Apple II Technical Notes

Developer Technical Support

Apple IIGS
#95: ROM Diagnostic Errors

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This Technical Note describes errors returned by the ROM Diagnostics on Apple IIGS systems.

The Built-In Diagnostics Revealed

The IIGS has a self-test capability in ROM. The self-test is activated by pressing Open-Apple and Option on power up, or Open-Apple, Option, and Reset. During the test, the test number is visible on the bottom of the screen followed by six zeros. After all tests are complete, a continuous 6 KHz one-second beep sounds and the screen displays a `System Good` message. If any test fails, the screen displays a message of the form `System Bad: AABBCCDD` on the lower left hand side and a staggered `AABBCCDD` on the upper left hand side to help read the error code in the event of a RAM failure. In the event of video failure, the failure code is also sent to the printer port. In the number contained in the error message, `AA` is the test number that failed and the failure code is embedded in the `BB`, `CC`, and `DD` fields. The complete failure codes for each of the 12 tests are as follows:

Self Test 1: ROM Test

`AA` = 01
`BB` = Failed checksum
`DD` = 01 if the test encountered bad RAM and the error code is a RAM error code similar to the RAM Test error codes

For a failure in ROM, the ROM diagnostics also display `RM` on the top left hand corner of the screen.

Self Test 2: RAM Test

AA = 02
BB = Bank Number (or $FF for ADB Tool call error)
CC = Bit(s) failed

Self Test 3: Soft Switches and State Register Test

AA = 03
BB = State Register bit (if any)
CC = Low byte of soft switch address

Self Test 4: RAM Address Test

AA = 04
BB = Failed bank number (or $FF for ADB Tool call error)
CCDD = Failed address

Self Test 5: Speed Test

AA = 05
BB = 01: Speed stuck slow
02: Speed stuck fast

Self Test 6: Serial Test

AA = 06:
BB = 01: Register R/W
04: Tx Buffer empty status
05: Tx Buffer empty failure
06: All Sent Status fail
07: Rx Char available
08: Bad data

Self Test 7: Clock Test

AA = 07
DD = 01: Fatal error occurred and the test is aborted

Self Test 8: Battery RAM Test

AA = 08
BB = 01: Address test and CC = bad address
02: Non-volatile RAM failed and CC = pattern, DD = address

Self Test 9: Apple Desktop Bus Test

AA = 09
BBCC = Bad checksum
DD = 01: Apple Desktop Bus tools call encountered a fatal error, no checksum computed.

Self Test 10: Shadow Register Test

AA = 0A
BB = 01: Text page 1 fail
02: Text page 2 fail
03: Apple Desktop Bus Tool call error
04: Power On Clear bit error

Self Test 11: Interrupts Test

AA = 0B
BB = 01: VBL interrupt time-out
02: VBL IRQ status fail
03: 1/4 sec interrupt
04: 1/4 sec interrupt
05:
06: VGC IRQ
07: Scan line

Self Test 12: Sound Test

AA = 0C
DD = 01: RAM data error
02: RAM address error
03: Data register failed
04: Control register failed
05: Oscillator interrupt timeout

Further Reference

- *Apple IIGS Hardware Reference*, Second Edition