CRAY T90 SERIES MDB INTERFACE REFERENCE

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This document is a quick reference guide to the options available on the simulator bugger/debugger (MDB). Using the simulator and MDB will help you understand problems customers can encounter, which will help you identify and solve future problems more quickly. Use this document to familiarize yourself with the options available on the MDB interface.

Notational Conventions

While you read this document, keep in mind the following notational conventions:

- Buttons are shown the way they appear in windows: $\overline{File \nabla}$.
- Settings are shown the way they appear in windows: [All] or [Selected].
- The arrow symbol (->) indicates that you should hold down the MENU mouse button while moving the mouse pointer to an adjoining menu item.
- Courier type indicates a command you can enter.
- Courier bold type indicates commands you should enter.
- Helvetica type indicates references to text in the MDB interface windows.



Helvetica bold type indicates menu entries you should choose from the interface; for example, File -> Load -> Bug refers to three adjoining menus (refer to illustration at left).

Interface Components

Figure 1 shows the MDB interface base window. The sections following the figure describe, in clockwise order, the components of the interface called out in the illustration.



Figure 1. MDB Interface Base Window Components

Base Window Title

The base window title area displays the name of the program: MSIM Simulator Bugger/Debugger (MDB).

Version Number

The version number area indicates which version of the software you are using.

Simulator Indicator

The simulator indicator shows that MDB is running with the simulator (indicated by SIM in Figure 1).

Workstation

The workstation indicator shows the name of the workstation on which MDB is running (indicated by stanley in Figure 1).

Copy Number

The copy number indicates the copy of MDB you are using (indicated by (12) in Figure 1.

Menu Bar

The menu bar contains six menu buttons. Use the commands that appear when you press these buttons to manipulate MDB. Refer to "Menu Button Commands" for more detailed information about the menu button options.

CPU Area

This area shows the total number of CPUs available to the MDB control program. If a CPU does not have its status set to N/A, then it is available. If any CPU or CPUs (00 through 37) appear highlighted in a bold face outline (on a monochrome display) or appear pressed in (on a color display), they are selected.

Control Area

The following controls reside in the control area of the MDB interface base window (Figure 1 shows the location of the control area):

Control	Description
All Selected (breakpoints)	Determines which breakpoints are affected when you use the <u>Enable</u> and <u>Disable</u> buttons. The selected breakpoint refers to a breakpoint enclosed in a box in the Breakpoint List scroll box of the base window.
All Selected (CPUS)	Determines which CPUs are affected when you use the Run, Step, Pause, Enable, and Disable buttons. If you use All CPUs, then all CPUs not marked as N/A are affected by the Run, Step, and Pause buttons; and all CPUs assigned to the currently selected breakpoint are affected by the Enable and Disable buttons.
Enable	Enables specified breakpoints. One or more CPUs must be selected.
Disable	Disables specified breakpoints.
Run	Runs AII or <u>selected</u> CPUs until a breakpoint is reached, until you click on <u>Pause</u> , until you click on <u>step</u> , or until the simulated mainframe is master cleared by MME.
Step)	Runs step mode on All or Selected CPUs. The CPUs in step mode issue the specified number of instructions and then pause (unless a breakpoint is reached).
Pause	Pauses [AII] or Selected CPUs. When a CPU pauses, PAU appears to the right of that CPU in the interface.
Current Bug:	Displays the bugfile loaded with the File -> Load -> Bug command.

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Mode Indicator

The mode indicator shows the type of mode you are currently using. There are two modes: *auto mode* and *user mode*. The system supplies default settings in automatic mode, or you can specify your own settings in user mode.

Current Bugfile Display

This display shows the bugfile currently in operation.

Breakpoint List Area

This area displays breakpoints you can select and manipulate. The Edit \rightarrow Set Breakpoint command (described later in this document) brings up the MDB Set Breakpoint window. Selecting the <u>set</u> button from this window adds the breakpoint to the breakpoint scroll box in the MDB base window.

Control Points/Breakpoint Status Fields

Breakpoint status fields are to the right of the corresponding CPU numbers in the MDB interface base window. The letters in the breakpoint status fields identify the status of each CPU regarding the currently selected breakpoint:

- B indicates that the breakpoint is currently triggered.
- D indicates that the breakpoint is currently disabled.
- E indicates that the breakpoint is currently enabled.

Menu Button Commands

This subsection describes each MDB menu button command available from the menu bar (refer again to Figure 1). Figure 2 (at the end of this document) shows all menu selections possible from the MDB interface base window and provides a page number to which you can refer for more information about each menu selection. Refer to this illustration as you read about each selection.

File -> Load -> Bug



The File -> Load -> Bug command, as shown at left, enables you to load a bugfile. When you choose this command, the following window appears:



Currently, there are no auto bug files.

To choose user bug mode and display user bug files, select Properties -> Bug Mode -> User and then choose the File -> Load -> Bug command. The MDB Load Bug window appears:



Choosing a bug file in the MDB Load Bug window in user bug mode and pressing the <u>load</u> button causes that bugfile to appear in one of the MSIM bugmaker windows. Refer to "Utilities -> Bugmaker -> Shared" and "Utilities -> Bugmaker -> Memory" later in this document for more information about the bugmaker utilities.

The currently loaded bug file is shown in the Current Bug: field of the MDB base window.

View --> Registers



The View -> Registers command, as shown at left, opens the MDB View Registers Setup window, which enables you to verify or modify register parameters.



(procedure to be provided)

Clicking on the <u>View...</u> button displays the specified register:

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CPU	B O	
P	00000000000a	AD 000000 000000 000000 000000 SO 000000 000000 000000 000000
PN	000	A1 000000 000000 000000 000000 S1 000000 000000 000000
XA	0000000	A2 000000 000000 000000 000000 52 000000 000000 000000
	0000000	A3 000000 000000 000000 000000 53 000000 000000 000000 000000
EAT	0000000	AS 000000 000000 000000 000000 54 000000 000000 000000 000000
EX3	0000000	
EX4	0000000	A7 000000 000000 000000 000000 S7 000000 000000 000000
CN	000 VL 000	MODES OO SCE TRI ESL BDM MM STATS OO YNU FPS WS BML
тм		
ŤF	000000 IRP 1	WE EPE ORE PRE FEX BPT MEC MOU RTT TOP TOT POI DL MIT NEX AMI
LAT	O RWXC OO RW	XD CO PB 00000000000 LB 000000000000 LL 00000000
LAT	1 RWXC OO RW	XD 00 PB 000000000000 LB 000000000000 LL 00000000
	2 RWXL UU RW	XD 00 PB 000000000000 FB 00000000000000000
	3 RWAC 00 RW	XD AD 98 00000000000000000000000000000000000
LAT	5 RWXC DD RW	XD 00 PB 0000000000000 LB 00000000000000 LL 00000000
LAT	6 RWXC DO RW	XD 00 PB 000000000000 LB 000000000000 LL 00000000
lllat	7 RWXC 00 RW	XD OD PB 000000000000 LB 000000000000 LL 00000000

View -> Channels



The View -> Channels command, as shown at left, opens the MDB View Channels Setup window, which enables you to specify or verify channel information.



(procedure to be provided)

Clicking on the <u>View</u> button causes a window to appear that displays channel information you specify in the MDB View Channels Setup window. The following illustration shows channel information for LOSP channels:

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						LC	DSP	Ch	anı	nels	5							
0	EMI-CPU	00	01	02	03	04	05	06	07	10	11	12	13	14	15	16	17	٦
00	IIO-CPU	00	01	02	03	04	05	06	07	10	11	12	13	14	15	16	17	
	EMI-CPU	20	21	22	23	24	25	26	27	30	31	32	33	34	35	36	37	
	IIO-CPU	20	21	22	23	24	25	26	27	30	31	32	33	34	35	36	37	
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ČĀ	000000000000000000000000000000000000000	innr	ñ		STA	AT I	nnn	າດດາ	າກກາ	DO D		1	JE I	FRR	∩ຂັ	DF /I	nTSA	c
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Edit -> Set Breakpoint



The Edit -> Set Breakpoint command, as shown at left, opens the MDB Set Breakpoint window, which enables you to modify breakpoint parameters.



Follow this procedure to set a breakpoint with this window:

1. Click on the appropriate option under Select CPUs: (or click on the numbered CPU indicators in the base window):

(Selected Breakpoint's) selects CPUs assigned to the current breakpoint, so you can perform operations on all the CPUs associated with that breakpoint.

<u>All Available CPUs</u> selects all available CPUs if control point tracking is off. It selects only the currently assigned control points (corresponding to MME) if control point tracking is on.

NOTE: If control point tracking is on, the All Available CPUs menu selection means all CPUs assigned to the current MME control point. If control point tracking is off, All Available CPUs means all of the physical CPUs.

2. Click on the appropriate option under Deselect CPUs: (or click on the numbered CPU indicators in the base window):

(Except Breakpoints) deselects CPUs except for those CPUs with the current breakpoint assigned to them (use this command to choose only the CPUs affected by the breakpoint).

All CPUs deselects all CPUs.

- 3. If you want to hold all CPUs when the breakpoint is reached in any CPU, click on the Hold All CPUs box. To allow other CPUs to keep running when a particular CPU reaches a breakpoint, click on All or Selected CPUs.
- 4. Click on <u>CPUIBA</u> to specify the address relative to the current value in the instruction base address and to have it recalculated after every exchange, or click on <u>Abs</u> (absolute) to use a fixed address in memory.
- 5. Click on <u>Insert</u> to create a new breakpoint, or click on <u>Replace</u> to replace the currently selected breakpoint, including its CPU assignments.
- 6. Click on the address: field and type the value you want.
- 7. Click on <u>set</u> to set a breakpoint.
- 8. Click on <u>Clear</u> to clear set breakpoints.

Edit --> Clear Breakpoint --> Selected Breakpoint

The Edit -> Clear Breakpoint -> Selected Breakpoint command, as shown at left, enables you to clear breakpoints previously set with the Edit -> Set Breakpoint command. Breakpoints in the Breakpoint List: scroll box of the MDB base window are cleared. Unless a breakpoint has been set, this menu selection appears gray in the menu and is not functional.

Edit 🗸	
Set Breakpoint	Delete Breakpoint
Clear Breakpoint	Selected Breakpoint
Select CPUs	All
Deselect CPUs Remove Bug	California de la calegra de
Deselect CPUs Remove Bug	

Edit -> Clear Breakpoint -> All

The Edit -> Clear Breakpoint -> All command, as shown at left, enables you to clear breakpoints previously set with the Edit -> Set Breakpoint command. Breakpoints in the Breakpoint List: scroll box of the MDB base window are cleared. Unless a breakpoint has been set, this menu selection appears gray in the menu and is not functional.



Edit -> Select CPUs -> Selected Breakpoint's

The Edit -> Selected CPUs -> Select Breakpoint's command, as shown at left, enables you to select those CPUs assigned to the current breakpoint, so you can perform operations on all the CPUs associated with that breakpoint.



Edit --> Select CPUs --> All Available CPUs

The Edit -> Select CPUs -> All Available CPUs command, as shown at left, selects all available CPUs if control point tracking is off. It selects only the currently assigned control points (corresponding to MME) if control point tracking is on.



CPUS can also be selected individually by clicking on the appropriate number in the CPU area of the base window (refer to Figure 1).

NOTE: If control point tracking is on, the All Available CPUs menu selection means all CPUs assigned to the current MME control point. If control point tracking is off, All Available CPUs means all of the physical CPUs.

Edit -> Deselect CPUs -> Except Breakpoint's

The Edit -> Deselect CPUs -> Except Breakpoint's command, as shown at left, deselects CPUs except for those CPUs with the current breakpoint assigned to them (use this command to choose only the CPUs affected by the breakpoint).



Properties -> Bug Mode -> Auto



Edit 🗸

The Properties -> Bug Mode -> Auto command, as shown at left, selects automatic bug mode. The currently operating bug mode is displayed by the mode indicator in the MDB interface base window (refer again to Figure 1). *This command is not yet implemented*.

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Properties -> Bug Mode -> User



The Properties -> Bugmode -> User command, as shown at left, selects user bug mode. The currently operating bug mode is displayed by the mode indicator in the MDB interface base window (refer again to Figure 1).

After choosing user bug mode, you can display user bug files by selecting the File -> Load -> Bug command. The MDB Load Bug window appears:



Choosing a bug file in the MDB Load Bug window (in user mode) and pressing the <u>user</u> button causes that bugfile to appear in one of the MSIM bugmaker windows. Refer to "Utilities -> Bugmaker -> Shared" and "Utilities -> Bugmaker -> Memory" later in this document for more information about the bugmaker utilities.

Properties -> P Regs/Breakpoints -> P Registers

The Properties \rightarrow P Regs/Breakpoints \rightarrow P Registers command, as shown at left, enables you to display P registers. P register addresses appear to the right of each CPU number in the base window.



Properties -> P Regs/Breakpoints -> Breakpoint List

Properties
At left, displated a

The Properties -> P Regs/Breakpoints -> Breakpoint List command, as shown at left, displays breakpoint addresses at each selected control point.

Properties --> P Regs/Breakpoints --> Triggered Breakpoints

The Properties \rightarrow P Regs/Breakpoints \rightarrow Triggered Breakpoints command, as shown at left, displays P register values for all CPUs that have reached a breakpoint.



Properties -> Ctrlpoints -> Track



The Properties -> Ctripoints -> Track command, as shown at left, enables you to track control points while you manipulate CPUs and breakpoints.

N/A appears to the right of each CPU that is not assigned to the current control point in MME.

Properties -> Ctrlpoints -> Ignore



The Properties -> Ctripoints -> Ignore command, as shown at left, enables you to ignore control-point tracking. All CPUs become available for manipulation by MDB regardless of CPU assignments to MME control points.

Properties -> P Registers -> Absolute



The Properties -> P Registers -> Absolute command, as shown at left, displays the memory locations from program address registers (P registers) in absolute format.

Properties --> P Registers --> IBA Relative



The Properties \rightarrow P Registers \rightarrow IBA Relative command, as shown at left, displays the memory locations from P registers in instruction base address (IBA) format.

Properties -> Configuration

Properties ⊽	
Bug Mode	Δ
P Regs/Breakpoints	⊳
Ctripoints	Þ
P Registers	Þ

Configuration...

The Properties -> Configuration command, as shown at left, opens the MSIM Configuration window, which enables you to view and edit MSIM configuration parameters.

S MSIM Configuration(YMP-T32)								
Memory Size: 🔽 512 KWords SSD Type: Memory File								
SSD Size: 🔽 256 KWords Dir: Zusr/tmp								
Control Point Tuning CPU Synch	ronizatio	n	In	stru	ction	But	fers	
ा Sync Asy	vnc Au	to	C	n	Off	1	iuto	
Cache On Off Lats On Off Max CPUs: V 32								
	00 04	10	14	20	24	30	34	
	01 05	11	15	21	25	31	35	
I/O Factor	02 06	12	16	22	26	32	36	
1X 10X 100X 1000X Auto	03 07	13	17	23	27	33	37	
<u>1 </u>								
	LUSI	' LOO	pbac	к				
LOSP Channels -> 100-117 120-	-137 14	10-15	57 1	60-	177	60	-67	
100 <= ⊽ 101 104 <= ⊽ 105	110 <=		111	114	4 <=	◙	115	
102 <= ▽ 103 106 <= ▽ 107	112 <=		113	111	6 <=	◙	117	
Apply	Reset)						

NOTE: The MSIM Configuration window opens automatically when you start MDB. You can either use the default configuration, or you can configure MSIM yourself.

,

Use the following procedure to manipulate the information in this window:

1. Use the MENU mouse button to select the appropriate memory size from the Memory Size button. The following window appears showing your options:



2. Click on the appropriate setting from the SSD Type: Memory File selection area to specify the type of simulated SSD created for running SSD diagnostic programs.

Click on Memory to use the MWS-E memory. Click on File to use a file on the hard disk. Triple click on the Dir: field and type the name of the directory you want to use.

3. Choose the appropriate SSD size from the SSD Size 🔊 button. The following window appears showing your options.



4. Control point tuning. This control is not implemented yet.

5. Click on the appropriate setting from the CPU Synchronization area:

Sync Information to be provided.

Async Information to be provided.

Auto Information to be provided.

6. Click on the appropriate setting from the Instruction Buffers area:

on enables instruction buffers in the simulator.

off disables instruction buffers in the simulator.

Auto Information to be provided.

7. Click on the appropriate setting from the Cache area:

 $\boxed{\circ}$ enables cache in the simulator.

off disables cache in the simulator.

8. Click on the appropriate setting from the Lats area:

 \square enables lats in the simulator for lat testing.

disables lats in the simulator for lat testing.

9. Specify the compute factor by either entering the value you want into the Compute Factor field or by dragging the slider to the value you want. Click on the <u>1×</u>, <u>10×</u>, <u>100×</u>, <u>1000×</u> or <u>Auto</u> compute factor by which you want to multiply the value in the Compute Factor field.

The compute factor specifies the number of instructions the simulator performs before MME and MDB are updated. The higher the compute factor, the higher the pass counts. The lower the compute factor, the more often MME and MDB are updated with data.

10. Specify the I/O factor either by entering the value you want into the I/O Factor field or by dragging the slider to the value you want. Click on the <u>1×</u>, <u>10×</u>, <u>100×</u>, <u>1000×</u> or <u>Auto</u> I/O factor by which you want to multiply the value in the I/O Factor field.

The I/O factor determines the speed at which the simulator updates channel activity. The higher the specified number, the faster channel activity is updated.

11. Click on a LOSP Loopback selection to specify the low-speed channel number you want to configure:

[100-117] selects LOSP channels 100 through 117.

[120-137] selects LOSP channels 120 through 137.

[140-157] selects LOSP channels 140 through 157.

selects LOSP channels 160 through 177.

60-67 selects LOSP channels 60 through 67.

12. Specify the channel connectors by choosing the connector number from the
→ next to each channel indicator:



13. Choose the maximum number of CPUs from the Max CPUs ⊽ button:



If you click on an individual CPU under Max CPUs:, you configure the CPU. If you deselect a CPU under Max CPUs:, you remove the CPU from the configuration. You can click on (Reset v) in the MDB base window to check the installed CPUs for the configuration you just created.

14. To apply your changes to the MSIM configuration, click on the (Apply) button. 15. To cancel your changes and return the window to its original settings, click on the (Reset) button.

Utilities -> Bugmaker -> Shared



The Utilities -> Bugmaker -> Shared command, as shown at left, enables you to create shared register bugs. User bug mode must be operating (refer to "Properties -> Bug Mode -> User" earlier in this document). When you select this command, the MSIM Bugmaker (Shared Registers) window appears.

Ø MSIM Bugmaker (Shared Registers)									
Bug Dir: usr/msim/mdbuser									
Bug File: learbug		N	lote:	In th	e MS	IM c	fg wi	ndow	
Cluster Number: 00 select Sync and Apply Register Number: 00						piy b L bu	efore gs		
Shared B Shared T Semaphore Semaphore/BS All									
SB/inc Read Write T/S C	lear	Set		licad	<u>ः</u>	Ŀ			
Source Result WS – Wait on Se DL – Dead Lock	Source Result WS - Wait on Semaphore 0 0 100 100								
Pick Drop		Sel	ect c	pu/c	pus	to bi	ıg :		
		1	Max (CPUs	: 🔽	1	:		
Byte Darrel Halfword Word	·)·)	(4	10	· 1-4 ·	20	24	30	34	
User Defined Rugged Bits:	1(1	(15	11	15	21	25	31	35	
000 000 000 000 000 000 000 165	0 <u>0</u>	(+6	12	16	22	26	30	36	
· ·	-03	(17	13	17	23	27	33	37	
Apply Apply & Save Delete Reset									

Follow this procedure to manipulate the information in this window to create a shared register bug: (complete procedure to be provided)

- 1. To apply your changes to the bugmaker window, click on the Apply button.
- 2. The Apply & save) button adds a bug file to the MDB Load Bug window.
- 3. The Delete) removes a bug file from the MDB Load Bug window.
- 4. To cancel your changes and return the window to its original settings, click on the Reset button.

Utilities -> Bugmaker -> Memory



The Utilities -> Bugmaker -> Memory command, as shown at left, enables you to create memory bugs. User bug mode must be operating (refer to "Properties -> Bug Mode -> User" earlier in this document. When you select this command, the MSIM Bugmaker (Memory) window appears.

, a production of the second	Ø MSIM Bu	igmaker (Memory)						
	Bug Dir: usr/msim/mdbuser,							
	Bug File: bugcache2	- Starting Address:						
	Load Store	0026000						
	On Off	Block Length: 001						
	Register Address Inst Fetch I	Exchange I/O Cache hit miss						
	A Reg B Reg S Reg T Reg V even	V odd Cache Mem All Ports None						
n 1997 - Stan Standard I.	Register Number: 00 Lat Bug Intermittent Percentage: Pick Drop On Off 0 Bugged Address Bits: Force Mbe Max CPUs: (7) 4							
	On Off	00 (-4 1) 14 (-) 24 (3) 34						
1. A. M. S. S.	User Defined Bugged Bits Format:	01 05 11 15 01 25 31 95						
	Byte Parcel Halfword Word	02 (46 12 16 22 26 32 36						
	000 000 170 000 000 000 000 000	03 (7 13 17 23 27 33 37						
	(Apply) (Apply & Save)	Delete Reset						

Follow this procedure to manipulate the information in this window to create a memory bug: (complete procedure to be provided)

- 1. To apply your changes to the bugmaker window, click on the Apply button.
- 2. The Apply & save) button adds a bug file to the MDB Load Bug window.
- 3. The Delete removes a bug file from the MDB Load Bug window.
- 4. To cancel your changes and return the window to its original settings, click on the **Reset** button.

Reset -> Client

Reset 💎	
Client	
Server	
Bugmode	

The Beset \rightarrow Client command, as shown at left, resets the client portion of the MDB application.

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Reset -> Server

(Reset ⊽	
Client	
Server	
Bugmode	

The Reset -> Server command, as shown at left, resets the server portion of the MDB application.

Reset -> Bugmode



The Reset -> Bugmode command, as shown at left, resets bug mode if you find an error from which your session cannot recover. Any CPUs and breakpoints you selected or bugs you loaded are not lost.

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1.1







Figure 2. Quick Menu Guide

See Page 16
See Page 17
See Page 17

Title: CRAY T90 Series **MDB Interface Reference**

Number: HDM-xxx-0

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