541 061707 140524
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0051047453    100363 057413 012175 071412
0051047454    056436 050367 117533 120712
0051047455    017111 033775 066141 136507
0051047456    141113 141466 076774 144073
0051047457    035220 130174 051033 052117
0051047460    024752 135236 001125 037067
0051047461    173340 061206 077502 001432
0051047462    152012 046230 171652 167435
0051047463    172731 062722 002734 033657
0051047464    077621 171022 137736 166675
0051047465    161530 177236 016242 004242
0051047466    177753 043415 134661 166457
0051047467    165507 031426 140225 121777
0051047470    174432 053424 105303 020625
0051047471    163776 073611 117154 175617
0051047472    051263 115227 053231 113672
0051047473    130234 132256 135410 142055
0051047474    051165 007210 165747 024315
0051047475    176437 072757 076001 175662
0051047476    022735 130436 024122 171436
0051047477    104642 171727 004433 054616
0051047500    176451 076230 162203 070360
0051047501    164305 160111 071623 055114
0051047502    013671 015742 051264 174122
0051047503    162022 054402 010056 004103
0051047504    172621 116777 034327 122452
0051047505    153577 064777 106460 073074
0051047506    064131 104566 173026 112051
0051047507    072607 117110 014505 012753
0051047510    151573 126731 106303 036325
0051047511    006523 071665 137215 100116
0051047512    031054 020525 074675 114463
0051047513    056402 156343 046647 141371
0051047514    172625 157265 056640 044464
0051047515    112357 125207 000271 074007
0051047516    144250 024423 040275 072621
0051047517    051566 160077 055046 101160
0051047520    111355 014624 026641 127730
0051047521    165472 062227 122030 102661
0051047522    162373 136254 000513 164406
0051047523    107017 172413 064525 100126
0051047524    100542 142462 074656 057362
0051047525    027570 066063 034422 006071
0051047526    167277 147167 007031 123027
0051047527    041567 075672 101463 153736
0051047530    143333 034373 172475 145654
0051047531    172530 157177 147237 170526
0051047532    003552 023163 130066 132521

Memory from A3 (A3 + DBA = 0051047672)
---------------------------------------
0051047672    000000 000000 000000 040264
0051047673    000000 000000 000000 004042
0051047674    000000 000000 000000 107327
0051047675    000000 000000 000000 107333
0051047676    000000 000000 000000 000000
0051047677    000000 000000 000000 000000
0051047700    000000 000000 000000 000000
0051047701    000000 000000 000000 000000
0051047702    000000 000000 000000 000000
0051047703    000000 000000 000000 000000
0051047704    000000 000000 000000 000000
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0051047707    000000 000000 000000 000000
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0051047741    000000 000000 000000 000000
0051047742    000000 000000 000000 000000
```

```
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0051050070    000000 000000 000000 000000
0051050071    000000 000000 000000 000000
```

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Memory from A4 (A4 + DBA = 0051053317)
---------------------------------------
0051053317    000000 000000 000000 000000
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0051053460    000000 000000 000000 000000
0051053461    000000 000000 000000 000000
0051053462    000000 000000 000000 000000
0051053463    000000 000000 000000 000000
0051053464    000000 000000 000000 000000
0051053465    000000 000000 000000 000000
0051053466    000000 000000 000000 000000
0051053467    000000 000000 000000 000000
0051053470    000000 000000 000000 000000
0051053471    000000 000000 000000 000000
0051053472    000000 000000 000000 000000
0051053473    000000 000000 000000 000000
0051053474    000000 000000 000000 000000
0051053475    000000 000000 000000 000000
0051053476    000000 000000 000000 000000
0051053477    000000 000000 000000 000000
0051053500    000000 000000 000000 000000
0051053501    000000 000000 000000 000000
0051053502    000000 000000 000000 000000
0051053503    000000 000000 000000 000000
0051053504    000000 000000 000000 000000
0051053505    000000 000000 000000 000000
0051053506    000000 000000 000000 000000
0051053507    000000 000000 000000 000000
0051053510    000000 000000 000000 000000
0051053511    000000 000000 000000 000000
0051053512    000000 000000 000000 000000
0051053513    000000 000000 000000 000000
0051053514    000000 000000 000000 000000
0051053515    000000 000000 000000 000000
0051053516    000000 000000 000000 000000

Memory from A5 (A5 + DBA = 0051047676)
---------------------------------------
0051047676    000000 000000 000000 000000
0051047677    000000 000000 000000 000000
0051047700    000000 000000 000000 000000
0051047701    000000 000000 000000 000000
0051047702    000000 000000 000000 000000
0051047703    000000 000000 000000 000000
0051047704    000000 000000 000000 000000
0051047705    000000 000000 000000 000000
0051047706    000000 000000 000000 000000
0051047707    000000 000000 000000 000000
0051047710    000000 000000 000000 000000
0051047711    000000 000000 000000 000000
0051047712    000000 000000 000000 000000
0051047713    000000 000000 000000 000000
0051047714    000000 000000 000000 000000
0051047715    000000 000000 000000 000000
0051047716    000000 000000 000000 000000
0051047717    000000 000000 000000 000000
0051047720    000000 000000 000000 000000
0051047721    000000 000000 000000 000000
0051047722    000000 000000 000000 000000
0051047723    000000 000000 000000 000000
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0051047726    000000 000000 000000 000000
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0051047745    000000 000000 000000 000000
0051047746    000000 000000 000000 000000
0051047747    000000 000000 000000 000000
0051047750    000000 000000 000000 000000
0051047751    000000 000000 000000 000000
0051047752    000000 000000 000000 000000
0051047753    000000 000000 000000 000000
0051047754    000000 000000 000000 000000
0051047755    000000 000000 000000 000000
0051047756    000000 000000 000000 000000
0051047757    000000 000000 000000 000000
0051047760    000000 000000 000000 000000
```

```
0051047761    000000 000000 000000 000000
0051047762    000000 000000 000000 000000
0051047763    000000 000000 000000 000000
0051047764    000000 000000 000000 000000
0051047765    000000 000000 000000 000000
0051047766    000000 000000 000000 000000
0051047767    000000 000000 000000 000000
0051047770    000000 000000 000000 000000
0051047771    000000 000000 000000 000000
0051047772    000000 000000 000000 000000
0051047773    000000 000000 000000 000000
0051047774    000000 000000 000000 000000
0051047775    000000 000000 000000 000000
0051047776    000000 000000 000000 000000
0051047777    000000 000000 000000 000000
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0051050002    000000 000000 000000 000000
0051050003    000000 000000 000000 000000
0051050004    000000 000000 000000 000000
0051050005    000000 000000 000000 000000
0051050006    000000 000000 000000 000000
0051050007    000000 000000 000000 000000
0051050010    000000 000000 000000 000000
0051050011    000000 000000 000000 000000
0051050012    000000 000000 000000 000000
0051050013    000000 000000 000000 000000
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0051050055    000000 000000 000000 000000
0051050056    000000 000000 000000 000000
0051050057    000000 000000 000000 000000
0051050060    000000 000000 000000 000000
0051050061    000000 000000 000000 000000
0051050062    000000 000000 000000 000000
0051050063    000000 000000 000000 000000
0051050064    000000 000000 000000 000000
0051050065    000000 000000 000000 000000
0051050066    000000 000000 000000 000000
0051050067    000000 000000 000000 000000
0051050070    000000 000000 000000 000000
0051050071    000000 000000 000000 000000
0051050072    000000 000000 000000 000000
0051050073    000000 000000 000000 000000
0051050074    000000 000000 000000 000000
0051050075    000000 000000 000000 000000


Memory from A6 (A6 + DBA = 0051000273)
---------------------------------------
0051000273    020000 000030 000000 000000
0051000274    066541 064556 000000 000000
0051000275    000000 000000 000005 000004
0051000276    000000 000000 000000 003705
0051000277    004000 000000 000000 000337
0051000300    000000 000000 000000 000011
0051000301    000000 000000 000000 000005
0051000302    000000 000000 000000 000000
0051000303    020100 024043 024554 064542
0051000304    072457 067165 066543 067556
0051000305    073057 061461 027563 062062
0051000306    072546 027163 004470 030056
```

```
0051000307    030011 030064 027461 033057
0051000310    034463 020061 031472 031470
0051000311    035060 032000 000000 000000
0051000312    020003 100000 000000 000001
0051000313    057776 177777 177777 177776
0051000314    040000 105075 070243 153412
0051000315    037777 115040 115204 175720
0051000316    037775 146314 146314 146314
0051000317    146314 146314 146314 146315
0051000320    040000 000000 000000 000000
0051000321    040000 000000 000000 000000
0051000322    040000 000000 000000 000000
0051000323    040000 000000 000000 000000
0051000324    040000 000000 000000 000000
0051000325    040000 000000 000000 000000
0051000326    040000 000000 000000 000000
0051000327    040000 000000 000000 000000
0051000330    057563 062062 072546 020040
0051000331    000000 000000 000005 000006
0051000332    000000 000000 000000 004200
0051000333    000400 000000 000000 000000
0051000334    000000 000000 000000 000000
0051000335    000000 000000 000000 000411
0051000336    000000 000000 000000 000000
0051000337    020100 024043 024554 064542
0051000340    072457 067165 066543 067556
0051000341    073057 061461 027563 062062
0051000342    072544 062545 027163 004470
0051000343    030056 030411 030070 027460
0051000344    031057 034463 020060 034072
0051000345    031466 035061 031000 000000
0051000346    020003 100000 000000 000001
0051000347    057776 177777 177777 177776
0051000350    040000 105075 070243 153412
0051000351    037777 115040 115204 175720
0051000352    037775 146314 146314 146314
0051000353    146314 146314 146314 146315
0051000354    040000 000000 000000 000000
0051000355    040000 000000 000000 000000
0051000356    040000 000000 000000 000000
0051000357    040000 000000 000000 000000
0051000360    040000 000000 000000 000000
0051000361    040000 000000 000000 000000
0051000362    040000 000000 000000 000000
0051000363    040000 000000 000000 000000
0051000364    040000 000000 000000 000000
0051000365    057563 062062 072545 071545
0051000366    000000 000000 000005 000010
0051000367    000000 000000 000000 006000
0051000370    000400 000000 000000 000000
0051000371    000000 000000 000000 000000
0051000372    000000 000000 000000 000411
0051000373    000000 000000 000000 000000
0051000374    057563 062062 072544 062545
0051000375    000000 000000 000005 000010
0051000376    000000 000000 000000 006043
0051000377    000400 000000 000000 000000
0051000400    000000 000000 000000 000000
0051000401    000000 000000 000000 000411
0051000402    000000 000000 000000 000000
0051000403    000000 000000 000000 000031
0051000404    000000 000000 000000 000000
0051000405    000000 000000 000000 000000
0051000406    000000 000000 000000 000000
0051000407    000000 000000 000000 000000
0051000410    000000 000000 000000 000000
0051000411    000000 000000 000000 000000
0051000412    000000 000000 000000 000000
0051000413    000000 000000 000000 000000
0051000414    000000 000000 000000 000000
0051000415    000000 000000 000000 000000
0051000416    000000 000000 000000 000000
0051000417    000000 000000 000000 000000
0051000420    000000 000000 000000 000000
0051000421    000000 000000 000000 000000
0051000422    000000 000000 000000 000000
0051000423    000000 000000 000000 000000
0051000424    000000 000000 000000 000000
0051000425    000000 000000 000000 000000
0051000426    000000 000000 000000 000000
0051000427    000000 000000 000000 000000
0051000430    000000 000000 000000 000000
0051000431    020100 024043 024554 064542
0051000432    072457 072162 061153 027543
0051000433    030457 072162 061153 027163
0051000434    004470 030056 030411 030462
0051000435    027460 030457 034464 020061
0051000436    032072 032065 035061 031000
0051000437    005040 041145 063551 067156
0051000440    064556 063440 067546 020124
0051000441    071141 061545 061141 061553
0051000442    035012 000000 000000 000000
```

```
0051000443    020040 041541 066154 062544
0051000444    020146 071157 066440 005000
0051000445    020040 051564 060562 072145
0051000446    062040 063162 067555 020012
0051000447    020105 067144 020157 063040
0051000450    052162 060543 062542 060543
0051000451    065456 005000 000000 000000
0051000452    020124 071141 061545 061141
0051000453    061553 020141 061157 071164
0051000454    062544 035440 070157 071563
0051000455    064542 066145 020163 072141
0051000456    061553 020143 067562 071165
0051000457    070164 064557 067056 005000
0051000460    020124 071141 061545 061141
0051000461    061553 020164 062562 066551
0051000462    067141 072145 062073 020155
0051000463    060570 064555 072555 020144
0051000464    062560 072150 020145 074143
0051000465    062545 062145 062056 005000
0051000466    060544 062162 062563 071440
0051000467    066151 067145 020000 000000
0051000470    020151 067040 071157 072564
0051000471    064556 062440 023400 000000
0051000472    000000 014631 114631 114632

Memory from A7 (A7 + DBA = 0051047672)
---------------------------------------
0051047672    000000 000000 000000 040264
0051047673    000000 000000 000000 004042
0051047674    000000 000000 000000 107327
0051047675    000000 000000 000000 107333
0051047676    000000 000000 000000 000000
0051047677    000000 000000 000000 000000
0051047700    000000 000000 000000 000000
0051047701    000000 000000 000000 000000
0051047702    000000 000000 000000 000000
0051047703    000000 000000 000000 000000
0051047704    000000 000000 000000 000000
0051047705    000000 000000 000000 000000
0051047706    000000 000000 000000 000000
0051047707    000000 000000 000000 000000
0051047710    000000 000000 000000 000000
0051047711    000000 000000 000000 000000
0051047712    000000 000000 000000 000000
0051047713    000000 000000 000000 000000
0051047714    000000 000000 000000 000000
0051047715    000000 000000 000000 000000
0051047716    000000 000000 000000 000000
0051047717    000000 000000 000000 000000
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0051047733    000000 000000 000000 000000
0051047734    000000 000000 000000 000000
0051047735    000000 000000 000000 000000
0051047736    000000 000000 000000 000000
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0051047740    000000 000000 000000 000000
0051047741    000000 000000 000000 000000
0051047742    000000 000000 000000 000000
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0051047752    000000 000000 000000 000000
0051047753    000000 000000 000000 000000
0051047754    000000 000000 000000 000000
0051047755    000000 000000 000000 000000
0051047756    000000 000000 000000 000000
0051047757    000000 000000 000000 000000
0051047760    000000 000000 000000 000000
0051047761    000000 000000 000000 000000
0051047762    000000 000000 000000 000000
0051047763    000000 000000 000000 000000
0051047764    000000 000000 000000 000000
0051047765    000000 000000 000000 000000
0051047766    000000 000000 000000 000000
0051047767    000000 000000 000000 000000
0051047770    000000 000000 000000 000000
0051047771    000000 000000 000000 000000
0051047772    000000 000000 000000 000000
```

```
0051047773    000000 000000 000000 000000
0051047774    000000 000000 000000 000000
0051047775    000000 000000 000000 000000
0051047776    000000 000000 000000 000000
0051047777    000000 000000 000000 000000
0051050000    000000 000000 000000 000000
0051050001    000000 000000 000000 000000
0051050002    000000 000000 000000 000000
0051050003    000000 000000 000000 000000
0051050004    000000 000000 000000 000000
0051050005    000000 000000 000000 000000
0051050006    000000 000000 000000 000000
0051050007    000000 000000 000000 000000
0051050010    000000 000000 000000 000000
0051050011    000000 000000 000000 000000
0051050012    000000 000000 000000 000000
0051050013    000000 000000 000000 000000
0051050014    000000 000000 000000 000000
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0051050016    000000 000000 000000 000000
0051050017    000000 000000 000000 000000
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0051050066    000000 000000 000000 000000
0051050067    000000 000000 000000 000000
0051050070    000000 000000 000000 000000
0051050071    000000 000000 000000 000000

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                      Test Point Dump
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@


    TP-> 0        1        2        3        4        5        6        7
OPT      01234567 01234567 01234567 01234567 01234567 01234567 01234567 01234567


YE0      01001011 11000111 11010111 01010111 11011111 01011111 00000001 00000001
YF0      11101111 00010110 01101010 11100101 11010000 00010110 01101010 11000011
YF1      11101111 00010110 01101010 11100101 11010000 00010110 01101010 11000011
YF2      11101111 00010110 01101010 11100101 11010000 00010110 01101010 11000011
YG0      00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000001
YH0      11111111 11111111 11111111 11110000 11000000 11111111 11111111 11111111
YJ0      11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
YJ1      11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
YM0      11111111 11111111 11111111 11111111 00000001 00000011 11111111 11111111
YM1      11111111 11111111 11111111 11111111 00000011 00000001 11111111 11111111
YK0      00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000001
YK1      00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000001
HA0      00001000 00110000 00001010 00000000 00001000 00110000 00001010 00000001
HC0      00000000 00000000 10101101 10111111 00001011 10110110 01011100 01110001
JA0      11111111 11111111 00000000 00000000 11110000 00000110 00000000 00000001
JB0      00000000 00000000 00000000 00000000 00000000 00000000 00000010 00000001
JC0      00000000 00000000 00100000 00010010 00100000 01101000 00000000 00000001
JQ0      11110011 11111111 11100101 10101100 11111111 11111111 10111111 11111111
VQ0      00000000 00000000 00000000 00000000 11111111 11111111 11110000 00000001
```

```
VQ1       00000000 00000000 00000000 00000000 11111111 11111111 11110000 00000001
DA0       10000000 11010111 10000000 00000001 00000001 10101111 00000000 00000011
DC0       00000000 10010011 00000000 00100011 01100000 01000010 00000000 00000001
DD0       00001010 00000011 11001000 00001010 00000011 11001000 11111111 11111111
DD1       10000000 00000000 00000010 00000000 00000000 00001111 11111111 11111111
JQ1       10100101 10110001 10001111 11001100 10111100 00001101 00011110 10011011
SIE       11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111


****
**** the 'bin/.smon_trigger_cmd' script could not be executed
****


*******************************************************************************
   System Monitor Dump completed at:   Mon Feb 13 13:52:29 1995
*******************************************************************************
```