7. RAMCHECK OPTIONS

There are various options that are available to expand RAMCHECK's capabilities. These additions include optional adapters that support SO-DIMMs, DDR and DDR2 devices, individual TSOP DDR and SDRAM chips, as well as older style SIMM modules.

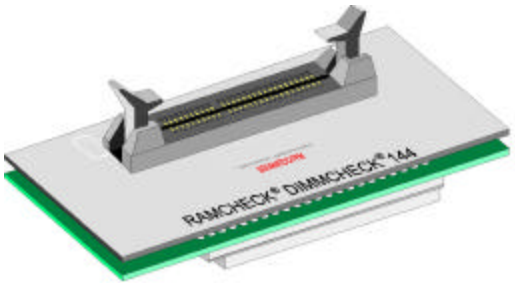
These options enhance your testing capabilities, making sure that your investment does not become obsolete as new memory devices are introduced to the market.

As we continuously develop new options, you may also want to check our web site (www.innoventions.com) for updated information.

7.0 QUICK INDEX

ADAPTER	P/N	DESCRIPTION
RC DIMMCHECK 144	INN-8668-1	144-pin DIMM adapter supporting SDRAM/EDO/FPM modules.
RC SIMM Adapter (72-p only)	INN-8668-2	72-pin SIMM adapter supporting EDO/FPM modules.
RC SIMM Adapter (72+30 pin)	INN-8668-2-A	72-pin and 30-pin SIMM adapter supporting EDO/FPM modules.
RC Sync Chip Adapter (54-pin)	INN-8668-3	Supports individual SDRAM TSOP chips in the 54-pin, package.
RC Sync Chip Adapter (54+50+44 pin)	INN-8668-3-A	Supports individual SDRAM TSOP chips in the 54-pin, 50-pin, and 44-pin packages.
RC DIMMCHECK 100	INN-8668-5	Supports 100-pin SODIMM modules commonly found in laser printers and some routers.
RC DDR 200p Converter	INN-8668-6-1	Converter supports 200-pin DDR SODIMM modules, requires 8668-9.
RC 200p Sun DIMM Adapter	INN-8668-8	Supports 200-pin DIMM modules found in Sun Micro servers.
RC DDR Pro	INN-8668-9	184-pin DDR adapter supporting desktop DDR modules up to 466 MHz.
RC 66-pin DDR Chip Converter	INN-8668-9-2	Supports testing 66-pin DDR chips, requires 8668-9.
RC 50-pin EDO TSOP Adapter	INN-8668-10	Adapter supports testing of 50-pin EDO TSOP chips.
RC 100-pin DDR SODIMM Adapter	INN-8668-11	Adapter supports testing of 100-pin SODIMM modules
RC DDR2 240-pin Adapter	INN-8668-12	Supports testing of 240-pin DDR2 modules
RC DDR2 200-pin Converter	INN-8668-12-1	For testing 200-pin DDR2 SODIMM modules, requires 8668-12-1

7.1 RC DIMMCHECK 144



This addition to the RAMCHECK® line provides a needed solution for testing SDRAM and standard EDO/FPM DRAM 144-pin SO DIMM modules at an affordable price.

The RC 144 Adapter (p/n INN-8668-1) bursts complex pattern tests, into and from the tested module, at a true 133MHz (or faster) synchronous rate. The automatic test provides the tested module's size, voltage, frequency, and type. RAMCHECK's internal 184MHz test engine verifies that the tested module can accept the various mode commands, including CAS latency of 1, 2, and 3, sequential, or interleave type bursts at different lengths, and the single write mode. It further verifies interleaved bank operation.

7.1.1 OPERATION

Install or remove this adapter only when RAMCHECK is OFF!

RAMCHECK automatically detects the presence of the RC 144 Adapter. The tester also automatically determines if the tested module is SDRAM or standard DRAM without the need for special setup.

In fact, you can test standard DRAM following an SDRAM, or vice versa, without the need of manual settings.

7.1.1.1 CONNECTION AND DIMM INSERTION

DIMM insertion and removal should be done only when RAMCHECK is in STANDBY Mode.

This adapter connects to RAMCHECK via the two adapter expansion slots located below the 168-pin socket. Plug the adapter into the expansion slots only when RAMCHECK is OFF.

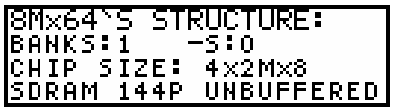
INSERTION: The RC DIMMCHECK 144 uses a vertically mounted high quality test socket with two ejectors that need to be opened prior to insertion. Carefully insert the DIMM into the socket, pushing it evenly along its top. When the DIMM is properly inserted, the ejectors will snap onto the semi-circular notches on each side of the module.

REMOVAL: The DIMM is easily released from the socket by pulling both ejectors sideways.

7.1.1.2 DIMM TESTING

Full support for SDRAM and EDO/FPM DIMM modules is available on the RC DIMMCHECK 144. They will test according to our procedure outlined in Section 4.3.2. Please note that the Burst LED will not glow when Standard EDO/FPM DRAM DIMMs are tested.

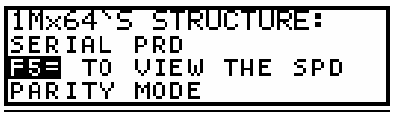
After the BASIC test, RAMCHECK will provide explicit structure information on the module tested.



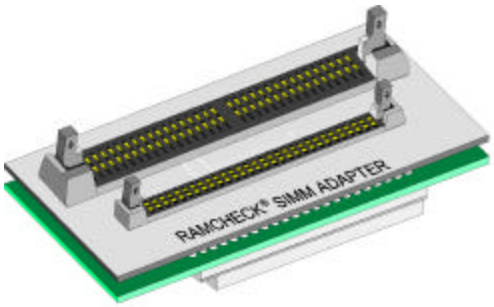
SPD Management including editing and filing are explained in further detail in Section 4.4.

7.1.2 SPD MANAGEMENT

If RAMCHECK detects the use of an SPD EEPROM chip, a summary screen will appear giving you the option of entering the SPD Management Mode.



7.2 RC SIMM ADAPTER



Another addition to the RAMCHECK® line provides a solution for testing older style 72-pin and optionally 30-pin standard EDO/FPM DRAM SIMM modules.

RAMCHECK automatically detects the presence of the RC SIMM Adapter. The tester also automatically determines if the tested module is EDO or FPM without the need for special setup. This adapter comes standard with 72-pin SIMM module support (p/n INN-8668-2), but also can be ordered with both 72-pin and 30-pin sockets (p/n INN-8668-2-A).

7.2.1 OPERATION

7.2.1.1 CONNECTION AND MODULE INSERTION

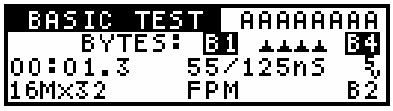
This adapter connects to RAMCHECK via the two expansion slots located beneath the 168-pin DIMM socket. Plug the adapter into the expansion slots only when RAMCHECK is OFF. Upon initial turn on, RAMCHECK will automatically identify the SIMM adapter.

INSERTION: 30-pin SIMM modules are inserted into the lower socket and 72-pin SIMM modules are inserted into the larger socket above. Note that the lower left corner has a curved notch for pin 1 identification. Also notice that there are standard holes on each side of the module. The socket has two flanges that can be pushed back about 35 degrees. Inspect them closely and notice that each flange has a pin that is designed to enter into the holes on the module's sides when they are correctly inserted. With very gentle pressure, insert the module into the socket and tilt it backward (thus also tilting the flanges) until the small pins on the socket flanges enter the holes in the module sides. With both hands return the flanges to the normal vertical position until the SIMM module enters the socket. Practice it a few times and you will be amazed how easy it is compared to working with regular SIMM sockets!

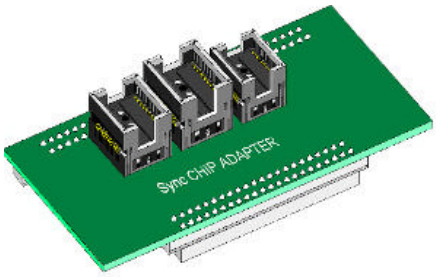
REMOVAL: Make sure that the Module Power **red** LED is off (if not - press ESC). In certain modules, the **red** LED may still be glowing slightly, even when the tester is in Standby Mode; if this occurs, it is still safe to remove the module from the socket, as the module is allowing only a minor amount of leakage current to flow. This however, should not be an indication of a defective device.

Place one finger on top of the SIMM module to **prevent the module from popping upward** and simultaneously push the two flanges away from you.

The test procedure for the RC SIMM Adapter is identical to our regular module test for EDO/FPM devices.



7.3 RC SYNC CHIP ADAPTER



The RAMCHECK Sync CHIP Adapter supports popular TSOP chips in sizes of 16Mx16, 4Mx16, 32Mx8, 8Mx8, 64Mx4, 16Mx4 and more.

This adapter is available supporting 54-pin TSOP SDRAM chips (p/n INN-8668-3) and also supporting all three popular styles of 54-pin, 50-pin, and 44-pin TSOP SDRAM chips (INN-8668-3-A).

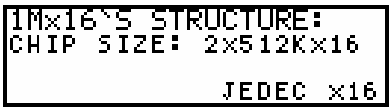
RAMCHECK automatically detects the presence of the RC Sync CHIP Adapter.

7.3.1 OPERATION

CHIP insertion and removal should be done only when RAMCHECK is in STANDBY Mode.

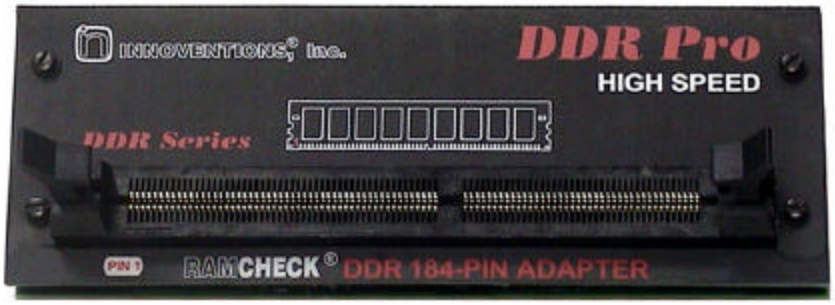
This adapter connects to RAMCHECK via the two expansion slots beneath the 168-pin DIMM socket and is automatically identified by the tester. Plug the adapter into the expansion slots only when RAMCHECK is OFF.

HANDLING THE TSOP CHIPS: The RC Sync CHIP Adapter uses up to three high-quality test sockets to support 54-pin, 50-pin, 44-pin, and TSOP chips. Pin 1 of the TSOP chip is typically marked with a dot. Alternatively, the short edge of the package, which is near pin 1, may be marked with a semi-circular tab. Place the chip in the corresponding socket so that pin 1 points away from you. Also make sure that the markings on the top of the chip face up (this is called "LIVE BUG" insertion). Insert the chip carefully at the bottom of the ZIF socket and press and release both sides of the black socket top to lock in the chip. Once the TSOP chip is inserted, press F1 to start the test.



Test summary and structure information screens follow the Basic Test. The test procedure is exactly the same as our SDRAM module test. After the test, press the black socket top to remove the chip from the socket.

7.4 RAMCHECK DDR PRO ADAPTER



The RAMCHECK DDR Pro 184-pin adapter features advanced circuitry and a powerful high-frequency test engine, allowing you to fully test and identify PC433/466/433/400/333/266/200 DDR modules.

The RAMCHECK DDR Pro adapter includes many new features not available in our older DDR test adapter, including the ability to control voltage settings (2.2-3 volt) and CAS Latency selection.

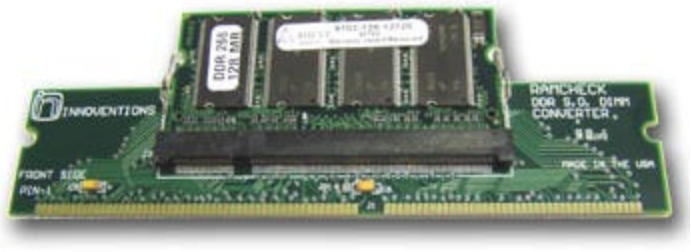
As with all of our RAMCHECK testers, each module's size, structure, and type are automatically detected, without the need for user's setup. Test flow of the DDR modules follows our standard Basic Test, Extensive Test, and Auto-Loop process. DDR Pro is very simple to operate, with little training or setup required.

The DDR Pro also supports the RAMCHECK 200-pin S.O. DIMM DDR converter and the 66-pin TSOP DDR Chip Tester.

DDR Pro Features
Supports Burst Length of 2, 4, and 8.
Supports CAS LATENCY of 2, 2.5, and 3. Default test allow automatic selection of CL=2 and CL=2.5 for different test phases. The user can select specific CL values using SETUP or the CHANGE-ON-THE-FLY feature.
DDR Data rates : 466MHz, 433MHz, 400MHz, 360MHz, 333MHz, 266MHz, 233MHz and 200MHz. (support for 533MHz and 500MHz will be added soon in the form of an optional hardware upgrade).
True 2.5V testing with a wide support range of 2.2V to 3.0V at +/- 50mV increments. While this range is sufficient to cover all popular DDR module, it can be extended using a special setup code.
Improved current and temperature measurement circuitry.
Controlled Vtt for true STTL-2 compatibility.
Parallel testing capability of 64/72-bits.
Rugged, test-quality ZIF socket for covenient module handling.
Automatic detection and support for Registered/Unbuffered modules.
Automatic DQS8..0/DM8..0 or DQS17..0 support.
Four -S control lines for up to 4-rank devices.
Fourteen A13..0 address lines and three BA2..0 bank select address lines to support 4GB modules.
Complete SPD programming support.
Supports optional converter for 200-pin S.O. DIMM modules (p/n INN-8668-1) and future converters.

If you need a test solution for non-standard or proprietary memory, the DDR Pro's advanced technology also makes it much easier to build custom adapters and converters.

7.5 200-PIN DDR SODIMM CONVERTER



The RAMCHECK DDR 200-Pin Converter (p/n INN-8668-6-1) is an inexpensive solution for testing modern laptop DDR memory. The

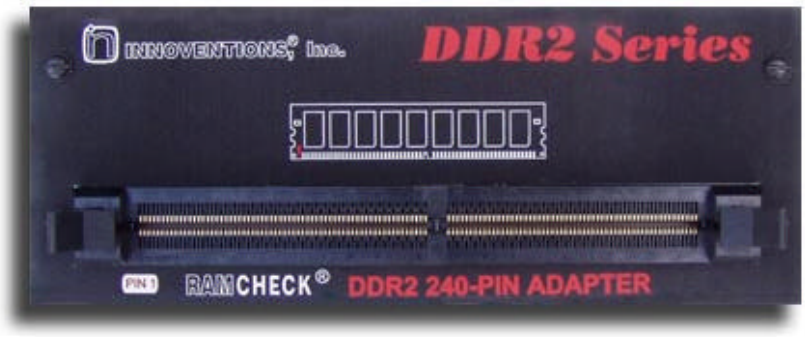
converter plugs directly into the 184-pin RAMCHECK DDR main adapter, providing you with fast, convenient testing capabilities. Please note that you must have the DDR 184 Adapter in order to use this converter.

The RAMCHECK tester automatically detects the presence of the converter indicating "RAMCHECK DDR SERIES" during power on. The module size, structure, and type are automatically detected, without the need for user's setup. Test flow of the DDR modules follows our standard Basic Test, Extensive Test, and Auto-Loop process. It is similar to the RAMCHECK test flow for SDRAM, so there is no need for special training.

SPECIFICATIONS

- Supports Burst Length of 2, 4, and 8.
- Supports CAS LATENCY of 2, 2.5, and 3.
- Clock frequencies (partial list): 200MHz, 224MHz, 248MHz, 260MHz, 266MHz, 280MHz, 300MHz, 316MHz, 333MHz, 400MHz, 433MHz and 466MHz.
- True 2.5V testing.
- Controlled Vtt for true STTL-2 compatibility.
- Parallel testing capability of 72-bits.
- Three controlled pairs of differential clocks for tested module.
- Automatic DQS8..0/DM8..0 or DQS17..0 support.
- Four -S control lines for up to 4-bank devices.
- The DDR adapter also includes fourteen A13..0 address lines and three BA2..0 bank select address lines to support future 4GB modules.
- Support current module sizes of up to 2GB, with downloadable firmware upgrade for future module size support.

7.6 RAMCHECK DDR2 ADAPTER



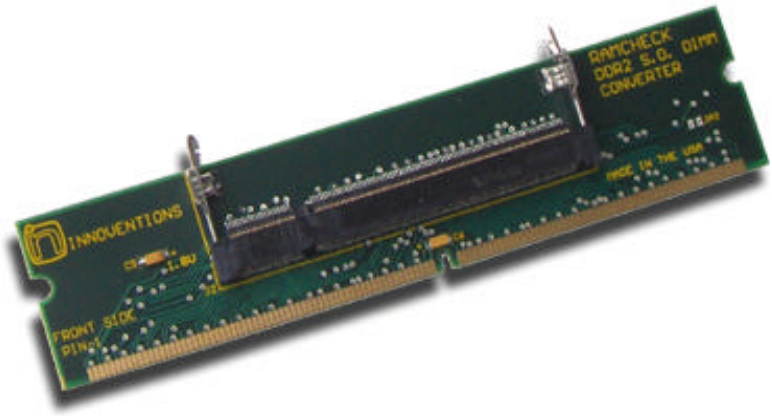
The RAMCHECK DDR2 adapter (p/n INN-8668-12) is the latest advanced memory test adapter for RAMCHECK. The adapter supports testing of 240-pin PC2-3200, PC2-4300, PC2-5300/PC2-5400 and PC2-6400 DDR2 memory, including unbuffered and registered modules (ECC and non-ECC) that comply with JEDEC standards. It can perform DDR2 tests at actual test frequencies up to 667MHz. Modules designed for 800MHz can be functionally tested on the DDR2 adapter but at a reduced frequency. The DDR2 test engine can achieve 800MHz internal diagnostic speeds.

As with all of our RAMCHECK adapters, each module's size, structure, and type are automatically detected, without the need for user's setup. The test flow follows our standard Basic Test, Extensive Test, and Auto-Loop process. The RAMCHECK DDR2 adapter is very simple to operate, with little training or setup required.

SPECIFICATIONS

- Supports Burst Length of 4 or 8.
- CAS Latency (CL) setup of 2, 3, 4, 5, 6. (Note: Not all modules support CL=2 and 6.)
- Clock frequencies (partial list): 667MHz, 600MHz, 533MHz, 466MHz, 400MHz and 366MHz.
- Uses digitally controlled state-of-the-art switching power supply for Vdd range of 1.5V to 2.2V. Voltage automatically defaults based on frequency to 1.8V-1.9V.Parallel testing capability of 72-bits.
- Automatic and user controlled test parameters of Trcd, CAS Latency (CL), Additive Latency (AL), Write Recovery (WR), OCD and more.
- Support current module sizes of up to 2GB, with downloadable firmware upgrade for future module size support.

7.7 RAMCHECK DDR2 SO-DIMM CONVERTER



The RAMCHECK DDR2 200-Pin Converter (p/n INN-8668-12-1) is an inexpensive solution for testing modern laptop DDR2 memory. The converter plugs directly into the 240-pin RAMCHECK DDR2 main adapter (p/n INN-8668-12), providing you with fast, convenient testing capabilities for modern DDR2 SO-DIMM modules. Please note that you must have the DDR2 Adapter in order to use this converter.

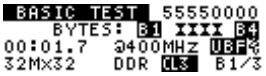
The RAMCHECK tester automatically detects the presence of the converter indicating "RAMCHECK DDR2 SERIES" during power on. The module size, structure, and type are automatically detected, without the need for user's setup. Test flow of the DDR2 modules follows our standard Basic Test, Extensive Test, and Auto-Loop process. It is similar to the RAMCHECK test flow for SDRAM, so there is no need for special training.

7.8 100-pin DDR SODIMM Adapter

The RAMCHECK 100-pin DDR Adapter (part number INN-8668-11) is a perfect tool for testing and identifying JEDEC-compliant 100-pin DDR SODIMM modules found in today's laser printers, including the popular HP brand. Tests are thorough and typical take just a few seconds.

The adapter uses a high quality, Zero-Insertion-Force (ZIF) test socket which allows you to easily insert and remove the modules. The adapter is mounted on top of the RAMCHECK base tester. No special setup is required. Test flow of the 100-pin DDR modules follows our standard Basic Test, Extensive Test, and Auto-Loop phases. Since the test flow is similar to the RAMCHECK test flow for SDRAM TSOP chips, there is no need for special training.

The following screen captures show RAMCHECK's display during Basic Test.



This example shows testing at 400MHz, CL3 of a 32Mx32 DDR module. The following screen captures some of the structure information in the RAMCHECK's Test Log.

```
REFRESH:AUTO
 BANKS: 2
 -S:0+1
DQS:3..0 DM:3..0
```

It shows the module as having 2 banks, controlled by -S0 and -S1. The module also uses DQS3..DQS0 and DM3..DM0, in compliance with the JEDEC standard.

7.9 66-pin DDR Chip Converter

The RAMCHECK 66-pin DDR Chip Converter (part number INN-8668-9-2) is made in the shape of a standard 184-pin DIMM module, but without the center key. You must have the RAMCHECK DDR Pro Adapter in order to use this converter.

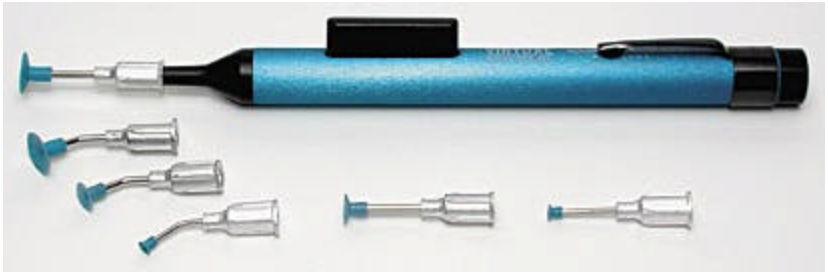
OPERATION

NOTE: The DDR CHIP Converter follows the same test flow and operation of testing regular 184-pin DDR modules, except for the different result screens shown here. This manual addendum must be read in conjunction with the main DDR PRO manual.

DDR CHIP HANDLING

Place the converter on a flat surface that is covered with a proper anti-static sheet. The converter can test either one chip (inserted in U1, the left socket) or two identical chips. The DDR chips supported by this converter are 66-pin TSOPs. They should be placed in the test socket very carefully with the pin 1 facing LEFT, as marked. The top of the test socket is then pressed down to lock the chip in place.

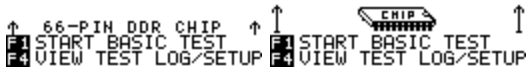
CAUTION: DDR chips are extremely delicate and can break easily. You must use a vacuum pick up device for proper handling. If your shop does not have a professional electrical vacuum pick up machines, you may use a low-cost pen-like pick up device like the following Pen Vac™ Tweezer:



Such tweezers are commercially available from many electronic tool distributors

Once you have inserted the chip(s) in the test sockets, insert the converter itself into the DDR adapter's 184-pin test socket as if it was a regular DDR module. Please make sure that pin-1 of the converter faces left so

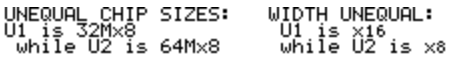
that the installed chips are facing you. Like testing regular DIMMs, you do not need to turn RAMCHECK off prior to the insertion of the converter. Press F1 to start the test, which generally follows the regular DDR test flow as outlined in the DDR Pro manual. RAMCHECK automatically detects the DDR CHIP converter as evident by the following DDR CHIP prompt:



Please note that when you first install the converter into the DDR PRO test socket, RAMCHECK will still prompt you to test a 184-pin DIMM. Once you press F1 to start the test, RAMCHECK will instantly auto-detect the chip converter. It will then change to the above DDR chip prompt for all your subsequent tests. Similarly, the prompt will change back to the original 184-pin DIMM message after you test a regular DIMM.

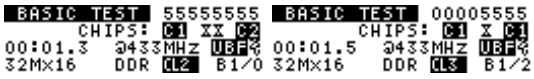
You can test one chip or two identical chips simultaneously. The DDR chip converter has two ZIF sockets, marked U1 (left socket) and U2 (right socket). You can test either one chip or two. If you test one chip only, you must use U1. When testing two chips, both must be of the same size. The following screens shows what you get if the two chips do not have same size:

Followed by a more explicit explanation as in these examples:

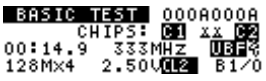


BASIC TEST

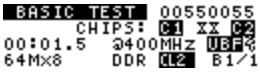
Basic Test for the DDR chips is similar to the test for DDR modules. The following two screens show testing of two 32Mx16 chips on the left and only one 32Mx16 chip on the right. The test animation uses "CHIPS: C1 X X C2" indication with two animation characters while testing two chips. The test for one chip uses "CHIPS: C1 X C1" indication with one animation character.



In the following example, two 128Mx4 are tested at 333MHz. You can override the default 333MHz to higher or lower frequency using the change-on-the-fly or setup features similar to the DDR modules setup.



The next example shows testing of two 64Mx8 DDR chips:



Here the test speed was overridden to 400MHz by the user.

Basic Test Results

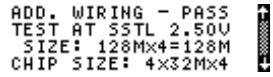
The following screen shows the first summary screen following a successful Basic Test with the DDR CHIP Converter:

In this example, two chips were tested simultaneously. Other screen follows with additional test results similar to the DDR PRO module tests.

RAMCHECK Test Log

The RAMCHECK Test Log allows you to review all the test results in one continuous scrolling display. You can view the test even after the test ends (but before you start a new test) by pressing F3 from Standby and selecting Test Log with F1. The Test Log is one of RAMCHECK's most powerful features. When used with the PC Communications program, the test log can be printed and saved into convenient log files.

The following screen shows you in particular how the DDR chip size is reported in the Test Log.



The first line of the size shows the standard notation for the total chip size, which is 64Mx8. It is also equal to 64MB. In the last line, the chip size is shown in the Banks x Size x Bit Width format. In the example, each chip has 4 banks, 16Mx8 each.

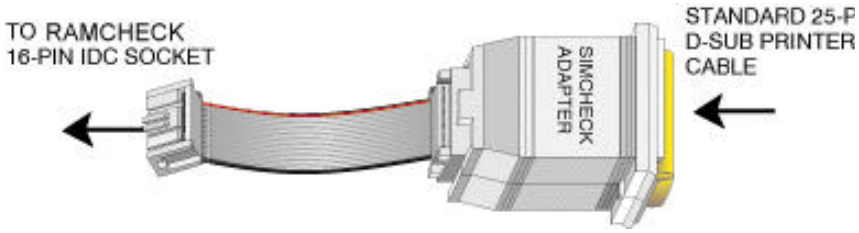
RAMCHECK 50-pin TSOP Adapter

This adapter (p/n INN-8668-10) provides an affordable solution for testing older legacy 4Mx16 EDO TSOP chips.

It also provides RAMCHECK users with a good starting platform for customizing their own adapters for testing other older legacy memory devices, thanks to its built-in connectors. The built-in connectors on this adapter can accommodate standard pin headers, and all signals are explicitly marked on the board for easy design.

The RAMCHECK TSOP 50-Pin EDO Chip Adapter works with any RAMCHECK base unit equipped with the legacy support option.

7.11 DIRECT PRINTER INTERFACE



The optional DIRECT PRINTER INTERFACE (p/n INN-8558-4) allows you to print directly from RAMCHECK to a printer, without the need of a PC connection. This option includes a special adapter, which connects to the RAMCHECK 16-pin IDC socket, and a special PAL chip, which controls the IDC socket.

Please install the PAL chip into your RAMCHECK in accordance with the instructions and drawings in Appendix.

The adapter comes with a short 16-pin IDC cable that connects to the RAMCHECK's IDC socket. Your printer connects directly to the standard 25-pin D-SUB connector on the other side of the adapter.

NOTE: The DIRECT PRINTER INTERFACE is targeted for dot matrix printers only, many of which can now be purchased in a convenient narrow size.

Once you have installed the PAL chip and connected the printer, you can print the Test Log either manually or automatically. Select the mode using Setup, Configuration, More, Printer. In automatic printing mode, the Test Log is printed whenever you return to Standby after a test. In manual printing mode, you can print the current Test Log by pressing F5 while viewing the Test Log.