OLD

PROCEDURE: TEST OF VME CPU BOARDS

DATE: 11/05/86 Rev. 03

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME CPU board is functional.
This test is applicable to all VME CPU board.

2, MATERIAL/TOOL

2.1 Unit under test: VME CPU board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board (two), SCSI board, SMD board, Adaptec disc controller board, GIP board and DIS-MEM board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.
2.5 Two CRT terminals, each with appropriate RS232 cable.

3, PROCEDURE:

3.1 Visually inspect the CPU board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the extension board in slot 1 of the card cage.
Insert the CPU board under test in extention board's slot.
Insert the HSMEM board to slot 2 of the card cage.
Insert the HSMEM board to slot 3 of the card cage.
Insert the SCSI board to slot 4 of the card cage.
Insert the SMD board to slot 5 of the card cage.
Insert the GIP board to slot 6 of the card cage.
Insert the DIS-MEM board to slot 7 of the card cage.
Connect the 2 CRT terminals to the CPU board via I/O bracket and rs232 cables.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The ISI logo should appear on the console CRT.

3.4 Set oscilloscope display to A trig. FREQ.
Measure E5-1, the frequency should be 12.49987.
Turn power off, connect probe to E5-1.
Turn power on, recheck the frequency.
Repeat these steps three times.

3.5 Channel A and channel B transmit and receive test.
Memory accessing test:

when you see	type:	
:	$1000	<cr>
1000 0:	5555	<cr>
:	$1000	<cr>
1000 5555:	aaaa	<cr>
:	$1000	<cr>
1000 aaaa:		<cr>
:	~asdfg	<cr>

You should see on second CRT: asdfg
Type zxc on the second CRT keyboard and you will see zxc on the console CRT.

3.6 Interrupt reset test.
Press reset.
Key in "!", crt display "interrupt enable".

Short to ground the interrupt inputs on at a time, the console screen should different trap error message one at a time.
After the test, key in "!" to disable the interrupt.
Interrupt input:
E45,E47,E49,E51,E53,E55,E57 for 68010 CPU.
E17,E18,E19,E20,E21,E22,E23 for 68020 CPU.

3.7 I/O address test.
Type in the following:

when you see	type:
:	$7fffe0 <cr> for 68010 CPU
	$ffffe0 <cr> for 68020 CPU
FFFFE0 FFFF or 0	<LF>
FFFFE2 FFFF or 0	<LF>
FFFFE4 FFFF or 0	<LF>
:	
FFFFEE FFFF or 0	<LF>
should see trap error message	
:	$d0000 <cr>
FD0000 0_	<cr>
:	

3.8 Mmu test.
Connect monitor to I/O bracket.
Press reset buttom.
Type in the following to run mmu test.

when you see	type:
:	sd(0,6)stand/mmu <cr> for 68010
	sd(0,6)stand.V20/mmu <cr> for 68020
test menu for function	c <cr> (68010 CPU)
	d <cr> (68020 CPU)
test menu for 4 test	z <cr>
Number of lap:	2 <cr>

This test will take about 60 seconds.
After all tests are done without error, reset the system.

3.9 Mem test.
Type in the following to run mem test:

when you see	type:
:	sd(0,6)stand/mem <cr> (68010 CPU)
	sd(0,6)stand.V20/mem <cr> (68020 CPU)
test all memory?	y <cr>
number of bank?	0 <cr>
test with parity?	y <cr>
test menu	e <cr>
repeat count	1 <cr>

After all tests are done without error, press reset button(or type "x").

3.10 Dmax test.
Type in the following to run dma test:

when you see	type:	
:	sd(0,6)stand/dmax <cr>	(68010 CPU)
	sd(0,6)stand.V20/dmax <cr>	(68020 CPU)
hit return to continue	<cr>	
device:	sd(1,0) <cr>	
Max block length	<cr>	default is 512 bytes
Min block length	<cr>	default is block 0
Max block number	<cr>	default is block 1000
No. of block per lap	<cr>	default is 1000
Read/verify retry count	<cr>	default is 0

```
random pattern(def. no) y<cr>
Test with parity?       y       <cr>
Verbose                 y       <cr>
Start:                  0x40000 <cr>
End:                    0x1ffffe <cr>
Number of laps:         2       <cr>
```

After all test are done without error, press reset button(or type "x").

3.11 Unix test.

Type in the following to run unix test and check in the monitor:

```
when you see        type:
:                   sd(0,0)vmunix.V10 <cr> for 68010
                    sd(0,0)vmunix.V20 <cr> for 68020
#                   fsck -p  <cr>
#                   mount -a <cr>
#                   ^D
Login:              root     <cr>
Password:           orange   <cr>
UNKNOWN#            cd /usr/bench    <cr>
UNKNOWN#            while 1          <cr>
>                   repeat 1 timeall <cr>
>                   echo -n .        <cr>
>                   end              <cr>
   The above test will check the timeall functionally.
   To terminate the test, type <ctr>C  after afew laps.
UnKNOWN#            kill 1 <cr>
#                   sync   <cr>
#                   sync   <cr>
#                   reboot <cr>
:             turn off power to system.
```

3.11 Voltage range test.

Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After all test are done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10.

3.12 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME ICP16/8 BOARDS

DATE: 11/05/86 Rev. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME ICP 16/8 board is functional.
This test is applicable to all VME ICP 16/8 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME ICP16/8 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the ICP board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the board under test to slot 3 of the card cage.
Connect the printer to ICP 16/8 via cable.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
	$fff520 <cr> for 68020 CPU
FFF520 D0	<LF> for 16 ports
or C8	<LF> for 8 ports
FFF522 0	<LF>
:	
FFF53A 0	<LF>

should see trap error messege

3.5 Transceiver test.
Connect the wire loops to J1 and J2.
Type in the following to test the register:

when you see	type:
:	$fff52c <cr>
FFF52C 0	5555 <LF>
FFF52E 0	<space>
FFF52E 5555	<LF>
FFF530 5555	<space>
FFF530 5555	

repeat these steps by typing: aaaa instead of 5555

3.6 Port test.
Disconnect the wire loop.
Connect the cable from J1 or J2 to I/O port.
Type in the following to run unix test:

when you see	type:
	sd(0,0)vmunix.new <cr> for 68020
#	ls >/dev/lp0 <cr>

```
                check the printer is functional.
#                       fsck -p <cr>
#                       mount -a <cr>
#                       <ctr D>
Login:          Check all 16 I/O ports is functional.
                login to the console and other port.
Login:                  root <cr>
Passwors:               orange <cr>
UNKNOWN#                <cr>
UNKNOWN#        Disconnect the port, the port should log off
                automatically.
Login:                  root <cr>
Password:               orange <cr>
UNKNOWN#                while 1 <cr>
>                       ls /*/* <cr>
>                       date <cr>
>                       end <cr>
     Check both crt run the file functionally.
                        <ctr C>
UnKNOWN#                kill 1 <cr>
#                       sync <cr>
#                       sync <cr>
#                       reboot <cr>
:                 turn off power to system.
```

3.7 Bus Continuity Test
Insert SCSI biard after ICP board (slot 4), make sure SCSI board can work.

3.8 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.9 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME SCSI BOARDS

DATE: 09/08/86 REV. 02

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME SCSI board is functional. This test is applicable to all VME SCSI board.

2, MATERIAL/TOOL

2.1 Unit under test: VME SCSI board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the SCSI board for solder shorts, backward IC, bent pins, blue jumpers, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSI board under test to slot 3 of the card cage.
Connect blank disc to drive 1 of Adaptec board.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The ISI logo should appear on the console CRT.

3.4 I/O address test.
At power up, the LED (DS1) on the SCSI board will blink 16 times. This is just a delay to allow the disk drive to become ready. When the LED stops blinking perform the registers tests as follow:

Type in the following: _

when you see	type:
:	$7fffe0 <cr> for 68010 CPU
	$ffffe0 <cr> for 68020 CPU
FFFFE0 0	<LF>
FFFFE2 0	<LF>
FFFFE4 0	<LF>
...	
FFFFEE 0	<LF>

You should see the trap error message. Note that if you do not wait until the LED stops flashing and do the above tests what you see will be:

```
FFFFE0 FFFF
FFFFE2 FFFF
FFFFE4 FFFF
    ...
```

3.5 Dmax test.
Type in the following to run dma test:

when you see	type:		
:	sd(0,6)stand/dmax	<cr>	(68010 CPU)
	sd(0,6)stand.V20/dmax	<cr>	(68020 CPU)
	<cr>		

```
device:                  sd(1,0)  <cr>
Max block length         <cr>
Min block length         <cr>
Max block number         <cr>
No. of block per lap     <cr>
Read/verify retry count  <cr>
Random pattern
Test with parity?        y        <cr>
Verbose                  y        <cr>
Start:                   0x40000  <cr>
End:                     0x1ffffe <cr>
Number of laps:          2        <cr>
```

After all the tests are done without error, press reset button.

3.6 Unix test.
Type in the following to run unix test:

```
when you see          type:
:                     sd(0,0)vmunix.V10 <cr> for 68010
                      sd(0,0)vmunix     <cr> for 68020
#                     fsck -p           <cr>
#                     mount -a          <cr>
#                     ^D
Login:                root              <cr>
Password:             orange            <cr>
UNKNOWN#              cd /usr/bench     <cr>
UNKNOWN#              while 1           <cr>
>                     repeat 1 timeall  <cr>
>                     echo -n .         <cr>
>                     end               <cr>
```

The above test will check the timeall functionally. To terminate the test type ^C after a few runs.

```
UNKNOWN#              kill 1   <cr>
#                     sync     <cr>
#                     sync     <cr>
#                     reboot   <cr>
:           -  turn off power to system.
```

3.7 Bus Continuity Test
Insert QIC2 board after SCSI board (slot 4). Boot up in unix as outlined in 3.6. Then type the following:

```
#tar cv *   <cr>
```

3.8 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After all tests are done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10.

3.9 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME MEMORY BOARDS

DATE: 11/05/86 Rev. 03

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME MEM board is functional.
This test is applicable to all VME MEM board.

2, MATERIAL/TOOL

2.1 Unit under test: VME MEM board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 CPU020 board, HSMEM board (another good board), SCSI board, Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the MEM board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU board to slot 1 of the card cage.
Insert the SCSI board to slot 2 of the card cage.
Insert the MEM board under test to slot 3 of the card cage.
Insert the good MEM board to slot 4 of the card cage.

3.3 Power up the system and CRT's.
Adjust 5 volt power supply to 4.75 volt.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 Mem test. (one lap takes 1.5 minutes)
Type in the following to run mem test:

when you see	type:
:	sd(0,6)stand.V10/mem <cr> for 68010
	sd(0,6)stand.V20/mem <cr> for 68020
test all memory?	y <cr>
number of bank?	0 <cr>
test with parity?	y <cr>
test menu	e <cr>
repeat count	2 <cr>

After the test is done without error, press reset buttom.

3.5 Memtest test.(one lap takes 13.5 minutes)
Type in the following to run memtest test:

when you see	type:
:	sd(0,6)stand.V10/memtest <cr> for 68010
	sd(0,6)stand.V20/memtest <cr> for 68020
enter p to return prom	<cr>
test with parity?	y <cr>
enter hex start address	40000 <cr>
enter hex stop address	1ffffe <cr>

Do this test for one lap.
After the test is done without error, press reset buttom.

3.5 Dmax test.(one lap takes 2.5 minutes)
Type in the following to run dma test:

when you see	type:
:	sd(0,6)stand.V10/dmax <cr> for 68010
	sd(0,6)stand.V20/dmax <cr> for 68020

```
hit return to continue <cr>
device:                 sd(1,0) <cr>
max block length        <cr>
min block length        <cr>
max block number        <cr>
No. of block per lap    <cr>
read/verify retry count <cr>
random patterns?        y <cr>
test with parity?       y <cr>
verbose                 y <cr>
start:                  0x40000 <cr>
end:                    0x3ffffe <cr>
lap:                    2 <cr>
```

After the test is done without error, press reset buttom.

3.6 Unix test.

Type in the following to run unix test:

```
when you see            type:
:                       sd(0,0)vmunix.V10 <cr> for 68010
                        sd(0,0)vmunix.V20 <cr> for 68020
#                       fsck -p <cr>
#                       mount -a <cr>
#                       <ctr D>
Login:                  root <cr>
Password:               orange <cr>
UNKNOWN#                cd /usr/bench <cr>
UNKNOWN#                load <cr>
     Check the timeall functionally.
     Run at least two laps.
                        <ctr C>
UNKNOWN#                kill 1 <cr>
#                       umount -a <cr>
#                       sync <cr>
#                       sync <cr>
#                       reboot <cr>
:               turn system's power off.
```

3.7 Voltage range test.

Turn the system's power on, adjust the 5 volt voltage to 5.25 volt, run mem test, dmax test and unix test.

3.8 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME QIC2 BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME QIC2 board is functional. This test is applicable to all VME QIC2 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME QIC2 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the QIC2 board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the QIC2 board under test to slot 3 of the card cage.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
:	$fff550 <cr>
FFF550 0 -	<LF>
FFF552 84C2	<LF>
FFF554 0	<LF>

should see trap error messege

3.5 Clock test.

Type in the following:

:sd(0,0)stand.V20/clock <cr>

when you see	type:	
address, set, display, or exit ?:	a	<cr>
Enter address of clock	fff554	<cr>
address, set, display, or exit ?:	d	<cr>
3:20.32		<cr>
address, set, display, or exit ?:	s	<cr>
		<cr>
hr:min.sec	3:22.12	<cr>
address, set, display, or exit ?:	e	<cr>
:		

3.6 Tar (Tape Archive) test.

Type in the following to run unix test:

when you see	type:

```
:                    sd(0,0)vmunix  <cr>
#                    fsck -p        <cr>
#                    mount -a       <cr>
#                    cd /usr/tmp    <cr>
# copy file 'vmunix' to files a1 through a4
#                    cp /vmunix a1  <cr>
#                    cp /vmunix a2  <cr>
#                    cp /vmunix a3  <cr>
#                    cp /vmunix a4  <cr>
#                    while true     <cr>
>                    do
>                    cp /vmunix ... <cr>
>                    tar c *        <cr>
>                    rm ...         <cr>
>                    tar x *        <cr>
>                    cmp -l /vmunix ... <cr>
>                    echo -n -OK-   <cr>
>                    done           <cr>
```

Type ^C to stop the test after 5 or 6 runs. Reboot system as follow:

```
#                    sync   <cr>
#                    sync   <cr>
#                    reboot <cr>
:              turn off power to system.
```

3.7 Battery test
Shut power off. Wait one minute, turn power on, type "date <cr>" and check the date is correct.

3.8 Bus Continuity Test
Insert SCSI board after ICP board (slot 4), make sure SCSI board can work.

3.9 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After all tests are done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.10 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME TC50 BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME TC50 board is functional.
This test is applicable to all VME TC50 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME TC50 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the TC50 board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the TC50 board under test to slot 3 of the card cage.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
	$fff550 <cr>
FFF550 0	<LF>
FFF552 4C0 -	<LF>
FFF554 0	<LF>
:	
should see trap error messege	

3.5 Date test.
Type in the following:

when you see	type:
:	sd(0,0)stand20/date <cr>
addr,set,dis,or exit	a <cr>
addr od clock	fff554 <cr>
addr,set,dis,or exit	d <cr>
3:20.32	<cr>
addr,set,dis,or exit	s <cr>
	<cr>
hr:min.sec	3:22.12 <cr>
addr,set dis,or exit	e <cr>
:	

3.6 Ttest test.
This test is driven by a command file.
Type in the following:

when you see	type:
:	sd(0,0)ttest <cr>
	check the messages shown on the screen.
:	turn off power to system.

3.7 Battery test
Shut power off. Wait one minute, turn power on, type "date <cr>" and check the date is correct.

3.8 Bus Continuity Test
Insert SCSI biard after ICP board (slot 4), make sure SCSI board can work.

3.9 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.10 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST FOR RL101 BOARDS

DATE: 11/05/86 Rev. 1

1, PUROSE
This procedure outlines the steps involved in determining whether or not the Q_BUS RL101 board is functional.
This test is applicable to all Q_BUS RL101 board.

2, MATERIAL/TOOL
2.1 Unit under test: Q_BUS RL101 board.
2.2 Q_BUS card cage abd backplane, with power supply for 5V, 12V, -12V.
2.3 CPU010 board and MEM board.
2.4 Disk drive loaded with UNIX and diagnostic programs like: elformat, disktest and diskwrite.
2.5 Formatted blank disk dirve.
2.6 One CRT terminal connected to CPU010 board via I/O bracket.

3, PROCEDURE:
3.1 Visually inspect the RL101 board for solder shorts, backward IC, bent pin, blue jumper and capacitor polarity.

3.2 Connect Blank formatted disk drive to drive 0.

3.3 Frequency Alignment

Power up the system.
Use short test wire connecting CR1 cathod to ground at C1.
Connect oscilloscope to 14R-11 (74S00).
Align R20 to get 10 MHz +/- until frequency in 14R-11 is stable.
Disconnect test wire from CR1.
Recheck the frequency without test wire. If the frequency is not 10 MHz, go back to the third step realigning R20.
Power down the system.
Disconnect test wire.

3.4
Connect 15P-3(26S02) to the positive side (+5V) of capacitor below R2.
Connect oscillosope to 15P-6.
Align R6 to get 250ns pulse 0 duty cycle.
Power down the system.
Disconnect test wire.

3.5 Format Blank Disk Test In Drive 0 (about 35 min)

Connect blank formatted disk 0.
Enable switch pin 1 on. Disable switch pin 2 off.
Connect 1D-6 (BDMGL, bus grant in) to bus grant out (third slot CPU).
Turn power on.

Keyin	shown	ds1	keyin
$3ff900	0	flashing	81 <line_feed>
3ff902			<line_feed>
3ff904	0		1941 <cr> for IMI 5012H disk
		or	22b8 <cr> for wren9415-5 disk
$3ff900	81		0 <cr>
			format status
$1000	0		<line-feed>show track number
:			
:			show spare block
:	ffff		

3.6 Voltage Control Test

Connect voltage meter to positive side of C3. (V+5)
Connect oscilloscope to 14E-13 (7438).
Adjust power supply voltage V+5 down until 14E-13 signal is off.
Measure the V+5 voltage at C3. The voltage should be less than 4.44 volt.
Adjust power supply voltage V+5 up until 14E-13 signal is on.
Measure the V+5 voltage at C3. The voltage should be higher than 4.75 volt.

3.7 Dmax test (5 laps)

This is the volatile test.
It test disk and controller.
Connect blank disk for drive 1.
Connect good disk with Unix for drive 0.

```
when you see          type:
:                     el(0,0)sa/dmax <cr>     Have soft error report
                  or  el(0,0)stand/dma <cr>
                   wait ds1 flashing
FOR DMAX:
hit return to contiue <cr>
device:               el(1,0) <cr>
max block length      <cr>                    default is 512 bytes
min block length      <cr>                    default is block 0
max block number      <cr>                    default is block 1000
no. of block per lap <cr>                     default is 1000
read/verify retry count <cr>                  default is 0
random pattern(default no) y<cr>
test with parity(def. no)  y<cr>
verbose                    y<cr>
start of buffer:      0x40000 <cr>
end of buffer:        0x13fffe <cr>
Number of laps:       5 <cr>

FOR DMA:
device:               el(1,0) <cr>
block size            <cr>                    default is 512 bytes
no. of block per lap <cr>                     default is 1000
start of buffer:      0x40000 <cr>
end of buffer:        0x13fffe <cr>
number of laps:       5 <cr>
```

3.8 Unix Test (10 laps)

```
Shown      Keyin
:          el(0,0)vmunix <cr>
#          <ctr D> <cr>
login:     root <cr>
Password:  orange <cr>
UNKNOWN#   cd /usr/bench <cr>
UNKNOWN#   load <cr>          run timeall program
         run timeall   10 laps

           <ctr C> <cr>        stop timeall program
UNKNOWN#   kill 1 <cr>
#          sync <cr>
#          reboot <cr>
```

PROCEDURE: TEST OF VME CPU BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME CPU board is functional.
This test is applicable to all VME CPU board.

2, MATERIAL/TOOL

2.1 Unit under test: VME CPU board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, SCSI board, SMD board, Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.
2.5 Two CRT terminals, each with appropriate rs232 cable.

3, PROCEDURE:

3.1 Visually inspect the CPU board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the HSMEM board to slot 1 of the card cage.
Insert the SCSI board to slot 2 of the card cage.
Insert the SMD board to slot 3 of the card cage.
Insert the CPU board under test to slot 4 of the card cage.
Connect the 2 CRT terminals to the CPU board via rs232 cables.
3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 Channel A and channel B transmit and receive test.
Try to access memory, type:

when you see	type:
:	$1000 <cr>
1000 0:	5555 <cr>
:	$1000 <cr>
1000 5555:	aaaa <cr>
:	$1000 <cr>
1000 aaaa:	<cr>
:	~asdfg <cr>

should see on second CRT: asdfg
Type zxc on the second CRT keyboard and you will see zxc on the console CRT.

3.5 Interrupt reset test.
Press reset. Short to ground the interrupt inputs on at a time, console screen should different trap error message one at a time.
Interrupt input:
E45,E47,E49,E51,E53,E55,E57 for 68010 CPU.
E17,E18,E19,E20,E21,E22,E23 for 68020 CPU.
3.6 I/O address test.
Type in the following:

when you see	type:
:	$7fffe0 <cr> for 68010 CPU
	$ffffe0 <cr> for 68020 CPU
FFFFE0 0_	<LF>
FFFFE2 0_	<LF>
FFFFE4 0_	<LF>

should see trap error messege

```
                                <ctr C>
  UnKNOWN#                      kill 1 <cr>
  #                             sync <cr>
  #                             sync <cr>
  #                             reboot <cr>
  :                       turn off power to system.
```

3.11 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.12 Heat test.
Perform the burn-in test according to system burn-in procedure.

```
                :                       $d0000 <cr>
                FD0000 0_               <cr>
                :
```

3.7 Mmu test.

Press reset buttom.

Type in the following to run mmu test.

```
                when you see            type:
                :                       sd(0,0)stand/mmu <cr> for 68010
                                        sd(0,0)stand20/mmu <cr> for 68020
                test menu for function c <cr>       for 68010 CPU
                                         d <cr>     for 68020 CPU
                test menu for 4 test z <cr>
                lap                     1 <cr>
```

This test will take about 30 seconds.

After is done without error, reset the system.

3.8 Mem test.

Type in the following to run mem test:

```
                when you see            type:
                :                       sd(0,0)stand/mem <cr> for 68010
                                        sd(0,0)stand20/mem <cr> for 68020
                test all memory?        y <cr>
                number of bank?         0 <cr>
                test with parity?       y <cr>
                test menu               e <cr>
                repeat count            1 <cr>
```

After the test is done without error, press reset buttom.

3.9 Dmax test.

Type in the following to run dma test:

```
                when you see            type:
                :                       sd(0,0)stand/dmax <cr> for 68010
                                        sd(0,0)stand20/dmax <cr> for 68020
                hit return to continue <cr>
                device:                 sd(1,0) <cr>
                max block length        <cr>
                min block length        <cr>
                max block number        <cr>
                No. of block per lap <cr>
                read/verify retry count <cr>
                test with parity?       y <cr>
                verbose                 y <cr>
                start:                  40000 <cr>
                end:                    1ffffe <cr>
                lap:                    1 <cr>
```

After the test is done without error, press reset buttom.

3.10 Unix test.

Type in the following to run unix test:

```
                when you see            type:
                :                       sd(0,0)vmunix.010 <cr> for 68010
                                        sd(0,0)vmunix.020 <cr> for 68020
                #                       fsck -p <cr>
                #                       mount -a <cr>
                #                       <ctr D>
                Login:                  root <cr>
                Password:               orange <cr>
                UNKNOWN#                cd /usr/bench <cr>
                UNKNOWN#                while 1 <cr>
                >                       repeat 1 timeall <cr>
                >                       echo -n . <cr>
                >                       end <cr>
```

Check the timeall functionally.

PROCEDURE: TEST OF VME MEMORY BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME MEM board is functional.
This test is applicable to all VME MEM board.

2, MATERIAL/TOOL

2.1 Unit under test: VME MEM board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, SCSI board, SMD board, Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the MEM board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU board to slot 1 of the card cage.
Insert the SCSI board to slot 2 of the card cage.
Insert the MEM board under test to slot 3 of the card cage.
Insert good MEM board to slot 4 of the card cage.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 Mem test.
Type in the following to run mem test:

when you see	type:
:	sd(0,0)stand/mem <cr> for 68010
	sd(0,0)stand20/mem <cr> for 68020
test all memory?	y <cr>
number of bank?	0 <cr>
test with parity?	y <cr>
test menu	e <cr>
repeat count	1 <cr>

After the test is done without error, press reset buttom.

3.5 Dmax test.
Type in the following to run dma test:

when you see	type:
:	sd(0,0)stand/dmax <cr> for 68010
	sd(0,0)stand20/dmax <cr> for 68020
hit return to continue <cr>	
device:	sd(1,0) <cr>
max block length	<cr>
min block length	<cr>
max block number	<cr>
No. of block per lap <cr>	
read/verify retry count <cr>	
test with parity?	y <cr>
verbose	y <cr>
start:	40000 <cr>
end:	1ffffe <cr>
lap:	1 <cr>

After the test is done without error, press reset buttom.

3.6 Unix test.
Type in the following to run unix test:

when you see	type:
:	sd(0,0)vmunix.010 <cr> for 68010
	sd(0,0)vmunix.020 <cr> for 68020
#	fsck -p <cr>
#	mount -a <cr>
#	<ctr D>
Login:	root <cr>
Password:	orange <cr>
UNKNOWN#	cd /usr/bench <cr>
UNKNOWN#	while 1 <cr>
>	repeat 1 timeall <cr>
>	echo -n . <cr>
>	end <cr>
Check the timeall functionally.	
	<ctr C>
UnKNOWN#	kill 1 <cr>
#	sync <cr>
#	sync <cr>
#	reboot <cr>
:	turn off power to system.

3.7 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.8 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME QIC2 BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME QIC2 board is functional.
This test is applicable to all VME QIC2 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME QIC2 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the QIC2 board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the QIC2 board under test to slot 3 of the card cage.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
:	$fff550 <cr>
FFF550 0	<LF>
FFF552 84C2	<LF>
FFF554 0	<LF>
should see trap error messege	

3.5 Date test.
Type in the following:

when you see	type:
:	sd(0,0)stand20/date <cr>
addr,set,dis,or exit	a <cr>
addr od clock	fff554 <cr>
addr,set,dis,or exit	d <cr>
3:20.32	<cr>
addr,set,dis,or exit	d <cr>
	<cr>
hr:min.sec	3:22.12 <cr>
addr,set dis,or exit	e <cr>
:	

3.6 Tar test.
Type in the following to run unix test:

when you see	type:
	sd(0,0)vmunix.020 <cr>
#	fsck -p <cr>
#	mount -a <cr>
#	cd /usr/tmp <cr>
# copy vmunix.020 to file a1 through a4	
#	cp /vmunix.020 a1 <cr>

```
#                       cp /vmunix.020 a2 <cr>
#                       cp /vmunix.020 a3 <cr>
#                       cp /vmunix.020 a4 <cr>
#                       while true <cr>
>                       do
>                       cp /vmunix.020 ... <cr>
>                       tar c * <cr>
>                       rm ... <cr>
>                       tar x * <cr>
>                       cmp -l /vmunix.020 ... <cr>
>                       echo -n "OK" <cr>
>                       echo <cr>
>                       done <cr>
    check the is functional.
                        <ctr C>
UnKNOWN#                kill 1 <cr>
#                       sync <cr>
#                       sync <cr>
#                       reboot <cr>
:               turn off power to system.
```

3.7 Battery test
Shut power off. Wait one minute, turn power on, type "date <cr>" and check the date is correct.

3.8 Bus Continuity Test
Insert SCSI biard after ICP board (slot 4), make sure SCSI board can work.

3.9 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.10 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME ICP16/8 BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME ICP 16/8 board is functional.
This test is applicable to all VME ICP 16/8 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME ICP16/8 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the ICP board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the board under test to slot 3 of the card cage.
Connect the printer to ICP 16/8 via cable.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
	$fff520 <cr> for 68020 CPU
FFF520 D0	<LF>
FFF522 0	<LF>
:	
FFF53A 0	<LF>
should see trap error messege	

3.5 Transceiver test.
Connect the wire loops to J1 and J2.
Type in the following to test the register:

when you see	type:
:	fff52c <cr>
FFF52C 0	5555 <LF>
FFF52E 5555	<space>
FFF52E 5555	<LF>
FFF52E 5555	<LF>

repeat these steps by typing: aaaa

3.6 Port test.
Disconnect the wire loop.
Connect the cable from J1 or J2 to I/O port.
Type in the following to run unix test:

when you see	type:
	sd(0,0)vmunix.new <cr> for 68020
#	ls >/dev/lp0 <cr>
check the printer is functional.	
#	fsck -p <cr>

```
#                       mount -a <cr>
#                       <ctr D>
Login:          Check all 16 I/O ports is functional.
                login to the console and other port.
Login:                  root <cr>
Passwors:               orange <cr>
UNKNOWN#                <cr>
UNKNOWN#        Disconnect the port, the port should log off
                automatically.
Login:                  root <cr>
Password:               orange <cr>
UNKNOWN#                while 1 <cr>
>                       ls /*/* <cr>
>                       date <cr>
>                       end <cr>
     Check both crt run the file functionally.
                        <ctr C>
UnKNOWN#                kill 1 <cr>
#                       sync <cr>
#                       sync <cr>
#                       reboot <cr>
:                 turn off power to system.
```

3.7 Bus Continuity Test
Insert SCSI biard after ICP board (slot 4), make sure SCSI board can work.

3.8 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.9 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME SCSI BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME SCSI board is functional.
This test is applicable to all VME SCSI board.

2, MATERIAL/TOOL

2.1 Unit under test: VME SCSI board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the SCSI board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSI board under test to slot 3 of the card cage.
Connect blank disc to drive 1 of Adaptec board.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
:	$7fffe0 <cr> for 68010 CPU
	$ffffe0 <cr> for 68020 CPU
FFFFE0 0	<LF>
FFFFE2 0	<LF>
FFFFE4 0	<LF>
:	
FFFFEE 0	<LF>

should see trap error messege

3.5 Dmax test.
Type in the following to run dma test:

when you see	type:
:	sd(0,0)stand/dmax <cr> for 68010
	sd(0,0)stand20/dmax <cr> for 68020
hit return to continue <cr>	
device:	sd(1,0) <cr>
max block length	<cr>
min block length	<cr>
max block number	<cr>
No. of block per lap <cr>	
read/verify retry count <cr>	
test with parity?	y <cr>
verbose	y <cr>
start:	40000 <cr>
end:	1ffffe <cr>
lap:	1 <cr>

After the test is done without error, press reset buttom.

3.6 Unix test.
Type in the following to run unix test:

when you see	type:
:	sd(0,0)vmunix.010 <cr> for 68010
	sd(0,0)vmunix.020 <cr> for 68020
#	fsck -p <cr>
#	mount -a <cr>
#	<ctr D>
Login:	root <cr>
Password:	orange <cr>
UNKNOWN#	cd /usr/bench <cr>
UNKNOWN#	while 1 <cr>
>	repeat 1 timeall <cr>
>	echo -n . <cr>
>	end <cr>
	Check the timeall functionally.
	<ctr C>
UnKNOWN#	kill 1 <cr>
#	sync <cr>
#	sync <cr>
#	reboot <cr>
:	turn off power to system.

3.7 Bus Continuity Test
Insert QIC2 biard after SCSI board (slot 4), rnu tar cv.

3.8 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.9 Heat test.
Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME TC50 BOARDS

DATE: 04/24/86

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME TC50 board is functional.
This test is applicable to all VME TC50 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME TC50 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disc driver loaded with UNIX, and diagnostic programs like : mmu, memtest and dma.

3, PROCEDURE:

3.1 Visually inspect the TC50 board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the TC50 board under test to slot 3 of the card cage.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory...
The IS logo should appear on the console CRT.

3.4 I/O address test.
Type in the following:

when you see	type:
	$fff550 <cr>
FFF550 0	<LF>
FFF552 4C0	<LF>
FFF554 0	<LF>
:	
should see trap error messege	

3.5 Date test.
Type in the following:

when you see	type:
:	sd(0,0)stand20/date <cr>
addr,set,dis,or exit	a <cr>
addr od clock	fff554 <cr>
addr,set,dis,or exit	8 <cr>
3:20.32	<cr>
addr,set,dis,or exit	9 <cr>
	<cr>
hr:min.sec	3:22.12 <cr>
addr,set dis,or exit	e <cr>
:	

3.6 Ttest test.
This test is driven by a command file.
Type in the following:

when you see	type:
:	sd(0,0)ttest <cr>
:	turn off power to system.

3.7 Battery test
Shut power off. Wait one minute, turn power on, type "date <cr>" and check the date is correct.

3.8 Bus Continuity Test
Insert SCSI biard after ICP board (slot 4), make sure SCSI board can work.

3.9 Voltage range test.
Turn power to the system, adjust the 5 volt supply to 4.75 volt, repeat step 3.10. After the test is done without error, adjust 5 volt supply to 5.25 volt and repeat step 3.10 again.

3.10 Heat test.
Perform the burn-in test according to system burn-in procedure.

EEPROM SPEED JUMPERING
250ns ⟶ E45_44
300ns ⟶ E45_E47
450ns ⟶ E45_E46.

PROCEDURE: TEST FOR NETWORK/ETHERNET BOARD

DATE: 12/02/86 REV. 02

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the Network/Ethernet board is functional. This test is applicable to all VME system.

2, MATERIAL/TOOL

2.1 Unit under test: VME Network/Ethernet board.
2.3 HSMEM board, CPU board, SCSI board, Adaptec disk controller board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic program nw.
2.5 Ethernet Transceiver.

3, PROCEDURE: ETHERNET BOARD: JUMP E41, E42 (WHEN SHIFT THEBOARD OUT)

3.1 Insert the CPU board to slot 1 of the card cage.
Insert the HSMEM board to slot 2 of the card cage.
Insert the SCSI board to slot 3 of the card cage.
Insert the Ethernet board to slot 4 of the card cage.
****Jumper E40, E42. ****
**** SELECT THE RIGHT JUMPER SETTING FOR EPROM SPEED. ****
The default jumper setting is E45-E46 (450ns for Eprom speed)
Connect ethernet transceiver to ethernet connector on the board.

3.2 Power up the system and CRT's.
Press the reset button and the console CRT should show:
Initialize all memory ..
The ISI logo should appear on the console CRT.

3.3 Network/Ethernet board Test.

Type in the following to run ICP port test,

when you see	type:		
:	sd(0,0)nw	<cr>	for VME system

```
VME Network Card Standalone Diagnostic
Version 1.0

Type 'd' to run the complete diagnostic.
Type 'a' to toggle firmware load flag.
Type 'b' to set the base address of the card under test.
     (Current value = 0xf80000)
Type 'e' to run the VME Ethernet Card diagnostic.
Type 'i' to run indivdual downloaded tests.
Type 'l' to loop on a particular test.
Type 'm' to print a menu of the tests.
Type 'o' to execute a test once.
Type 't' to become a terminal for downloaded test firmware.
('~' escapes from terminal operation.)

e <cr>
cpu:e
Now running test.
Typing any character will terminate testing
Test1: ram countup succeeded
Test2: .....
....
....
Test10: Firmware has been downloaded.
        Testing will now be controlled from the VME Network card.
```

```
Test 1: Timer succeed
Test 2: LANCE go - no go internal test succeed

VME Network Card Download Diagnostic
Version 1.0
Jumper RAM size = 256 k byte

Type 'd' to run the complete diagnostic.
Type 'l' to loop on a particular test.
Type 'm' to print a menu of the tests.
Type 'o' to execute a test once.
nw:d
nw:o <cr>
Select test to be executed (0=quit)
7 <cr>
Test 7: LANCE external loopback succeed
```

3.4 Press reset.
Remove ethernet transceiver from the board.
Remove the board from card cage.
**** Remove jumper E40.*****
****Jumper E41.*****

4.1 Debugging:

If any item failed during the test, the test would stop at that test item and show some error messages on the screen.
Reboot the system and reload the diagnostic program.
Select "l" for looping test and check the board.
Select "i" for firmware downloaded.
Select "o" for executing a test once.

If the failed item is in RAM, there is another way for debugging.
Remove E40,E41,E42,E43, press reset. The debugger will be enabled, see in the manual table 4.1 for the definition.

NOTE: The following are the test descriptions in each test item.

This diagnostic performs the tests listed below from the VME side. The card under test must be jumpered to skip ROM resident diagnostics.

1. Write all possible 65536 values to a single location in the dual-port RAM, and verify that they have been written.
2. Test to see if strobing of individual bytes into the RAM works using DS0* and DS1* lines.
3. Test to see that only one of the two RAM banks is selected at a time.
4. Write the patterns 0x5555, then 0xaaaa to all locations of RAM, then verify that all locations in RAM were written correctly.
5. Fill RAM with 0x5555, wait a few seconds, then check to see that the data written had not decayed away.
6. Take the network card out of reset, and watch to see that the sixteen-bit location, 'testno,' is set to zero by the on-card ROM program indicating successful completion of the on-card diagnostics. Note that this test will NOT pass unless the card is jumpered for RAM download operation.
7. Download the test firmware to the card, and request 256 times that it interrupt the host, each time using a different interrupt vector.
8. Access the card's interrupt control location, and verify that the card saw the interrupt vector.
9. Perform a test of the 68000 TAS instruction to verify that the special bus cycle associated with it works properly.

10. Download the test firmware to the card, requesting that it begins its own local testing.

This diagnostic performs the tests listed below from the VME Network Card CPU itself. Tests 1-6 are an automatic part of the diagnostics performed by the downloader. All other tests require manual intervention and must be initiated by hand.

1. Verify that the timer works.
2. Perform an internal loopback test on the LANCE.
3. Test the DMA controller by transferring blocks back and forth forth in memory.
4. Perform an internal loopback test on the Z8530 using the DMA controller.
5. Verify that transfers over the VME bus are possible using both the 68000 and the DMA controller.
6. Verify that LANCE and DMA accesses cause bus errors while those parts are reset, and verify that a reset Z8530 doesn't function
7. Perform an external loopback test on the LANCE. This requires that a dummy cable and transceiver be connected to the card.
8. Perform an external loopback test on the Applebus. A loopback or transceiver connector must be connected without being connected to the Applebus.
9. Verify that RS-232 signals are working. A test connector must be plugged into the RS-232 port and the board must be jumpered for RS-232 operation with the RS-232 clocks driven by the board Connect jumper E53(1-2) instead of E53(2-3). The RXC receiver is NOT tested by this test.
10. Verify that the baud rate crystal is working. The board must be jumpered for asynchronous RS-232 operation.
11. Verify that the Multinet is working. The board must be jumpered for Multinet operation and not connected to the network. The Multinet receive enable is NOT tested by this test.
12. Verify that the card can turn on and off the SYSFAIL* line.
13. Print statistics gathered from LANCE testing.
14. Zero statistics gathered from LANCE testing.
15. Change parameters for VME master test.

NEW

PROCEDURE: TEST OF VME COLOR GIP BOARD

DATE: 12/05/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME COLOR GIP board is functional.

2, MATERIAL/TOOL

2.1 Unit under test: VME COLOR GIP & Display Memory board.
2.2 VME card cage and backplane, with power supply for 5V, +/- 12V, and -5V.
2.3 Two HSMEM boards, CPU board, SCSI board, & Adaptec disk controller board
2.4 Disk loaded with UNIX 4.2BSD and "debug" diagnostic program for the GIP.

3, PROCEDURE:

3.1 Visually inspect the C/GIP board for solder shorts, backward ICs, bent pins, blue jumpers, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM boards to slot 2&3 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the C/Mem board to slot 7 of the card cage.
Insert the C/GIP board under test to slot 8 of the card cage.
Connect the flat cables from the C/GIP board to the C/Mem board.
Connect the -5V to the C/GIP board on the lower right side.

3.3 Power up the system.
Press the reset button and the console CRT should show:
Initialize all memory ....
The IS logo should appear on the console CRT.

3.4 I/O address test.

Type in the following to check the I/O address of the C/GIP:

when you see	type:
:	$FFC000 <cr>
FFF000 FF9F	<LF>
FFF000 FF9F	<LF>
FFF000 FF9F	<LF>
...	...

Type in the following to check the I/O address of the C/Mem:

when you see	type:
:	$e00000 <cr>
e00000 0	<LF>
e00000 0	<LF>
e00000 0	<LF>
...	...

3.5 C/GIP diagnostic.

When you see: type:
: sd(0,6)stand.V20/debug <cr> for 68020
or sd(0,6)stand.V10/debug <cr> for 68010

The system will invoke the debug diagnostic program. You will see:

GIP Board Debugger
Color System
Rev. D board in use

type ? for help

Typing a "?" at the new prompt "->" will display the test menu:

```
c) clear screen.
g) graphic commands.
h) hardware tests.
m) microcode tests.
q) quit & return to PROM monitor.
s) set screen to white.
t) toggle use of interrupts.
z) zap 29116 ALU.

x) initialize color table.
y) display color table.
```

Each test can be invoked by typing the desired letter at the arrow prompt. To run the next test type "q" at the present test and you should be back at the original prompt. Be SURE to check ALL images that are displayed for each of the following test should be clear as indicated without any distortion.

```
-> x    <cr>     The screen should be red.
-> y    <cr>     A color table should be displayed.
-> s    <cr>     The screen should be white.
-> c    <cr>     Clear screen.
-> h    <cr>     Go to hardware test menu.
```

The prompt is now changed to "h>" to show that you are at the sub-menu level. Typing a "?" will display the new menu:

```
d) debug mode.
f) fifo read/write test.
g) alignment grid.
h) byte/word/long display memory test.
i) interrupt test.
l) look at display memory.
m) byte memory read/write exercise.
n) word       "       "       "
o) long       "       "       "
r) microcode auto repeat.
q) quit & return to main prompt.
v) vme memory access test.
z) zap test.
```

Run the following tests:

```
h> g                        <cr>
   turn on Red?     'y/n'   <cr>
   turn on Green?   'y/n'   <cr>
   turn on Blue?    'y/n'   <cr>
```

Type (y/n) to the above questions. Depending on how you answered the monitor will display grid lines with a dot in the center and with the colors in the table listed below:

R	G	B	Color
0	0	0	Blank
0	0	1	Blue
0	1	0	Green
0	1	1	Cyan (Light blue)
1	0	0	Red
1	0	1	Purple

Note: '1' correspond to 'y'
'0' " " 'n'

```
            1 1 0  Yellow
            1 1 1  White

h> v      <cr>      Run all tests:

   Test memory region ?          <cr>
   Repeat count in decimal ?     <cr>

   Test available:

      a) pattern.
      w) walk.
      p) ping pong.
      r) random.
      u) uniq.

   Run each of the above test:

      a    <cr>   Should see vertical lines moving left.
      w    <cr>   Walk small pattern across the screen.
      p    <cr>   White lines running back/forth on top of the screen.
      r    <cr>   Display random bits in memory.
      u    <cr>   White bars moving right.

Type "q" to go to main menu and select the Microcode Automatic test:

-> m      <cr>   Activate Microcode test.
m> ?      <cr>   Display test menu.

The following menu should be displayed:

     b) blit test.
     e) erode demo.
     f) font test.
     l) color lookup test.
     m) memory access test.
     n) box pattern.
     p) paint.
     r) random box.
     s) box size.
     v) vector.
     w) walking address.

     d) toggle debug mode.

m> b                    <cr>   Box moving randomly on the screen with
   width?           450 <cr>      trailing images.
m> e                    <cr>
   double buffer?   n   <cr>   Single erode image only.
m> f                    <cr>   Scrolling fonts in window.
m> l                    <cr>   Color boxes.
m> m                    <cr>       "     blinking black lines.
m> n                    <cr>       "     pattern within a window.
m> p                    <cr>
   width?           450 <cr>
   background?         <cr>   Two boxes with the top moving & blinking.
m> r                    <cr>   Random black box on white screen.
m> s                    <cr>      "   box w/different sizes.
m> t                    <cr>      "         "         "    & blinking.
m> v                    <cr>
   toggle?              <cr>   Random color string art pattern.
m> w                    <cr>   White box flashing across & down screen.

m> q                    <cr>   quit the microcode section.
```

-> q <cr> quit the diagnostic program.

3.6 UNIX test

Type the following to boot up UNIX and run graphics software:

when you see:	type in:	
:	sd(0,0)vmunix	<cr>
#	fsck -p	<cr>
#	mount -a	<cr>
#	^D	
login:	demo	<cr>

A graphic menu will be displayed. This time you will need to use the mouse to select the functions. The 3 buttons on the mouse perform the following functions:

B1 (left button) - Select the process,move, or change size.
B2 (middle ") - " " activate sub-menu.
B3 (right ") - Select/Deselect the process.

Use the mouse select "csh". This creates a process called "/usr/demo". Change its size to smaller window and move it down to the bottom right of the screen. Then select "art". A different menu will be displayed. At this time you should run 6 or more processes and see that they are running OK. Remember to position each process in each window to fit all on the screen for clearer observation of all the processes.

Activate the "usr/demo" process with B2 on the mouse. Type "su" for superuser. A process called "console" will be created. Activate the "usr/demo" again. You should see the prompt changed from "%" to "UNKNOWN %". Type "sync;sync;reboot". This terminates all the running processes and exit to the PROM prompt.

3.7 Voltage range test.

Repeat all tests above with the 5V supply adjusted to 4.75V and 5.25V.

3.8 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME CPU BOARDS

DATE: 12/02/86 REV. 03

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME CPU board is functional. This test is applicable to all VME CPU boards.

2, MATERIAL/TOOL

2.1 Unit under test: VME CPU board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board (two), SCSI board, SMD board, Adaptec disc controller board, GIP board and DIS-MEM board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: mmu, memtest, and dma.
2.5 Two CRT terminals, each with appropriate RS232 cable.

3, PROCEDURE:

3.1 Visually inspect the CPU board for solder shorts, backward ICs, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the extension board in slot 1 of the card cage.
Insert the CPU board under test in extention board's slot.
Insert the HSMEM board to slot 2 of the card cage.
Insert the HSMEM board to slot 3 of the card cage.
Insert the SCSI board to slot 4 of the card cage.
Insert the SMD board to slot 5 of the card cage.
Insert the GIP board to slot 6 of the card cage.
Insert the DIS-MEM board to slot 7 of the card cage.
Connect the 2 CRT terminals to the CPU board via I/O bracket and RS232 cables.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory .....
The ISI logo should appear on the console CRT.

3.4 Set oscilloscope display to A trig. FREQ.
Measure E5-1, the frequency should be 12.49987MHz.
Turn power off, connect probe to E5-1.
Turn power on, recheck the frequency.
Repeat these steps three (3) times.

3.5 Channel A and channel B transmit and receive test.

Memory accessing test:

when you see	type:	
:	$1000	<cr>
1000 0:	5555	<cr>
:	$1000	<cr>
1000 5555:	aaaa	<cr>
:	$1000	<cr>
1000 aaaa:		<cr>
:	~asdfg	<cr>

You should see on second CRT: asdfg
Type zxc on the second CRT keyboard and you will see zxc on the console.

3.6 Interrupt reset test.

Press reset.
Key in "!", crt display "interrupt enable".
Short to ground the interrupt inputs on at a time, the console screen should show different trap error message one at a time.
After the test, key in "!" to disable the interrupt.
Interrupt inputs:

E45,E47,E49,E51,E53,E55,E57 for 68010 CPU.
E17,E18,E19,E20,E21,E22,E23 for 68020 CPU.

3.7 I/O address test.

when you see	type:		
:	$7fffe0	<cr>	for 68010 CPU
	$ffffe0	<cr>	for 68020 CPU
FFFFE0 FFFF or 0	<LF>		
FFFFE2 FFFF or 0	<LF>		
FFFFE4 FFFF or 0	<LF>		
... ...	<LF>		
FFFFEE FFFF or 0	<LF>		

Should see trap error message.

:	$d0000	<cr>
FD0000 0_	<cr>	
:		

3.8 Mmu test.

Connect monitor to I/O bracket. Press reset button.
Type in the following to run mmu test.

when you see	type:		
:	sd(0,6)stand/mmu	<cr>	for 68010
	sd(0,6)stand.V20/mmu	<cr>	for 68020
test menu for function	c	<cr>	(68010 CPU)
	d	<cr>	(68020 CPU)
test menu for 4 test	z	<cr>	
number of lap:	2	<cr>	

This test will take about 60 seconds.
After the test is done without error, reset the system.

3.9 Mem test.

Type in the following to run mem test:

when you see	type:		
:	sd(0,6)stand/mem	<cr>	(68010 CPU)
	sd(0,6)stand.V20/mem	<cr>	(68020 CPU)
test all memory?	y <cr>		
number of bank?	0 <cr>		
test with parity?	y <cr>		
test menu	e <cr>		
repeat count	1 <cr>		

After the test is done without error, reset the system.

3.10 Dmax test.

Type in the following to run dmax test:

when you see	type:		
:	sd(0,6)stand/dmax	<cr>	(68010 CPU)
	sd(0,6)stand.V20/dmax	<cr>	(68020 CPU)
hit return to continue	<cr>		

```
device:                  sd(1,0)  <cr>
max block length         <cr>          default is 512 bytes
min block length         <cr>          default is block 0
max block number         <cr>          default is block 1000
number of block per lap  <cr>          default is 1000
read/verify retry count  <cr>          default is 0
random pattern(def. no)  y<cr>
test with parity?        y        <cr>
verbose                  y        <cr>
start:                   0x40000  <cr>
end:                     0x1ffffe <cr>
number of laps:          2        <cr>
```

After the test is done without error, reset the system.

3.11 UNIX test.

Type in the following to run UNIX test and check the monitor:

```
when you see    type:
:               sd(0,0)vmunix.V10   <cr>   for 68010 CPU
                sd(0,0)vmunix.V20   <cr>   for 68020 CPU
#               fsck -p             <cr>
#               mount -a            <cr>
#               ^D
login:          root                <cr>
password:       orange              <cr>
UNKNOWN#        cd /usr/bench       <cr>
UNKNOWN#        while 1             <cr>
>               repeat 1 timeall    <cr>
>               echo -n .           <cr>
>               end                 <cr>
```

The above test will run the timeall test. To terminate the test type ^C after a few laps.

```
UNKNOWN#        kill 1              <cr>
#               sync;sync;reboot    <cr>
```

3.11 Voltage range test.

Repeat all tests above with the 5V supply adjusted at 4.75V and 5.25V.

3.12 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME ICP16/8 BOARD

DATE: 12/02/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME ICP 16/8 board is functional. This test is applicable to all VME ICP 16/8 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME ICP16/8 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: mmu, memtest, and dma.

3, PROCEDURE:

3.1 Visually inspect the ICP board for solder shorts, backward ICs, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the ICP 8/16 board under test to slot 3 of the card cage.
Connect the printer to ICP 16/8 via cable.

3.3 Power up the system and CRT's.
Press the reset buttom and the console crt should show:
Initialize all memory ..
The IS logo should appear on the console CRT.

3.4 I/O address test.

when you see:	type:		
:	$fff520	<cr>	for 68020 CPU
FFF520	D0	<LF>	for 16 ports
or	C8	<LF>	for 8 ports
FFF522 0	<LF>		
...	...		
FFF53A 0	<LF>		

Should see trap error message.

3.5 Transceiver test.

Connect the wire loops to J1 and J2.
Type in the following to test the register:

when you see	type:
:	$fff52c <cr>
FFF52C 0	5555 <LF>
FFF52E 0	<space>
FFF52E 5555	<LF>
FFF530 5555	<space>
FFF530 5555	

Repeat these steps by typing: aaaa instead of 5555

3.6 Port test.

Disconnect the wire loop & connect the cable from J1 or J2 to I/O port.
Type in the following to run UNIX test:

when you see:	type:		
	sd(0,0)vmunix.new	<cr>	for 68020
#	ls > /dev/lp0	<cr>	check printer
#	fsck -p	<cr>	
#	mount -a	<cr>	
#	^D		

Check if all 16 I/O ports is functional. Login to the console and the first port.

login:	root	<cr>
password:	orange	<cr>
UNKNOWN#		

Disconnect the first port, that port should log off automatically. Login again to the first port. Type the following on both the console and the first port.

login:	root	<cr>
password:	orange	<cr>
UNKNOWN#	while 1	<cr>
>	ls /*/*	<cr>
>	date	<cr>
>	end	<cr>

Check that both CRTs loop continuously while displaying the files and the date. Repeat the above test for all 8/16 ports. To terminate the test type ^C.

UNKNOWN#	kill 1	<cr>
#	sync;sync;reboot	<cr>

Turn off power to system.

3.7 Bus Continuity Test.

Insert SCSI board after ICP board (slot 4), make sure SCSI board can work.

3.8 Voltage range test.

Repeat all above tests with the 5V supply adjusted to 4.75V and 5.25V.

3.9 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME MEMORY BOARD

DATE: 12/02/86 REV. 03

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME MEM board is functional. This test is applicable to all VME MEM boards.

2, MATERIAL/TOOL

2.1 Unit under test: VME MEM board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 CPU020 board, HSMEM board (another good board), SCSI board, Adaptec disc controller board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: mmu, memtest, and dma.

3, PROCEDURE:

3.1 Visually inspect the MEM board for solder shorts, backward ICs, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU board to slot 1 of the card cage.
Insert the SCSI board to slot 2 of the card cage.
Insert the MEM board under test to slot 3 of the card cage.
Insert a good MEM board to slot 4 of the card cage.

3.3 Power up the system and CRT's.
Adjust 5V power supply to 4.75V.
Press the reset button and the console CRT should show:
Initialize all memory .... (4 dots)
The IS logo should appear on the console CRT.

3.4 Mem test. (one lap takes 1.5 minutes)

Type in the following to run mem test:

when you see	type:	
:	sd(0,6)stand.V10/mem	<cr> for 68010
	sd(0,6)stand.V20/mem	<cr> for 68020
test all memory?	y	<cr>
number of bank?	0	<cr>
test with parity?	y	<cr>
test menu	e	<cr>
repeat count	2	<cr>

After the test is done without error, reset the system.

3.5 Memtest test.(one lap takes 13.5 minutes)

Type in the following to run memtest test:

when you see	type:	
:	sd(0,6)stand.V10/memtest	<cr> for 68010
	sd(0,6)stand.V20/memtest	<cr> for 68020
enter p to return prom	<cr>	
test with parity?	y	<cr>
enter hex start address	40000	<cr>
enter hex stop address	1fffe	<cr>

Do this test for one lap.
After the test is done without error, reset the system.

3.5 Dmax test.(one lap takes 2.5 minutes)

Type in the following to run dma test:

when you see	type:	
:	sd(0,6)stand.V10/dmax <cr>	for 68010
	sd(0,6)stand.V20/dmax <cr>	for 68020
hit return to continue	<cr>	
device:	sd(1,0)	<cr>
max block length	<cr>	
min block length	<cr>	
max block number	<cr>	
number of block per lap	<cr>	
read/verify retry count	<cr>	
random patterns?	y	<cr>
test with parity?	y	<cr>
verbose	y	<cr>
start:	0x40000	<cr>
end:	0x3ffffe	<cr>
lap:	2	<cr>

After the test is done without error, reset the system.

3.6 UNIX test.

Type in the following to run unix test:

when you see	type:		
:	sd(0,0)vmunix.V10	<cr>	for 68010
	sd(0,0)vmunix.V20	<cr>	for 68020
#	fsck -p	<cr>	
#	mount -a	<cr>	
#	^D		
login:	root	<cr>	
password:	orange	<cr>	
UNKNOWN#	cd /usr/bench	<cr>	
UNKNOWN#	load	<cr>	

Check the timeall functionally. Run at least two laps. To terminate the test type ^C.

UNKNOWN#	kill 1	<cr>
#	umount -a	<cr>
#	sync;sync;reboot	<cr>

3.7 Voltage range test.

Rerun all tests above with the 5V supply adjusted to 4.75V and 5.25V.

3.8 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME MONOCHROME GIP BOARD

DATE: 12/05/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME MONOCHROME GIP board is functional.

2, MATERIAL/TOOL

2.1 Unit under test: VME MONOCHROME GIP & Display Memory board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, and -12V.
2.3 Two HSMEM boards, CPU board, SCSI board, & Adaptec disk controller board
2.4 Disk loaded with UNIX 4.2BSD and "debug" diagnostic program for the GIP.

3, PROCEDURE:

3.1 Visually inspect the M/GIP board for solder shorts, backward ICs, bent pins, blue jumpers, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM boards to slot 2&3 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the M/Mem board to slot 7 of the card cage.
Insert the M/GIP board under test to slot 8 of the card cage.
Connect the flat cables from the M/GIP board to the M/Mem board.

3.3 Power up the system.
Press the reset button and the console CRT should show:
Initialize all memory ....
The IS logo should appear on the console CRT.

3.4 I/O address test.

Type in the following to check the I/O address of the M/GIP:

when you see	type:
:	$7fc000 <cr>
7FC000 FFFF	<LF>
7FC002 FFFF	<LF>
7FC004 FFFF	<LF>
...	...

Type in the following to check the I/O address of the M/Mem:

when you see	type:
:	$e00000 <cr>
e00000 0	<LF>
e00000 0	<LF>
e00000 0	<LF>
...	...

3.5 M/GIP diagnostic.

When you see: type:
:
sd(0,6)stand.V20/debug <cr> for 68020
or sd(0,6)stand.V10/debug <cr> for 68010

The system will invoke the debug diagnostic program. You will see:

GIP Board Debugger
Monochrome System
Rev. D board in use

type ? for help

Typing a "?" at the new prompt "->" will display the test menu:

```
c) clear screen.
g) graphic commands.
h) hardware tests.
m) microcode tests.
q) quit & return to PROM monitor.
s) set screen to white.
t) toggle use of interrupts.
z) zap 29116 ALU.
```

Each test can be invoked by typing the desired letter at the arrow prompt. To run the next test type "q" at the present test and you should be back at the original prompt. Be SURE to check ALL images that are displayed for each of the following test should be clear as indicated without any distortion.

```
-> s    <cr>    The screen should be white.
-> c    <cr>    Clear screen.
-> h    <cr>    Go to hardware test menu.
```

The prompt is now changed to "h>" to show that you are at the sub-menu level. Typing a "?" will display the new menu:

```
d) debug mode.
f) fifo read/write test.
g) alignment grid.
h) byte/word/long display memory test.
i) interrupt test.
l) look at display memory.
m) byte memory read/write exercise.
n) word       "       "       "
o) long       "       "       "
r) microcode auto repeat.
q) quit & return to main prompt.
v) vme memory access test.
z) zap test.
```

Run the following tests:

```
h> g    <cr>    Should see white grid lines with a dot in the center.
h> v    <cr>    Run all tests:
```

```
Test memory region ?          <cr>
Repeat count in decimal ?     <cr>
```

```
Test available:

   a) pattern.
   w) walk.
   p) ping pong.
   r) random.
   u) uniq.
```

```
Run each of the above test:

   a   <cr>   Should see vertical lines moving left.
   w   <cr>   Walk small pattern across the screen.
   p   <cr>   White lines running back/forth on top of the screen.
   r   <cr>   Display random bits in memory.
   u   <cr>   White bars moving right.
```

Type "q" to go to main menu and select the Microcode Automatic test:

```
-> m      <cr>   Activate Microcode test.
m> ?      <cr>   Display test menu.
```

The following menu should be displayed:

```
     b) blit test.
     e) erode demo.
     f) font test.
     l) color lookup test.
     m) memory access test.
     n) box pattern.
     p) paint.
     r) random box.
     s) box size.
     v) vector.
     w) walking address.

     d) toggle debug mode.
```

```
m> b                    <cr>   Box moving randomly on the screen with
   width?          450 <cr>      trailing images.
m> e                    <cr>
   double buffer?  y    <cr>   Double eroding image.
m> f                    <cr>   Scrolling fonts in window.
m> m                    <cr>       "     blinking black lines.
m> n                    <cr>       "     pattern within a window.
m> p                    <cr>
   width?          450 <cr>
   background?         <cr>   Two boxes with the top moving & blinking.
m> r                    <cr>   Random black box on white screen.
m> s                    <cr>      "   box w/different sizes.
m> t                    <cr>      "          "         "    & blinking.
m> v                    <cr>
   toggle?              <cr>   Random string art pattern.
m> w                    <cr>   White box flashing across & down screen.

m> q                    <cr>   quit the microcode section.
-> q                    <cr>   quit the diagnostic program.
```

3.6 UNIX test

Type the following to boot up UNIX and run graphics software:

when you see:	type in:	
:	sd(0,0)vmunix	<cr>
#	fsck -p	<cr>
#	mount -a	<cr>
#	^D	
login:	demo	<cr>

A graphic menu will be displayed. This time you will need to use the mouse to select the functions. The 3 buttons on the mouse perform the following functions:

```
B1 (left button)  -  Select the process,move, or change size.
B2 (middle  "  )  -     "         "        activate sub-menu.
B3 (right   "  )  -  Select/Deselect the process.
```

Use the mouse select "csh". This creates a process called "/usr/demo". Change its size to smaller window and move it down to the bottom right of the screen. Then select "art". A different menu will be displayed. At this time you should run 6 or more processes and see that they are running OK. Remember to position each process in each window to fit all on the screen for clearer observation of all the processes.

Activate the "usr/demo" process with B2 on the mouse. Type "su" for superuser. A process called "console" will be created. Activate the "usr/demo" again. You should see the prompt changed from "%" to "UNKNOWN %". Type "sync;sync;reboot". This terminates all the running processes and exit to the PROM prompt.

3.7 Voltage range test.

Repeat all tests above with the 5V supply adjusted to 4.75V and 5.25V.

3.8 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME QIC2 BOARD

DATE: 12/02/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME QIC2 board is functional. This test is applicable to all VME QIC2 board.

2, MATERIAL/TOOL

2.1 Unit under test: VME QIC2 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board, Adaptec disc controller board, and 12V or 24V tape drive.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: mmu, memtest, and dma.

3, PROCEDURE:

3.1 Visually inspect the QIC2 board for solder shorts, backward IC, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 3 of the card cage.
Insert the QIC2 board under test to slot 4 of the card cage. Connect the 50-pin flat cable from the QIC2 board to the tape drive.

3.3 Power up the system, CRT's, and tapedrive.
Press the reset buttom and the console crt should show:
Initialize all memory ..
The IS logo should appear on the console CRT.

3.4 I/O address test.

Type in the following:

when you see	type:
:	$fff550 <cr>
FFF550 0	<LF>
FFF552 84C2	<LF>
FFF554 0	<LF>
...	

Should see trap error message.

3.5 Clock test.

When you see:	type:
:	sd(0,6)stand.V20/clock <cr>
address, set, display, or exit ?	a <cr>
Enter address of clock	fff554 <cr>
address, set, display, or exit ?	s <cr>
	<cr>
hr:min.sec	3:22.12 <cr>
address, set, display, or exit ?	d <cr>
(Should see time running)	<cr>
address, set, display, or exit ?	e <cr>
:	

3.6 Tar (Tape Archive) test.

Type in the following to run the tape Read/Write test in UNIX:

when you see	type:	
:	sd(0,0)vmunix	<cr>
#	fsck -p	<cr>
#	mount -a	<cr>
#	tapetest	<cr>

The CRT should be displaying the tape R/W sequences while checking the operation of the QIC2 board. Any error encountered will be displayed. Type ^C to stop the test after 3 or 4 laps. Reboot system as follow:

#	sync;sync;reboot	<cr>

3.7 Battery test

Shut power off. Wait one minute, turn power on, boot up in UNIX and type "date <cr>" and check that the date is the same as before powerdown.

3.8 Voltage range test.

Repeat all tests above with the 5V supply adjusted to 4.75V and 5.25V.

3.9 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST FOR RL101 BOARD

DATE: 12/02/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in testing the QBUS RL101 board. This test is applicable to all QBUS RL101 boards.

2, MATERIAL/TOOL

2.1 Unit under test: QBUS RL101 board.
2.2 QBUS card cage and backplane, with power supply for 5V, 12V, -12V.
2.3 CPU010 board and MEM board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: elformat, disktest and diskwrite.
2.5 Formatted blank disk dirve.
2.6 One CRT terminal connected to CPU010 board via I/O bracket.

3, PROCEDURE:

3.1 Visually inspect the RL101 board for solder shorts, backward ICs, bent pins, blue jumper, and capacitor polarity.

3.2 Connect the blank formatted disk drive to drive 1.

3.3 Frequency Alignment

Power up the system.
Use short test wire connecting CR1 cathode (-) to ground at C1.
Connect oscilloscope to 14R-11 (74S00).
Align R20 (1K Pot) to get stable 10 MHz frequency at 14R-11.
Disconnect test wire from CR1.
Recheck the frequency without test wire. If the frequency is not 10MHz go back to the third step realigning R20.
Press reset and disconnect test wire.

3.4 Timing Alignment

Connect 15P-3(26S02) to the positive side (+5V) of capacitor below R2.
Connect oscillosope to 15P-6.
Align R6 (5K Pot) to get 250ns pulse 0 duty cycle.
Power down the system and disconnect test wire.

3.5 Format Blank Disk Test In Drive 1 (about 30 min)

Connect blank formatted disk drive 1.
Enable switch pin 1 on. Disable switch pin 2 off.
Connect 1D-6 (BDMGL, bus grant in) to bus grant out (third slot CPU).
Turn power on.

Key in	shown	ds1	Key in		
$3ff900	0	flashing	81	<LF>	
3ff902				<LF>	
3ff904	0		1941	<cr>	for IMI 5012H disk
		or	22b8	<cr>	for wren9415-5 disk
$3ff900	81		0	<cr>	

At this point ds1 and ds2 should be flashing showing R/W to disk.

$1000	0	<LF>
$1000	(Show track number)	<LF>

```
...          ...                    <LF>
...          ffff                   <LF>
```

3.6 Voltage Control Test

Connect voltage meter to positive side of C3 (5V).
Connect oscilloscope to 14E-13 (7438). Measure logic '1' at > 4.45V.
Adjust power supply voltage 5V down until 14E-13 signal switches low.
Measure the 5V voltage at C3. The voltage should be < 4.44V.
Adjust power supply voltage 5V up until 14E-13 signal is on.
Measure the 5V voltage at C3. The voltage should be > 4.75V.

3.7 Dmax test (5 laps)

This test the disk and controller. It does R/W on the blank disk.
Connect blank disk for drive 1.
Connect good disk with Unix for drive 0.

```
When you see:                type:
:                            el(0,0)sa/dmax   <cr>   w/ soft error report
                       or    el(0,0)stand/dma <cr>
                             (wait for dsl flashing)
FOR DMAX:
hit return to continue       <cr>
device:                      el(1,0)  <cr>
max block length             <cr>                default is 512 bytes
min block length             <cr>                default is block 0
max block number             <cr>                default is block 1000
number of block per lap      <cr>                default is 1000
read/verify retry count      <cr>                default is 0
random pattern(default no)   y        <cr>
test with parity(def. no)    y        <cr>
verbose                      y        <cr>
start of buffer:             0x40000  <cr>
end of buffer:               0x13fffe <cr>
number of laps:              5        <cr>

FOR DMA:
device:                      el(1,0)  <cr>
block size                   <cr>                default is 512 bytes
number of block per lap      <cr>                default is 1000
start of buffer:             0x40000  <cr>
end of buffer:               0x13fffe <cr>
number of laps:              5        <cr>
```

3.8 Unix Test (10 laps)

```
When you see:                Key in:
:                            el(0,0)vmunix      <cr>
#                            fsck -p            <cr>
#                            ^D
login:                       root               <cr>
Password:                    orange             <cr>
UNKNOWN#                     cd /usr/bench      <cr>
UNKNOWN#                     load               <cr>    (run timeall pgm)
...                          ^C
UNKNOWN#                     kill 1             <cr>
#                            sync;sync;reboot   <cr>
```

PROCEDURE: TEST OF VME SCSI BOARD

DATE: 12/02/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME SCSI board is functional. This test is applicable to all VME SCSI boards.

2, MATERIAL/TOOL

2.1 Unit under test: VME SCSI board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, Adaptec disc controller board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: mmu, memtest, and dma.

3, PROCEDURE:

3.1 Visually inspect the SCSI board for solder shorts, backward IC, bent pins, blue jumpers, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSI board under test to slot 3 of the card cage.
Connect blank disk drive 1 to the Adaptec board.

3.3 Power up the system and CRT's.
Press the reset button and the console CRT should show:
Initialize all memory ..
The ISI logo should appear on the console CRT.

3.4 I/O address test.

At power up, the LED (DS1) on the SCSI board will blink 16 times. This is just a delay to allow the disk drive to become ready. When the LED stops blinking perform the registers tests as follow:

when you see :	type:
	$7fffe0 <cr> for 68010 CPU
	$ffffe0 <cr> for 68020 CPU
FFFFE0 0	<LF>
FFFFE2 0	<LF>
FFFFE4 0	<LF>
...	
FFFFEE 0	<LF>

You should see the trap error message. Note that if you do not wait until the LED stops flashing and do the above tests what you see will be:

```
FFFFE0 FFFF
FFFFE2 FFFF
FFFFE4 FFFF
...
```

3.5 Dmax test.

Type in the following to run dma test:

when you see :	type:		
	sd(0,6)stand/dmax	<cr>	(68010 CPU)
	sd(0,6)stand.V20/dmax	<cr>	(68020 CPU)
	<cr>		

```
device:                  sd(1,0)  <cr>
Max block length         <cr>
Min block length         <cr>
Max block number         <cr>
No. of block per lap     <cr>
Read/verify retry count  <cr>
Random pattern
Test with parity?        y        <cr>
Verbose                  y        <cr>
Start:                   0x40000  <cr>
End:                     0x1ffffe <cr>
Number of laps:          2        <cr>
```

After the tests is done without error, reset the system.

3.6 UNIX test.

Type in the following to run unix test:

```
when you see          type:
:                     sd(0,0)vmunix.V10 <cr> for 68010
                      sd(0,0)vmunix     <cr> for 68020
#                     fsck -p           <cr>
#                     mount -a          <cr>
#                     ^D
login:                root              <cr>
password:             orange            <cr>
UNKNOWN#              cd /usr/bench     <cr>
UNKNOWN#              while 1           <cr>
>                     repeat 1 timeall  <cr>
>                     echo -n .         <cr>
>                     end               <cr>
```

The above test will check the timeall functionally. To terminate the test type ^C after a few runs.

```
UNKNOWN#              kill 1            <cr>
#                     sync;sync;reboot  <cr>
```

3.7 Bus Continuity Test

Insert QIC2 board after SCSI board (slot 4). Boot up in UNIX as outlined in 3.6. Then type the following:

```
#tar cv *   <cr>
```

The system should be writing all the files to the tape while displaying the names of all files written.

3.8 Voltage range test.

Repeat the above tests with the 5V supply adjusted to 4.75V and 5.25V.

3.9 Heat test.

Perform the burn-in test according to system burn-in procedure.

PROCEDURE: TEST OF VME TC50 BOARD

DATE: 12/02/86 REV. 01

1, PURPOSE

This procedure outlines the steps involved in determining whether or not the VME TC50 board is functional. This test is applicable to all VME TC50 boards.

2, MATERIAL/TOOL

2.1 Unit under test: VME TC50 board.
2.2 VME card cage and backplane, with power supply for 5V, +12V, -12V.
2.3 HSMEM board, CPU board, SCSI board,Adaptec disc controller board.
2.4 Disk loaded with UNIX 4.2BSD and diagnostic programs like: mmu, memtest, and dma.

3, PROCEDURE:

3.1 Visually inspect the TC50 board for solder shorts, backward ICs, bent pins, blue jumper, and capacitor polarity.

3.2 Insert the CPU020 board to slot 1 of the card cage.
Insert the MEM board to slot 2 of the card cage.
Insert the SCSC board to slot 4 of the card cage.
Insert the TC50 board under test to slot 3 of the card cage.

3.3 Power up the system and CRT's.
Press the reset button and the console CRT should show:
Initialize all memory ..
The IS logo should appear on the console CRT.

3.4 I/O address test.

Type in the following:

when you see	type:	
:	$fff550	<cr>
FFF550 0	<LF>	
FFF552 4C0	<LF>	
FFF554 0	<LF>	
...		

Should see trap error message.

3.5 Date test.

Type in the following:

when you see	type:	
:	sd(0,0)stand20/date	<cr>
addr,set,dis,or exit?	a	<cr>
addr of clock?	fff554	<cr>
addr,set,dis,or exit?	s	<cr>
	<cr>	
hr:min.sec	3:22.12	<cr>
addr,set,dis,or exit?	d	<cr>
(Should show running time)		<cr>
addr,set dis,or exit?	e	<cr>
:		

3.6 Ttest test.

This test is driven by a command file.
Type in the following:

when you see	type:
:	sd(0,0)ttest <cr>

Check the messages shown on the screen. When the test is done the colon prompt will return.

:

3.7 Battery test

Shut power off. Wait one minute, turn power on, boot up in UNIX and type "date <cr>". Check to see that the date is the same as before powerdown.

3.8 Bus Continuity Test

Insert SCSI board after ICP board (slot 4), make sure SCSI board works.

3.9 Voltage range test.

Repeat all above tests with the 5V supply adjusted to 4.75V and 5.25V.

3.10 Heat test.

Perform the burn-in test according to system burn-in procedure.