Apple ][ Family Diagnostic Information

SOURCE

18 December 2008
XPS - DIAGNOSTICS IIe  (c1985)

(Main Menu Screen)

A)  MAIN MEMORY    B)  KEYBOARD
C)  SYSTEM ROMS     D)  GAME CONTROLS
E)  CPU (6502)      F)  CHANGE SLOT/DRIVE
G)  DISK SYSTEM     H)  ADJUST DRIVE SPEED
I)  PRINTER         J)  ADD PERIPHERALS
K)  PERIPHERAL CARDS L)  MEDIA VERIFY
M)  80 COLUMN CARD  N)  ENABLE PRINTOUT
O)  AUXILIARY MEMORY P)  COLOR BAR TEST
Q)  QUIT            R)  FOCUS TEST

This disk is a successor to APPLE-CILLIN (c1982); it is a sophisticated update of that earlier diagnostic. It has more tests, and the tests are more advanced. The XPS opening menu screen declares that it diagnoses the IIe, but it works also with the IIc; it correctly identified the ports of my IIc, although it described them as "peripheral cards."

The vintage of this disk is "early IIe," because it presumes that the CPU is a 6502 chip. Still, its CPU tests passed my IIc's 65c02 8 MHz ZIP CHIP.

The RAM TESTS are applied separately to main RAM (lower 64K) and to auxiliary RAM (upper 64K). Within each bank, the eight RAM chips are identified with the letter "G" to show that each has passed the continuous RAM tests. Presumably, the RAM test could identify the specific RAM chip that fails, enabling the replacement of that specific chip. This RAM identification would apply especially to the auxiliary RAM bank. A failed chip in main memory would prevent the program from loading and executing. But because the RAM tests are continuously repeating through endless "passes," the main memory RAM tests might be useful to identify marginally working RAMs that work initially but which fail later when warm. To identify "cold-failing" RAMs in main memory, the internal self-test is recommended: The self-test identifies bad RAM in either bank which fail at power-up.

SYSTEM ROMS TEST: This test is useless on any computer other than an early-vintage (pre-1985) IIe. With my Unidisk 3.5 model of IIc, all tests of the EO/CO ROMs yielded error messages.

PERIPHERAL CARD IDENTIFICATION AND TESTS: XPS will identify the peripheral (interface controller) card in each IIe slot or IIc port. Unlike the automatic card identifier on the MECC Computer Inspector, the XPS disk must be "trained" to identify each card. Later, the card will be named automatically when recognized in a slot. XPS applies a checksum algorithm to the card-resident ROMs to identify each card. When the checksum matches a value held on the disk, then the card is given the name associated with that checksum value. If the card checksum does not match any value held on
the disk, then the user is prompted to name the unknown card. That name is then held with the checksum on the disk to be used for future identifications.

GAME CONTROLS TESTS: These include the joystick or the antique "game paddles." For each direction of movement, values ranging from 0 to 255 are displayed. On/off switch contacts for the left fire button (switch 0) and right fire button (switch 1) are shown. But in addition to the joystick/paddles test, the mouse also is tested! The mouse is tested in a comparable way: with directional movement values (0 to 255) and also with the mouse-button (switch 2). These tests are recognized even on the IIC.

DISK DRIVE TESTS: These apply only to 5.25" floppy drives. These qualities are assessed: (a) disk speed, (b) write to disk, (c) track-seeking, and (d) read from disk. The tests run continuously until stopped. Errors are counted, but detailed information on the nature of the error is not given. A separate drive-speed test gives a numerical (no-graphical) indication of rotational speed RPM.

When using the disk drive tests, apply a tab over the write-protect notch of the program disk to protect it against accidental erasure. The XPS disk presumes that drive tests are to be done on slot 6, drive 1, unless the slot has been changed previously on a different menu selector.

MEDIA VERIFY TEST: Visually, this is the most exciting test on XPS. It resembles the fast copy display on Locksmith 6.0: an array of the 35 tracks and 15 sectors presented on Apple 5.25" floppies. The test disk need not be formatted in advance. A moving dot pattern sweeps upward and to the right across the array, with a dot (.) to indicate good sectors. Bad sectors are identified with a number which increments on successive failures during later passes. The media test appears to be valid; it identified bad sectors on several disks which could not be formatted. Because this verification test can be applied even prior to formatting, it is one of the best features of XPS and is recommended highly.

Should bad-sector disks be kept or discarded? Some users may choose to throw away disks with even a few bad sectors. After all, 5.25" disks are cheap these days! Still, bad-sector disks may have limited uses. As long as the bad sectors are not located in the directory area (tracks 00-01), then they make be useful for short programs or even for data storage of small files. The remaining good storage space may be used by scanning the disk with CERTIFIX. CERTIFIX formats the disk in either ProDOS or DOS 3.3. While formatting, it automatically identifies any bad sectors and locks them out by placing them in a special file so that the bad blocks do not intrude on programs or data storage.

The XPS disk is copy-protected, but backups can be made with the Locksmith v.4.1 bit copier.
YO YO DUCK DIAGNOSTICS v.2.5 (c1990)

(Main Menu Screen)

1) BURNIN  2) C.D. CONNECTION
3) MONITOR.TEST  4) DRIVE CLEANER
5) D.HI.RES.TEST  6) DISK.TEST2
7) ENSONIQ.SOUNDS  8) HIRES.TESTS
9) INSTRUCTIONS  10) IW2
11) IWLQ  12) JOY.PAD.TEST
13) KEYBOARD.TEST  14) MEMORY.TEST
15) PRINTER.TEST  16) SPEAKER.TEST
17) TEST.80.COL  18) ZANY.QUIT

CATALOG = 0

YO YO DUCK DIAGNOSTICS is unique software. It is supplied as a two-sided 5.25" floppy, and is distributed as shareware by many public domain software distributors. It offers many tests, which are less sophisticated than those available elsewhere (such as Master Diagnostics, Aptest, or Computer Inspector). It is inexpensive shareware (Michael Coffey, 1640 Cante, Florissant, MO 63033). I paid the shareware fee in 1992 and have not yet received upgrades. Still, its author is very knowledgeable about Apple II and writes long letters in response to technical inquiries. He also has a IIgs-specific disk of shareware ant-virus programs.

The best routine on YO YO DUCK DIAGNOSTICS is the documentation itself, selected as #9 on the opening menu, INSTRUCTIONS. The docs occupy the entire second side of the disk. They can be displayed on the screen (using Karl Bunker's "dogpaw" text-display routine), or printed, at the user's option. Docs explain plenty, going beyond the software itself.

The first routine, BURNIN, is a continuous loop of tests, intended to test hardware for hours.

Overall, the individual tests on YO YO DUCK DIAGNOSTICS are unsophisticated but there are so many of them that the shareware fee is well worth its cost. Also, the documentation is excellent so users will learn how their hardware works...

YO YO DUCK DIAGNOSTICS v.2.5 has a strange name, which the author should explain. It is ProDOS based and is not copy-protected. Payment of the shareware fee is based on the honor system.
ZIP CHIP IIE/IIC UTILITIES V. 2.00 (C1988)

(Main Menu Screen)

CONFIGURE INSTALLED

A) RUN ZIP SYSTEM CHECK
B) RUN ZIP CONFIGURER
C) RUN ZIP INSTRUCTIONS
X) EXIT MENU

ZIP CHIP IIE/IIC combines utilities and diagnostics to test the integrity of the 8-bit ZIP CHIP sold for the IIE/IIC. It includes utilities to slow the accelerated speed below the maximum 8 MHz speed. In actual practice, ZIP CHIP users either use the maximum acceleration or they turn it off. I can think of no scenario for which partial acceleration would be preferred.

The diagnostics portion of this disk proceeds through an impressively long list of function tests; yet, their validity is doubtful. When the disk was read by an Apple that lacked a ZIP CHIP, many "tests" were passed despite the prominent fact that the computer lacked a ZIP! The ZIP CHIP manual is very brief and the routines are not explained. The manual have identified the outcomes for which the ZIP chip could be judged conclusively to be defective. Early ZIP chips (c1988-1991) had a high failure rate so it would be desirable to identify failed ZIPs. In practice, software confirmation of ZIP CHIP failure is unnecessary. Dysfunctional ZIP CHIPS fail catastrophically, and software is thereby rendered unbootable.
ZIP-GS DIAGNOSTICS (C1991)

This is a disk that accompanies the ZIP-GS accelerator card. It is a flashy graphical product with hyperscreen features. It is not a true diagnostic in the sense that it judges the performance of hardware. Instead, it is a manual on a disk. It teaches the installation and operation of ZIP-GS at an elementary level --- too elementary, in my view. The disk should teach how ZIP-GS accelerates, but explanation is minimal. Utilities are included to install the ZIP-GS NDA on the Finder. As a diagnostic, this software is flashy, yet disappointing. The ZIP=GS NDA by "Brutal Deluxe" from France is more impressive than this. Unprotected software.
THE BEST DIAGNOSTIC ROUTINES

Identifying the best diagnostics in any category is very subjective and these reflect my personal views. Reasoning behind each selection is stated.

BEST RAM MEMORY TESTERS:

Internal Self-Test IIe/IIC. This was judged the best because it will identify bad RAM chip specifically, even when RAM failure in the main (lower 64K range) prevents other software from loading and running. Its shortcoming is that it is cryptic and the user may have trouble deducing which RAM has gone bad. (RAM-identification instruction details are given in the review of the self-test, above).

BEST DISK-DRIVE SPEED TESTERS:

My favorites are drive-speed testers in MASTER DIAGNOSTICS IIE/IIC, and also in APTEST. These testers are graphical and accurate. Some might prefer LOCKSMITH 6.0 speed tester with its "continuous over time" graphical display, and its feature that drive speed can be evaluated optionally with course/ medium/ fine precision.

BEST DISK-DRIVE TESTS:

MASTER DIAGNOSTICS IIE/IIC gives the disk drive an elaborate series of tests which are reported and explained continuously on the screen. (==========================) has an excellent series of random read/ write tests which measure the head mechanism's ability to move quickly and accurately across the disk surface.

BEST ROM TESTS:

MASTER DIAGNOSTICS IIc/IIe checks each ROM, and it knows that different models have different ROMs. It even knows the different ROM sets that identify the three IIc models.

BEST CPU (MICROPROCESSOR) TESTS:

Choosing the best CPU test is difficult because it is unclear which aspects of CPU functions are tested. It is also unclear which functions are most
vital to CPU operation. XPS Diagnostics completes about 100 passes per second during its CPS tests. Bearing this uncertainty in mind, APPLECILLIN's CPU test is judged the best. This test is buried within APPLECILLIN's "Other Tests" submenu, but it offers a repeating cycle of clearly identified CPU tests: overflow tag, carry tag, decimal mode flag, index register Y, index register X, negative flag, stack pointer, accumulator, and status register. This test is identified by software as for the older 8-bit processor, 6502, but it appears to work well with the newer 65c02 or with the 8-bit ZIP chip.

BEST 80 COLUMN CARD TESTS:

MASTER DIAGNOSTICS IIC/IIE has a series of visually attractive tests of the 80 column card functions; most other disks just give 1-2 screens of 80 column demos or tests.

BEST PERIPHERAL (INTERFACE) CARD IDENTIFIER:

APEX DIAGNOSTICS identifies interface cards recognized "under the hood," from a standard set. It also can add new or unrecognized cards to its card archive. Recognition is apparently achieved by applying a checksum routine to the ROMs on the card. Once identified, the software consistently names the card every time in the future. The potential size of its interface card recognition file is unknown ---- my file has about 90 interface cards so far.

MECC COMPUTER INSPECTOR was impressive at identifying the interface cards in my IIe, even without pretraining. Two other diagnostics (MASTER DIAGNOSTICS IIE and also XPS DIAGNOSTICS IIE) identified cards but only when pretrained (i.e., card initially identified by user). MASTER DIAGNOSTICS IIE notices whether any ROMs have changed on successive days, and this change could indicate faults in interface cards.

BEST DISK MEDIA VERIFIER:

XPS DIAGNOSTICS IIE (also known as POWER UP COMPUTER CHECKUP) gives an excellent screen display, identifying specific bad sectors in a repeating series of tests. CERTIFIX is less interesting to watch but CERTIFIX will actually lock out bad sectors, enabling bad-sector disks to be used for data or programs.

BEST JOYSTICK/MOUSE TESTS:

MASTER DIAGNOSTICS IIE/IIC has an excellent graphics-based mouse-test, but it does not test the joystick. (===================) uses a graphical grid-array to facilitate centering-adjustment of the joystick. XPS DIAGNOSTICS IIE tests either joystick or mouse fully on a single combined text-based screen.
BEST PRINTED MANUAL:

This is tough to judge because the manuals are unavailable for most software reviewed here. MASTER DIAGNOSTICS IIE/IIC has an excellent manual that explains the various tests and gives advice for corrective or preventative maintenance.

BEST DOCS-ON-DISK:

YO-YO-DUCK DIAGNOSTICS presents a large set of mediocre tests, but it includes a whole disk-side of excellent docs. The docs are self-booting and are accessed through the opening screen menu.

MOST FLEXIBLE SET OF SELF-REPEATING TESTS:

APPLE DIAGNOSTICS allows the user to choose any combination of tests, correctly suited for any model (IIE/IIC, IIC+, IIgs), which can repeat endlessly. YO-YO DUCK DIAGNOSTICS has a repeating series of tests (The "Burnin'" series) but the user cannot delete selectively any of the tests.

BEST OVERALL DIAGNOSTICS PACKAGE:

Master Diagnostics IIC and IIe. These were chosen because of their tests' number, variety, sophistication, and ease of use. The manual also was excellent, giving further information to identify and correct faults.

APEX DIAGNOSTICS is a close ranked second. Its abilities to identify interface cards held "under the hood" and to learn the identities of new interface cards are impressive.

WORST DIAGNOSTICS:

VITESSE DISK DRIVE DIAGNOSTICS are the worst. They are inaccurate and give a simplified yes-no evaluation of drive speed without specifying the criterion applied for passing. My test copies, an original and a backup obtained from a separate source, each failed to terminate its own drive-speed test. Its visual display is primitive, considering its recent date (1993). Company support was deficient; I described by phone the problem to Vitesse, and was told I would have to pay a service fee even to have the disk checked for faults. I declined, reasoning that even if it worked the software was not worth the disk replacement fee demanded by Vitesse.

AUTHOR'S NOTES AND ACKNOWLEDGEMENTS

1. This is the first version (v.1.0) of this review. Readers' comments, corrections, and additions are welcome and they will be added to the next revision.
2. This paper will be updated, especially when further Apple II diagnostics are located. Assistance from readers in locating further Apple II diagnostics will be appreciated and will be added in the next version. Specialized diagnostics for the IIgs are sought in particular.

3. Advice, comments, or software were provided by John Countryman, John Daniels, Tim Gaines, Doug Durkee, Wayne Jones, Jim Poore, Charles "Dr. Tom" Turley, and Joe Walters. Their contributions are gratefully acknowledged.

4. Nearly all diagnostic software reviewed here are out of print today (1996) but they are widely available through informal sources. I will appreciate being notified (and will be amazed) if any of these software packages are supported presently with updates.

5. Readers are welcome to contact me:

Stephen Buggie
Psychology Dept.
University of New Mexico-Gallup
200 College Rd.
Gallup NM  87301

Office phone: (505) 863-7504.
Fax: (505) 863-7532.
E-mail: buggie@unm.edu
BIT BANGER (IIgs Ram Tester, 1993)
by Harold Hislop

This is a sophisticated RAM tester for the IIgs. It performs an extensive series of tests on RAM, repeating endlessly if instructed to do so. It appears to be very similar to the RAM tester from Appleworks-GS (1989, Claris).

Docs are included; they state that the IIgs must first pass the internal self-test before BIT BANGER can be used. If an accelerator with more than 128K of cache memory, it must first be disabled. As with all RAM testers, any information held on a RAM disk will be lost.

These RAM tests are executed: a preliminary overall test, and tests for stuck bit, nibble, byte, page, bank, and crosstalk errors. A refresh test is done with a 5 minute delay, to assess whether information is held accurately for that brief duration. The tests are done sequentially within each bank, and then sequentially across the banks. Addresses of RAM error locations are displayed.

Tests are lengthy: testing one meg of RAM will take about 10 minutes even at accelerated speeds. Overnight burn-in testing is recommended. At the end of the tests, a colorful scrolling rainbow pattern is displayed. Before rebooting, the computer must be turned off.

I have not seen BIT BANGER yet confront a bad ram chip, but it certainly looks impressive with its sequence of clearly identified subtests.
CERTIFIX DISK DIAGNOSTICS V. 2.0

[Opening Menu, CERTIFIX]

RUN CERTIFIX (PRODOS)  RUN DRIVE SPEED TEST
RUN CERTIFIX (DOS 3.3)  CREATE 40 TRACK 'CERTIFIX'
RUN " RESCUE"            CERTIFIX DOCUMENTATION
RUN DRIVE SPEED TEST     QUIT TO BASIC

This diagnostic is focused on identifying and locking out any defective blocks on 5.25" floppies. It also formats disks in either DOS 3.3 or ProDOS, and includes a simple speed tester. The software can also allow formatting of 40-track Apple II 5.25" floppies. Some disk drives are capable of 40-track formatting --- most older full-height drives cannot do this.

With a five minute intensive spin, the drive mechanism assesses the presence of any bad blocks on the disk surface. Users should keep in mind that identifying the source of faults is difficult and that persistence is needed.
INTERNAL SELF-TEST (IIe, IIC, IIgs)

The internal self-test is available on the enhanced IIe and enhanced IIC, as well as on all models of the IIgs. It can be retrofitted to older versions of the IIe or IIC by changing a single ROM chip. This enhancement is very worthwhile, especially because the test can identify the locations of faulty RAMs. Replacing faulty RAM chips is especially important for the IIC, which loses RAMs occasionally due to heat buildup resulting from faulty ventilation within the CPU.

The self-test is activated by holding down the open-apple and closed-apple keys at power-up. In the enhanced IIe and enhanced IIC, a checkerboard pattern appears on the screen for about a minute, changing slightly every five seconds. If all is well, the checkerboard display is replaced by the words, "SYSTEM OK" on the screen. When faults are detected, a cryptic message appears on the screen to identify the fault. Tests are done on the CPU, MMU, IIC ports, RAM, and others. No message is displayed when subtests are passed. When a circuit fails, that failure alone is identified on the screen. Other failures are not identified until the first-identified failures are corrected.

RAM chips are identified by location, within each 64K bank: the main 64K, and auxiliary 64K. The 8 chips in the main 64K bank are identified on the screen by the word, RAM followed by eight zeros:

```
RAM     0 0 0 0 0 0 0 0
```

Any bad RAM chip is shown by a 1 rather than an 0. If the faulty RAM is in the auxiliary 64K bank, the display is preceded by an asterisk:

```
* RAM    0 0 0 0 0 0 0 0
```

In the IIC, the 16 RAM chips are arranged in a column along the right edge of the motherboard. The eight RAMs closes to the front (keyboard end) are main RAM, while the eight RAMs closest to the rear (back panel) are auxiliary RAM. Positions in the display, counted from the right, represent motherboard positions counted from the front. For example, consider this RAM error display:

```
RAM     0 0 0 0 0 0 1 0
```

This RAM error message indicates that the THIRD ram in main memory is faulty ---- the third RAM as counted from the front (keyboard) end of the RAM column.

The IIgs internal self-test is activated at powerup by holding down the open-apple and option keys. This self-test takes about two minutes. It generates a colorful, dynamic display of geometric designs and shapes, ending with the reassuring message, SYSTEM GOOD. These subtests are included: RAM, ROM, system speed, serial ports, internal clock, battery
RAM, the desktop bus, interrupts, and possibly other tests.

The internal self-tests are impressive for several reasons.

First, I resurrected two junked IICs which merely had bad RAMs. Locations of the dead RAMs were identified accurately by the self-test. Second, because the self-tests reside in ROM rather than on disk, they are convenient to apply, even if no disk drives are presently connected. Third, they appear to test many motherboard functions. When inspecting hardware, these tests could be valuable to apply before making a decision to buy.

The limitation presented by these tests is that documentation is difficult or impossible to find. Owners' manuals mention little about them, and even technical reference manuals on IIgs/IIe/IIc given very scanty information. The most detailed listing of error codes on the IIgs self-test is found on an NDA: SUPER INFO III, V.3.0 (1992). The error codes are listed under the ERR/SELF-TEST pull-down menu. (SUPER INFO III is a $15 shareware item available from its author: Jim Luzar, Apt. 241, 5324 N. Lovers Lane, Milwaukee WI 53225).
MASTER DIAGNOSTICS IIE/IIC, V. 7.0, 1990)

(Main Menu Screen: IIC)

MENU OF OPTIONS

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<th>IIC</th>
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<tbody>
<tr>
<td>1</td>
<td>ROM TEST</td>
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<tr>
<td>2</td>
<td>80 COLUMN TESTS</td>
</tr>
<tr>
<td>3</td>
<td>MOUSE SCALE</td>
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<tr>
<td>4</td>
<td>RAM TESTS</td>
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<tr>
<td>5</td>
<td>DISK DRIVE ANALYZER</td>
</tr>
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<td>6</td>
<td>PORT ANALYSIS</td>
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<td>MONITOR ROUTINES</td>
</tr>
<tr>
<td>H</td>
<td>HELP % - EXIT</td>
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(Sub-menu: IIC Ram Test)

<table>
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<tr>
<th></th>
<th>* TEST OPTIONS *</th>
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<tbody>
<tr>
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<tr>
<td>2</td>
<td>MOTHERBOARD RAM (MANUAL)</td>
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<tr>
<td>3</td>
<td>MOTHERBOARD RAM (CONTINUOUS)</td>
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<tr>
<td>4</td>
<td>AUXILIARY RAM (AUTO)</td>
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<tr>
<td>5</td>
<td>AUXILIARY RAM (MANUAL)</td>
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<tr>
<td>6</td>
<td>AUXILIARY RAM (CONTINUOUS)</td>
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<td>7</td>
<td>RETURN TO MENU</td>
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(Sub-menu: Disk-Drive Analyzer)

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<tr>
<td>1</td>
<td>DISK READ/WRITE TEST</td>
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<tr>
<td>2</td>
<td>DISK SPEED UTILITY</td>
</tr>
<tr>
<td>3</td>
<td>WRITE-PROTECT SWITCH TEST</td>
</tr>
<tr>
<td>4</td>
<td>HEAD CLEANING UTILITY</td>
</tr>
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<td>5</td>
<td>RETURN TO MENU</td>
</tr>
<tr>
<td>6</td>
<td>REBOOT</td>
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</table>

MASTER DIAGNOSTICS IIE/IIC gets my vote for the best all-around Apple II diagnostics software. There are two separate one-sided 5.25" disks, each for the IIe and IIC respectively. If the wrong disk is inserted, a prompt screen will appear. The disks are easy to use, the tests are extensive and accurate, and they are accompanied by an excellent manual. The disks are formatted in DOS 3.3, and copy protection was removed from later versions (Mine are v.7.0, dated 1990). Transitions to the main menu are smooth and users need not reboot when navigating among menu screens. The IIe and IIC software must be bought separately: I paid $85 for the IIe package (1991) and $35 extra to get the IIC version.

Many routines are the best available. Favorites are: Disk Drive Analyzer, RAM tests, 80 column tests, Port Analysis Tests (IIC only), and the interface card tests (IIe version only). An older version is available for the II+, but no IIgs version was ever produced.

DISK DRIVE ANALYZER: Routines are listed above. All are excellent. These routines would be great for demonstrating a disk drive at the time of sale. The Write Protect Switch Test is sometimes erratic; that test sometimes reported false write-switch errors. A HEAD CLEANING UTILITY is included. This utility sweeps the cleaning disk through all head positions. A partial run through the head positions will suffice. The IIe version (but not the IIC version) can initialize scratch disks for the read/write test and for the disk speed utility.
ROM TEST: This test is excellent. The software knows that ROMs were expanded in later IIC models, and those roms (D8, D0, E0, E8, F0, F8) are recognized and tested. Each ROM is identified clearly on the screen as the test proceeds.

This is the best of all Apple II diagnostics, but it could be improved. The $85.00 I paid in 1991 was hiked $10.00 above its $75 advertised price; certainly a price-hike should indicate that upgrade versions are on their way down the pipeline. No update was ever sent or announced. Customers should be told at time of purchase that updates will not be available in the future. The lack of disk updates should be publicized to uses. MASTER DIAGNOSTICS IIE/IIC should have been updated to allow these tests: 3.5" 800k drives, SCSI hard drives, big RAM cards, ZIP CHIPS, and other modern interface cards, etc.
MECC COMPUTER INSPECTOR V.1.0 (1988)

(Main Menu Screen)

COMPUTER INSPECTOR

1. MACHINE IDENTIFICATION  5. RAM MEMORY TEST
2. MONITOR ADJUSTMENT    6. JOYSTICK/PADDLE TEST
3. PRINTER TEST           7. INFORMATION
4. DISK DRIVE TEST        8. QUIT

This diagnostic disk was produced by MECC, a major supplier of educational software, which is now phasing down its support for the Apple II. The menu screens resemble those of Master Diagnostics IIe/IIC; they are well labeled and easily used; no manual is needed. All routines allow smooth return to the main menu screen; rebooting is unnecessary.

One's first impression on seeing the opening screen is that few tests are presented. In fact, some of its diagnostics are excellent. This disk is worth adding to your collection. It is applicable to all late model Apple IIs: IIgs, IIc, IIc Plus, or IIe.

The best routine on MECC COMPUTER INSPECTOR is MACHINE IDENTIFICATION. By inspecting the computer's ROMs, this routine deduces the following information: model number, identity or function of all interface cards, and identity of all memory (main RAM, auxiliary RAM, and expansion RAM). IIc ports (corresponding to expansion slots) are identified correctly. This routine resembles an updated version of the peripheral card routine on APPLE-CILLIN II, although this routine is more efficient. It identifies cards and ports accurately, even without manual pre-identification as required by Apple-Cillin. I was impressed that even the make and model number of the SCSI hard drive in my flagship IIe was identified correctly. The only mistake it made in identification is that it falsely identified my IIc (Unidisk 3.5" model) as a IIc Plus. This error likely happened because it mistook my Zip Chip 8 MHz accelerator for the accelerator in the IIc Plus.

The MONITOR ADJUSTMENT option has three subprograms:
(a) normal text and graphics [a mixed test pattern with color patches, line grids, large type, and a simple graphic].
(b) a super-high resolution graphic [suitable for IIgs only], and
(c) a single-page 80 column text sample screen.

The PRINTER TEST is simple, but good. This test instructs the printer to reproduce the entire alphabet and supporting symbols.

The DISK DRIVE TEST has an excellent test of the write-protect switch. Its test of "general operations (write/read to disk) is hard to evaluate because it gave very little information on my successful tests. Hopefully,
if any drive tests were failed, the faults would have identified. A drive speed test is included, but its performance was poor relative to drive speed tests on other diskettes. This drive-speed test is text-based only, without graphics. It identified the drive speed of all my tested drives as 300 rpm. These drives are well adjusted for speed, but drive speed tests on other software identify even slight variations from true speed, unlike this program.

The RAM MEMORY TEST has a text-based screen. In the IIe/IIe, it automatically tests main memory (lower 64K), auxiliary memory (upper 64K), plus any extended memory available. It recognizes and tests all IIgs memory, taking about ten minutes to test a 4 meg IIgs RAM card. All RAM tests were passed, so its reporting of RAM failures cannot yet be judged.

An excellent JOYSTICK TEST is included. The user does X-axis and Y-axis centering on a grid pattern. This adjustment is efficient and clearly understandable.

Docs, unfortunately, are minimal, consisting of three brief screens. They cannot be printed. The operating system is proprietary, neither ProDOS nor DOS 3.3. Thus the routines cannot be split from the package. The MACHINE IDENTIFICATION routine would be handy to use elsewhere, but it must remain with the package.

The MECC COMPUTER INSPECTOR program code was reviewed in COMPUTIST magazine, v 71, p. 17 (1989). The disk can be backed up with the bit copier on Locksmith v.4.1.
MULTIRAM IIE OR MULTIRAM IIC DIAGNOSTICS V.2.0 (1985)

CHECKMATE TECHNOLOGY INC.

by Steve Stephenson

(main Menu Screen)

Status

Bank 1 ???K
Bank 2 ???K             Bank A
Bank 3 ???K             Group:       ???K
Bank 4 ???K

Bank 5 ???K
Bank 6 ???K             Bank B
Bank 7 ???K             Group:       ???K
Bank 8 ???K

TOTAL       ???K

RETURN          ARROWS         SPACE    BAR    ESCAPE
starts          select         pause/resume          cancel

These diagnostics specifically test the two Checkmate RAM cards
MultiRam IIE and MultiRam CX (512K for the IIC)

I have the disk, but not the docs. The IIE and IIC tests are on separate
files. The question marks on the opening screen later identify the RAM
capacity when the user returns to the status screen after the tests. (For
the 512K MultiRam CX card in the IIC, each of the eight banks has 64K, and
each Bank Group has 256K.) Of the three test options [3], [4], [5], option
[5] is recommended so that the behavior of the RAMs can be judged over
time.

When the test is selected, an attractive screen appears, outlining the
interface card, and identifying which sockets are filled with RAMs. The
RAMs are each identified as (a) good, (b) good but unusable, or (c)
bad/empty. The test proceeds sequentially across the eight RAM banks. Any
bad/unusable RAMs are easily identified with this graphic display, which
resembles the similar graphic display of AE RAMFACTOR or AE RAMWORKS.

The IIE version, MultiRam Diagnostics IIE, has a further set of options
preceding its opening screen. These options are:

1. MultiRam IIe card (alone)
2. MultiRam IIe (on the RGB)
3. MultiRam RGB card
4. Exit.

I have only the IIc version: MultiRam CX. The IIe version shows a map of the 32 256K RAM chips in each of the configurations listed above. Tests on the IIe software will also examine other cards, although identifying the bad RAM chip ---- the main goal of these programs ---- will be ambiguous because the RAM maps are specific to these Checkmate cards. Onboard docs report that the MultiRam IIe and MultiRam RGB cards can be installed together, yielding a total of 1.75 megabytes of RAM. These tests could be useful to others in the sense that they will signal whether _any_ RAM is bad; then other tests could be used as follow-up to identify the location of the bad RAM.

I got the software separately from my used MultiRam CX 512K IIc board. The disk has these extra programs other than the diagnostics: MRAM.SYSTEM, MD.PRO.CUSTOM, MULTIDRIVE.PRO, LOGO.SYSTEM, PRINT.DOC, RAM, and RAM.FILER. The three pages of on-disk v. 4.3 docs can be selectively viewed on the screen or routed to a slot #1 printer. Mainly, the docs outline the changes made in the successive versions of the software.

I received the Checkmate MultiRam diagnostics and related programs on a nonbootable disk that lacks menus. To simplify their use, I have recopied these files to a self-booting disk controlled with an excellent program launcher (Super Selector v.3.22). This disk will be sent to users on request.

Overall, this software is well arranged and is excellent for those who have the specific RAM cards for which the software is intended. For non-MultiRam cards, the software merely tells the user that a chip is bad without identifying its location clearly.
POWER UP! COMPUTER CHECKUP (1984)

William G. Peters, Software Publishing Corp.

This disk is an identical clone of XPS Diagnostics IIe; see the review of XPS. The disk is copy-protected, and the krack recipe published in COMPUTIST magazine failed to deprotect it. See the review on XPS.
RAM 4000 (RAM-GS TEST v.1.4, c1993)

This is a RAM testing disk supplied with the Chinook RAM 4000 memory expansion board for the IIgs. It shows an outline drawing of the RAM card, with its 32 chips clearly identified. These RAM tests are selectable: standard memory test (regular or extended), memory refresh test, and unique address test. I have yet to see it identify a failed RAM chip.

REAL SOFTWARE DIAGNOSTICS (1986)

(Main Menu Screen)

A) DISK DRIVE TEST  D) FLOPPY DISK TEST
B) MEMORY TEST      E) COLOR TEST
C) PRINTER TEST      F) AUDIO TEST

This is a very minimal diagnostic set. It is ProDOS-based, and the disk is freely copyable. Its ProDOS operating system identifies it as a diagnostic of the recent Apple II era. Display screens are text, not graphics. Easy return to the main menu screen is available following all tests other than the MEMORY TEST, for which a warm reboot is needed. There is so much empty space left on the disk that one cannot avoid wondering why more tests were not added.

The DISK DRIVE TEST has special features. It expects the disk to be formatted in ProDOS; it tests either 5.25" or 3.5" disks, it identifies the disk's capacity, and it verifies the drive's read/write capabilities.

The MEMORY TEST portrays a unique upward-scrolling low-res pattern for fifteen seconds, followed by the words, TEST PASSED.

The FLOPPY DISK TEST requires a ProDOS-formatted disk, and it checks the disk, block-by-block, reporting specific numbers of any failed blocks. The display is strictly text, so it is less interesting to watch than XPS Diagnostics. But this routine is useful because it has the unique capability to test the 1600 blocks (800K) of 3.5" disks.

The COLOR TEST is done full-screen, one hue at a time. When adjusting color monitors my preference is to have all colors displayed simultaneously because adjustment of color controls affects all colors, not just one. Thus, this COLOR TEST is judged inferior to others which commonly display a simultaneous spectrum of colors.

The AUDIO TEST presents a simple melody, the theme from Star Wars.

Overall this is a very simple diagnostic set. Its main advantages are: (a)
It is ProDOS-based and unprotected, so its routines could be compiled elsewhere, and (b) Its floppy disk test and disk drive test will verify 3.5" disks and drives in addition to the common older 5.25" size.
SEQUENTIAL MEG-80Z MEMORY TESTER V.2.1 (1993)

This is a disk that accompanied the 1024K RAM board for the IIe, marketed by Sequential. It resembles the AE RAM testers, because it shows an outline of the RAM card and its chip locations. The tests are routine; nothing spectacular is shown.
TUNING APPLE II FLOPPY DRIVES (1995)

by Stephen Buggie

This is a disk to guide the user in the steps required to do track-center alignment adjustment on 5.25" drives. APTEST is presented on Side B, while an extensive set of docs is given on side A.

For unknown reasons, the drive alignment software will not load on a IIc. Therefore, a IIc-compatible version is also available. This disk is entitled, TRACK-CENTER ALIGNMENT. This version can also be used on the IIe and IIgs.

This disk, and its procedures, will be demonstrated at APPLE II KANSASFEST in July 1996!
VITESSE DRIVE-CHECK (c1993)

DRIVE-CHECK FOR THE APPLE II
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CURRENT DRIVE: SLOT 6 DRIVE 2

MAIN MENU

SELECT DISK DRIVE
CLEAN DISK DRIVE
VERIFY FLOPPY DISK
DRIVE SPEED TEST
DRIVE SEEK TEST
DRIVE WRITE TEST
ALL DRIVE TESTS
QUIT TO PRODUCE

This software gets my vote for the worst diagnostic available for the Apple II. Why? Several reasons:

First, the drive speed test is seriously bugged to the extent that it is useless. The screen states that the drive speed test will take two minutes --- but it continued endlessly without completion. This fault was noticed on the original disk as well as on two backups obtained independently. The drive speed test is flawed because no readout is given regarding direction (+/-) or extent of drive speed error. With the software equivalent of an "idiot light" on a car dashboard, the software only gives a pass/fail judgment on disk speed. This is clearly deficient because the other speed checkers give appropriate graphical or numerical information.

Second, the user interface is simple and uninformative. While this could be overlooked if this software dated from the early 1980's, one would expect that a 1993 software product ought to have an appealing look.

Third, publisher support is deficient. This diagnostic is still supported (Vitesse), but inadequately. By phone, I described the drive speed bug and was told to return the disk accompanied by a replacement fee. I judged that the software, even if it worked, was not worth even the cost of the disk replacement fee.

In conclusion, this software is a big dud. Readers are cautioned against it even if it is available at a discounted rate. VITESSE DRIVE-CHECK is an ironic disappointment: the most recently released diagnostic is also the least worthwhile one to have.

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