5. ADVANCED TESTS

RAMCHECK advanced tests are essentially made by changing the setup. While most casual and non-technical users may not need to use RAMCHECK's setup, you can get the most from your unit by reviewing the material presented in this section.

5.1 ADVANCED SETUP OVERVIEW

RAMCHECK has a built-in EEPROM device, which stores your setup. Therefore, when you turn your RAMCHECK on, the unit "remembers" its last setup.

RAMCHECK Advanced Setup mode lets you do the following:

■ Preset a fixed speed (RAS access time or SDRAM Frequency Rate) reference so that all memory slower than the reference will be failed. This is different than the default mode, which automatically displays the actual speed.

■ Preset a fixed refresh value for modules that you wish to have tested at various refresh rates.

■ Preset a fixed module (or chip) size so that all tested memory will fail if it is not of this type (as opposed to the default mode which automatically detects the module size).

■ Customize the Test Flow by selectively skipping various test modes and phases.

■ Change the values of the Row Address Hold Time and the RAS to CAS delay time.

■ Take an in-depth look at the operation of the automatic Access Time algorithm [performance].

■ Repair bad modules faster.

5.2 ACCESSING SETUP MODE

Press any key (except ESC) if you wish to skip the SETUP initial graphic screen.

You can enter the RAMCHECK's Advanced SETUP mode only from the STANDBY mode by first pressing **F2**. The setup graphic screen will appear momentarily. Thereafter, the menu offers five selections:

■ **F1** SETUP PARAMETERS
■ **F2** TESTFLOW
■ **F3** LIST SETUP
■ **F4** AUTO
■ **F5** NEXT

These selections are detailed below. You return to the STANDBY mode by pressing ESC. If the current setup was changed, you will see a message notifying you that the new setup is stored in the non-volatile memory of RAMCHECK.

5.3 SETUP PARAMETERS

The SETUP PARAMETERS section, in which users can preset the **type**, **frequency**, **size**, **speed**, and other **parameters** of the tested modules or chips, is one of the more powerful features which will appeal to advanced users.

- Presetting the **frequency rate** of the module allows you to test SDRAM memory operation at a fixed reference. For example, with a preset value of 100MHz, RAMCHECK will fail all modules operating at slower frequency rates.

- Presetting the EDO/FPM **RAS Access Time** allows you to test memory operation at a fixed reference. For example, with a preset value of 47nS, RAMCHECK will fail all modules slower than 47nS, even if they operate fine at a slower speed.

- The importance of presetting **size** may not be immediately apparent. The following example will illustrate a potential use. Suppose that you are testing a batch of 8Mx72 modules which accidentally includes one 4Mx64 module. Without the ability to preset size, you have to closely watch RAMCHECK's automatic size indication in order to catch this 4Mx64 module. With a preset size of 8Mx72, RAMCHECK aborts the tests and responds with an error message (SIZE ERROR: 4Mx64 NOT EQUAL TO @8Mx72) when it detects a module other than 8Mx72.

SETUP PARAMETERS MENU:

SETUP PARAMETERS allows you to make changes to the existing setup for module size, timing parameters (including speed), voltage settings, refresh, or patterns used to test.
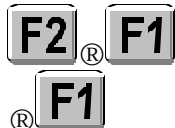
```
SETUP PARAMETERS#1
F1 TIMING    Esc PrevMenu
F2 SIZE      F5 NextMenu
F3 VOLTAGE   F4 AUTO
```

Selecting **F5** will bring up the second menu for SETUP PARAMETERS:

```
SETUP PARAMETERS#2
F1 PATTERNS  Esc PrevMenu
F2 REFRESH   F5 NextMenu
F3 MODE      F4 REG/UBUF
```

Selecting F4 on this and most other setup menus will set the current setup group to their default (AUTO) values.

SIZE SETUP:

F2 ® F1

® F1

5.3.1 MEMORY SIZE SETUP

The current preset memory size (or AUTO-SIZE) is displayed. ← or → can be used to scroll the setting from AUTO-SIZE, 2K, 4K, 8K, 16K, 32K, 64K, 128K, 256K, 512K, 1M, 2M, 4M, 8M, 16M, 32M, 64M, 128M, 256M, 512M to 1G. Press **F1** ENTER to set the size you selected.

Upon entering the size, you are then prompted to enter the bit configuration of your module. ↑ and ↓ can be used to either increase or decrease the value on the display and ← and → can be used to move the cursor position either left or right. Press **F1** ENTER to set the bit configuration you selected. Afterwards, you are prompted to select whether your setup will fail modules not meeting this size, or whether the DUT should be partially tested.

```
SHOW ERROR IF DUT
DIFFERS FROM SETUP  ↕
TEST DUT AT SETUP
SIZE (PARTIAL TEST)
```

Pressing ↓ will highlight TEST DUT AT SETUP SIZE, forcing smaller modules to fail and larger modules to only be tested at the size entered.

5.3.2 TIMING

This selection will display the Setup Timing menu. You may choose to setup the speed or frequency of the module, or change either the RAS to CAS delay time (Trcd) or the Row address Hold Time (Trah). If a previous timing parameter was entered and you wish to reset it to the default timing setup, simply select **F4** AUTO. Selecting **F5** for NEXT MENU allows you to enter the Advanced Code Setup Menu; this feature is currently under development.

SPEED SETUP:

F2 ® **F1**

F1 ® **F1**
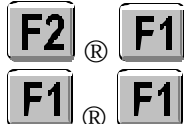
5.3.2.1 SPEED SETUP

```
SETUP SPEED:
F1 SETUP FREQUENCIES
F2 SETUP ACCESS TIME
```

Selecting this function will allow you to change the current setup for the access time from RAS or the SDRAM frequency rate.

Pressing F1 selects the EDO/FPM access time from RAS. The ← and → keys are used to position the cursor, while the ↑ and ↓ keys allow you to either increase or decrease the value at the current cursor position. To return to AUTO SPEED, simply press **F5** until the cursor reaches its last position on the right. To enter your selected speed setting, press **F1**.

Selecting F2 allows you to determine the frequency rate at which RAMCHECK will access SDRAM memory.

```
SELECT FREQUENCY:
AUTO
F1 ENTER      ABORT Esc
← 667MHz             →
```

Use the ← and → keys to scroll through the available frequencies. RAMCHECK will now run modules strictly at the 100MHz level.

After presetting the speed, RAMCHECK allows you to select whether the value entered will be used for the default setup speed, or if it is to be used as a speed limit.

```
TEST DUT AT SETUP
SPEED                    ↑
USE SETUP SPEED          ↓
AS SPEED LIMIT
```
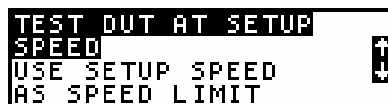
There are two modes for presetting speed. The default mode is "SPEED AT" where RAMCHECK speed is actually fixed at the preset speed. This mode is useful when the actual speed is unimportant, so long as it meets a particular reference value. The other mode is the "SPEED LIMIT" where RAMCHECK fails a unit that is slower than the preset speed limit. If the unit tests slower than the preset speed, the test terminates with a "SPEED ERROR: ABOVE LIMIT" message. If the unit tests faster than the preset limit, the actual speed is displayed.

Note that if you select the SPEED LIMIT mode, the preset speed will be shown with a " ^ " prefix during all subsequent test modes.

5.3.2.2 SPEED ALGORITHM SETUP

If you select AUTO SPEED, or if you select a certain speed value to be used as a limit, you will be prompted to select the speed algorithm.

```
SET SPEED ALGORITHM:
FAST [default]
F1 ENTER      ABORT Esc
← FAST [default]       →
```

This will determine the resolution at which RAMCHECK will make its speed determination. The broader the resolution, the quicker the test. For a more precise speed measurement, select the default by pressing **F1**.

Trcd SETUP:

F2 ® F1
F2 ® F2
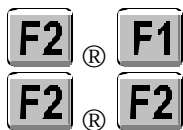
This function has no effect on SDRAM testing.

5.3.2.3 Trcd SETUP

Selecting this function will allow you to change the existing RAS to CAS delay time (Trcd). RAMCHECK will first prompt you to determine if you wish to change the existing setup of Trcd, or leave it as AUTO. Selecting **F1** will allow you to change Trcd. You will also have the capability to view the settings in graphic detail, as the display will change to show each control signal in relation to the address lines.

```
-RAS
ADD
-CAS
↑ Trcd= 20nS            ↓
```
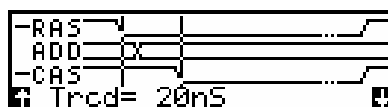
As you will note by the graphic display, the CAS signal moves

forward or backward in response to the pressing of either ↑ (increasing the time) or ↓ (decreasing the time). Press F1 to enter the time selected. The display will then return to the previous menu.

Trah SETUP:

F2 ® **F1** ®
F2 ® **F3**
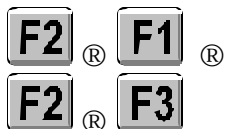
**This function has no effect on SDRAM testing.**

5.3.2.4 Trah SETUP

This function will allow you to change the current setting of the Row Address Hold Time (Trah). As the previous setting, a choice is given to determine if you wish to change the current Trah, or leave it as AUTO. Selecting F1 will allow you to change Trah.

```
-RAS ‾_____...../‾
 ADD ═══C═══════════════
-CAS ‾_____...._/‾
↑ Trah=   6nS              ↓
```

Like the Trcd function above, the graphic view showing the address line and the control signals is displayed. By pressing either ↑ or ↓, the time will increase or decrease, with the address display following the value. Press F1 to enter the time selected. The display will then return to the previous menu.

VOLTAGE SETUP:

F2 ® **F1** ®
F3
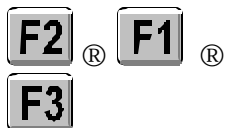
5.3.3 SETUP VOLTAGE

Selecting this setting will allow the use of either 5.0V or 3.3V testing. Select F4 AUTO to allow RAMCHECK to use its internal algorithm for determining the best voltage.   Select F3 to setup CUSTOM VOLTAGE for the test. Press F5 to reset the voltage to its default setting. The AUTO and CUSTOM VOLTAGE features are currently under development.

SDRAM testing is performed strictly at 3.3V regardless of setup voltage.
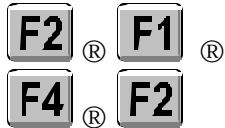
PATTERNS SETUP:

F2 ® **F1** ®
F4 ® **F1**
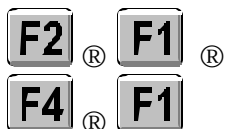
5.3.4 SETUP PATTERNS

This selection (from the second menu of SETUP PARAMETERS) allows you to edit two of the main 32-bit test patterns used by BASIC test and similar tests.   Default patterns are PATT1= 55555555h, PATT2=AAAAAAAAh. Setup uses hexadecimal notation.

REFRESH SETUP:

F2 ® **F1** ®
F4 ® **F2**

5.3.5 SETUP REFRESH

This selection (from the second menu of SETUP PARAMETERS) will allow you to set a specific refresh rate by which the DUT is to be tested.

You can set the refresh to Auto, None, or a fixed 2mS-999mS interval. Longer refresh intervals create slower refresh rate, and vice versa (refresh rate =1/refresh interval). Memory devices are better and typically consume lower power if they can sustain data at larger

refresh intervals.

```
SETUP REFRESH:
AUTO            NONE
F1 ENTER        ABORT Esc
 REFRESH:       AUTO
```

To set this rate, use ← or → to position the cursor, then use ↑ or ↓ to set the refresh value in mS. Press F1 to enter your selected value. Moving the cursor to the right most position will toggle between AUTO refresh and NONE, or no refresh. AUTO refresh will set the default refresh value of 50mS for each module, whereby NONE, or no refresh, will cause RAMCHECK to stop any special refresh operation to the DUT. Since the regular memory test typically covers all the rows in a rapid succession, the test itself actually refreshes the memory, even if you set refresh to None. Therefore, do not be surprised if most of your memory devices seem to work even when you set refresh to NONE, or if you set it to a slow rate like 900mS. In such cases, you will notice failures mostly in large memory devices, during AUTO-LOOP.

On the other hand, when setting refresh at an extremely fast rate, e.g. 4mS, large memory devices cannot be tested since the refresh activity takes most of the processor time. Therefore, our test program automatically increases your set refresh interval if it is found to be too fast for the tested memory. You can see the Actual refresh rate in the test log. For example, if you set refresh to 7mS and test a 4Mx32 device, you will see in the test log an actual refresh interval of 8mS. For 16M, the RAMCHECK's minimum is 16mS, and for 1M, the minimum is 4mS. These RAMCHECK minimum values are well below the DUT's minimum specifications, thus allowing you to fully test the refresh capabilities of your memory.

MODE SETUP:

F2 ® **F1** ®
F4 ® **F3**
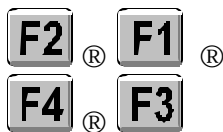
5.3.6 SETUP MODE

You can setup MODE to force RAMCHECK to pass only modules of a particular mode. For example, if you setup MODE to EDO, only EDO type devices will pass the tests.

```
SETUP MODE:
EDO
F1 ENTER        ABORT Esc
 EDO
```

To change to the desired mode of operation, press ← or → to scroll through the different options. Press F1 to enter your selection.

TESTFLOW SETUP:

5.4 TESTFLOW

Press **F2** from the main setup menu to enter the testflow setup. This menu will allow you to setup your own customized program test flow.
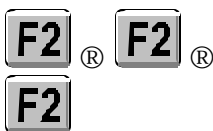
F2 ® **F2**

```
SETUP TEST FLOW:
F1 SKIP TESTS  Esc QUIT
F2 EDIT TEST FEATURES
F5 DEFAULT
```

Pressing **F5** from this menu resets the program to its default testflow. The following display appears upon resetting the test flow to its default mode:

```
RAMCHECK IS SET FOR:
DEFAULT TEST FLOW AND
TEST FEATURES
```

SKIP TESTS:

5.4.1 SKIP TESTS

F2 ® **F2** ®
F2

Press **F1** to enter the SKIP TESTS menu. Use ← or → to scroll through the different test phase titles.

```
SKIP TESTS:
F1 ENTER     ABORT Esc
← VOLTAGE BOUNCE   →
↑ PERFORM THIS TEST
```

If you wish to skip a test, simply scroll through the test phases until you find the one you wish to skip. Press **F3** to remove it from the test procedure. Note that each phase has the caption 'PERFORM THIS TEST' until you press **F3** for that test phase to remove it from the procedure. Once removed, the caption will read 'SKIP THIS TEST', after which you may continue scrolling to other test phases.

```
SKIP TESTS:
F1 ENTER     ABORT Esc
← VOLTAGE BOUNCE   →
↑ SKIP THIS TEST
```

After all your changes have been made, press **F1** to enter your new test procedure.

5.5 CONFIGURATION

The CONFIGURATION setup menu allows you to change the RAMCHECK configuration.

```
CONFIGURATION SETUP#1
F1 DUT TYPE  Esc Prev
F2 DEBUG     F5 Next
F3 Reserve   F4 DEFAULT
```

5.5.1 DUT TYPE SETUP

You can force RAMCHECK to test only DUT of specific types. For example, you may force it to test only DIMMs with 144 pins. By selecting this configuration, RAMCHECK will report an error whenever you test a different type of device.

**DUT TYPE
SETUP:**

F2 ® **F5** ®
F1 ® **F1**
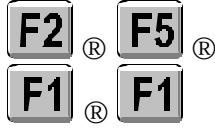
Press **F1** to enter the DUT TYPE SETUP mode.

```
SETUP DUT TYPE:
AUTO
F1 ENTER      ABORT Esc
← AUTO              →
```

Pressing ← or → will allow you to scroll through the various DUT types. Press **F1** to enter your selection.

5.5.2 DEBUG SETUP

This selection is used by INNOVENTIONS for the development of the RAMCHECK program. It has several debug flags which may be toggled by their corresponding keys. Pressing **F5** from the configuration menu will reset the configuration to its default settings.

**VIEW PRODUCT
INFORMATION:**

F2 ® **F5** ®
F3
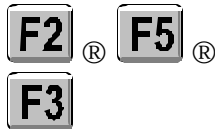
5.5.3 PRODUCT INFORMATION DISPLAY

Selecting **F3** from the Setup Main Menu #2 allows you to view the Product Information Display. This display shows you which software features are activated on your RAMCHECK. This display also provides revision information for your RAMCHECK firmware and hardware, as well as your RAMCHECK Serial Number.

Selecting the **F4** key allows you to view additional product information, pressing **F3** allows you to go back.

5.5.4 SDRAM CONFIGURATION

Selecting **F1** from the second Configuration Menu allows you to enter the SDRAM Configuration Setup.

```
SDRAM CONFIG.
F1 LOCK        Esc QUIT
F2 PC100       F5 DEFAULT
F3 P.BURST     F4 REG/UBF
```

Selecting **F1** will allow you to set the tester to fully lock on all available frequencies before its initial use. This setting is normally not needed, however it may be necessary to activate it if instructed by Tech Support in certain rare occasions. The default setting is OFF.

Selecting **F2** allows you to specify whether you wish to have tight margins or wide margins for the determination of a PC-100 module. The default setting is tight margins.

Selecting **F3** allows you to toggle between active Page Burst on SDRAM modules, or disabling the feature. As most SDRAM modules will have the burst capability, we recommend for this function to be left in its default state of ON.

Selecting **F4** allows you to set the indicators "UBF" or "REG" either ON or OFF during the BASIC TEST. "UBF" is displayed when RAMCHECK detects an unbuffered module under test, while the "REG" is displayed when testing registered memory. The default setting is ON.

**DIRECT
PRINTER SETUP:**

F2 ® **F3** ®

F4 ® **F2**

5.5.5 DIRECT PRINTER SETUP

You can use our optional printer adapter to connect RAMCHECK directly to a printer, without using your PC and the supplied Realtime Interface program. This selection allows you to enable or disable RAMCHECK's direct printer support. Please refer to Section 7 for additional information on the setting up the printer port.

**SPD PROGRAM
ENABLE:**

F2 ® **F3** ®

F4 ® **F3**

5.5.6 SPD PROGRAM ENABLE

This option allows you to enable SPD programming. Please note that we recommend programming to be done by advanced users only. Additionally, we recommend that SPD data be backed up before programming.

ALWAYS MAKE BACKUP FILES BY UPLOADING THE SPD DATA TO YOUR PC AND SAVING IN *.SPD FILES. INCORRECT SPD DATA MAY CAUSE A MODULE TO MALFUNCTION IN YOUR COMPUTER.

Once backups are made, you can experiment with the various programming modes to find the one best suited for your application.

Use the right arrow button to select the programming mode.

```
SPD PROGRAMMING

F1ENTER        ABORTEsc
←16-BYTE PAGE MODE→
```

BYTE MODE PROGRAMMING - each byte of the SPD is written to a specific address in the SPD EEPROM. This is the slowest mode but it should work with almost all SPD devices.

8 or 16 BYTE PAGE MODES - write data into the SPD at groups of 8 or 16 bytes at a time. These are faster modes but may not be compatible with all SPD devices.

SHOW PATTERNS:

F2 ® **F3** ®
F4 ® **F5** ®
F2

5.5.7 SHOW PATTERNS

This selection allows you to enable or disable the HEX patterns displayed during BASIC test and other tests. The default value is SHOW PATTERNS.

TOGGLE SOUND:

F2 ® **F3** ®
F4 ® **F5** ®
F3

5.5.8 ENABLE/DISABLE SOUND

This selection allows you to enable or disable the audible sounds emitted by RAMCHECK. The default value is ON.

5.6 VIEW SETUP LIST

VIEW SETUP LIST:

F2 ® **F3**

Only variables, which have been changed from their default setting, are shown.

Press F4 on the SETUP main menu to view the current settings of the RAMCHECK program. By scrolling through the virtual window displayed, you can see the current size settings, timing parameters set, etc.

```
SETUP LIST           ↑
SETUP SIZE:⑤16M×64   ▓
SETUP SPEED:⑤100MHz  ▓
SDRAM LOCK=ON        ↓
```

The setup list can also be viewed from Standby mode by pressing **F4** then **F2**. Press ESC to return to the previous menu.

5.7 SETUP RESET TO AUTO

RESET TO AUTO:

F2 ® F4
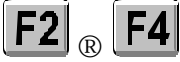
Selecting the AUTO command from the main setup menu returns RAMCHECK to its factory default settings for every parameter. A message appearing after the selection will inform you that this setting has taken place.

```
RAMCHECK IS RESET
TO ITS DEFAULT
AUTOMATIC OPERATION
```