

Last error message

QUESTION: What combination of errors are indicated by the code?
(Assembly/module trees are listed in diagnostic-tree section 3.)

If FATAL ERROR #2, Go to, 1.3.4.
If ONLY FATAL ERROR #9, Go to, 3.1.3.1.0, A2 Mass-spectrometer tree.
If ONLY FATAL ERROR #11, Go to, 3.1.4.1.0, A2 Cesium-oven tree.
If ONLY FATAL ERROR #10, Go to, 3.1.1.1.0, A2 Hot-wire ionizer tree.
If ONLY FATAL ERROR #12, Go to, 1.3.5, Cs oven timeout test.
If ONLY FATAL ERROR #4, Go to, 3.9.1.1, A19 Reference-oscillator tree.
If FATAL ERROR #5, Go to, 2.4.3.0, C-field tree.
If FATAL ERROR #19 or #22, Go to, 1.3.3.

NOTE

A non-zero total in the first field of the right-most word indicates that the HP 5071A was being steered at the time of shutdown: it has no diagnostic significance.

Additional diagnostic information may be obtained from any warnings or messages indicated by data in the error codes. See 1.4.1 and 1.7.1 for more details.

1.3.2 Warm-Up Error Interpretation

- 1 Locate the most recent error (should be at the end of the log).
- 2 Record this error.

QUESTION: What is the error?

(All assembly/module trees are in diagnostic tree section 3.)
(RF-chain and C-field trees are in diagnostic tree section 2.)

If ERROR = Cs oven failed: ion pump overcurrent, Go to, 1.3.2.1.
If ERROR = Cs oven timeout, Go to, 1.3.5.
If ERROR = Osc. oven timeout, Go to, 3.9.1.1, A19 diagnostic tree.
If ERROR = Low Cs signal <#> with max Emult, Go to, 1.3.6.
If ERROR = High Cs signal <#> with min Emult, Go to, 1.3.6.
If ERROR = Cannot set E-mult to avoid saturation, Go to, 1.3.6.
If ERROR = Signal saturated at min E-mult voltage, Go to, 1.3.6.
If ERROR = Beam min/max values not 5% apart, Go to, 1.3.7.
If ERROR = Failed attempts to set Osc. control, Go to, 1.3.7.
If ERROR = Osc. control range error, Go to, 1.3.7.
If ERROR = CBT signal loss Go to, 1.3.7.
If ERROR = Line center not found, Go to, 1.3.7.
If ERROR = VCXO at tuning limit, Go to, 1.3.7.
If ERROR = RF Amplitude range error, Go to, 2.3.1.0.
If ERROR = RF amplitude at range limit, Go to, 2.3.1.0.
If ERROR = E-mult voltage has changed, Go to, 3.7.1.0.
If ERROR = Failed attempts to set C-field, Go to, 1.3.7.

1.3.5 Cs Oven-Timeout Test

This error occurs because the indicated cesium oven temperature has not reached the correct value within 45 minutes from power on or an error has subsequently occurred. This may be due to a failure of the cesium-oven heater or thermistor, or the associated circuits on A2.

- 1 Perform the A2 Thermistor and Cesium Oven diagnostic test procedures in diagnostic section 3 (3.1.2.1.0 and 3.1.4.1.0) of this chapter.
- 2 Replace A2 and/or A7 as indicated.
- 3 Reapply power to the instrument and observe the warm up behavior.

QUESTION: Did the instrument fail in the same manner?

If Yes: The CBT may be defective, contact your nearest Hewlett-Packard Sales office for assistance.

If No: Continue diagnostic testing.

1.3.6 CBT Background-Signal Warm-Up Errors

These errors occur when the CBT background signal is not within acceptable limits after warm up. This condition can be caused by a malfunction in the CBT itself or by various circuits that control it. This procedure checks these alternatives.

NOTE

The instrument self-tests **must** pass successfully for the following procedure to be conclusive.

- 1 Perform the Electron-Multiplier Supply tests with procedure 3.7.2.1. Replace A16 if necessary, and re-connect all leads.
- 2 Perform the Analog-Signal Chain tests 2.2.1.0. Repair as necessary, and re-connect all cables and assemblies.
- 3 Retest the instrument by cycling ac power.

QUESTION: Does the instrument fail to lock-up, then display one of the same errors?

If Yes: A CBT fault is indicated, contact your nearest Hewlett-Packard Sales office for further assistance.

If No: Continue the diagnostic procedures.

A2 Thermistor Diagnostic Tree

This functional subsection describes the A2 thermistor diagnostic tree for the HP 5071A Primary Frequency Standard. Performance of these tests is indicated by the presence of either a self-test or fatal error that reports a thermistor fault.

3.1.2.1.0 CBT Thermistor Resistance Test

- 1 Power off the HP 5071A.
- 2 Unplug cable from A2J2.
- 3 Use a DMM to measure the resistance between pins 6 and 7 on cable.

QUESTION: Is the resistance between 200 and 250 k Ω ?

If No: Recheck results and DMM, then replace CBT.

If Yes: Go to, 3.1.2.1.1.

3.1.2.1.1 CBT Thermistor Ground Test

- 1 Use a DMM to measure the resistance between cable pins 7 and 11.

QUESTION: Is the resistance less than 1 Ω ?

If No: Recheck results and DMM, then replace CBT.

If Yes: Go to, 3.1.2.1.2.

3.1.2.1.2 Thermistor Monitor Test (No Current)

- 1 Remove instrument power.
- 2 Remove A2 CBT Controller.
- 3 Install long extender board (05071-60052) into A2 slot.
- 4 Turn on the HP 5071A.
- 5 Use SCPI command `syst:print?`.
(Terminal-to-instrument via RS-232C data communication required.)

QUESTION: Is thermistor between -0.05 and +0.05 C°

If Yes: Go to, 3.1.2.1.3.

If No: Remove power, replace A7, and retest.

A2 Cesium-Oven Diagnostic Tree

This functional subsection describes the A2 cesium-oven diagnostic tree for the HP 5071A Primary Frequency Standard. Performance of these tests is indicated by the presence of either a self-test or fatal error that reports a cesium-oven fault.

3.1.4.1.0 Cesium-Oven Resistance Test

- 1 Remove instrument power.
- 2 Unplug cable from A2J2.
- 3 Use a DMM to measure the resistance between cable pins 8 and 15.

QUESTION: Is the resistance between 22 and 32 Ω ?

If No: Recheck results and DMM, then replace CBT.

If Yes: Go to, 3.1.4.1.1.

3.1.4.1.1 Cesium Oven-to-Ground Test

- 1 Use a DMM to measure the resistance between cable pins 15 and 11.

QUESTION: Is the resistance greater than 10 k Ω ?

If No: Recheck results and DMM, then replace CBT.

If Yes: Go to, 3.1.4.1.2.

3.1.4.1.2 Cesium Oven Monitor Test (Current Off)

- 1 Remove instrument power.
- 2 Remove A2 CBT Controller.
- 3 Install long extender board (05071-60052) into A2 slot.
- 4 Reapply instrument power.
- 5 Use SCPI command `syst:print?`.
(Terminal-to-instrument via RS-232C data communication required.)

QUESTION: Is CBT Oven Err: between 0.5 and -0.5V?

If Yes: Go to, 3.1.4.1.3.

If No: Remove power, replace A7, and retest.