



Diagnostics

What is diagnostics

This feature of the control software is useful in testing the 1400-2 or higher, as well as RAM expansion, it will test the RS232 port, video, axis controllers, the Clock Card and Mill Interface card.

Getting into Diagnostics

At the ENTER NEXT COMMAND, type DI and press enter. Then use the code G 0 3000. All digits are numerical. Press ENTER and you should see the first page of diagnostics. You will have 5 pages and once you put in the G 0 3000 code you will be on the first page of 5 total. The SPACEBAR is used to switch pages and the ENTER key moves you from field to field.

Diagnostic Commands

COMMAND	DESCRIPTION
CE	Clears messages under DE
DE	Displays the last 48 error messages
DS	Displays the machine switches
X	Terminate diagnostics and exit
G 0 3000	Enter diagnostics menu

Function #1 – EPROM CHECKSUM:

This command reads the eproms on the 1610 module card. After performing the Checksum test, the results are displayed. This test displays four to six 1 byte numbers. They should all be zeros. If they are, the test will loop and continue to test. Press the manual key to stop the test. If you get a checksum error this indicates you have a problem with the CPU card or the software module.

Function #2 – RAM Test (1400):

This test performs a write/read to test the CPU onboard memory. The memory is used for things such as holding the parameters, offsets, execution buffers and general usage of the CPU. While the test is running, the current memory segment is displayed as follows:

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SEGMENT 6 OR 4  
SEGMENT 7 OR 5  
SEGMENT 8  
PASSED TEST ##### OF TIMES.
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The message "Memory Failure" would appear and the data that failed would be displayed. A failure with this test indicates the 1400-X card needs replacing.



Function #3 – RAM EXPANSION TEST (1460):

This will test the same as function #2 except it checks for memory expansion to 422k.

SEGMENT 9
 SEGMENT A
 SEGMENT B
 SEGMENT C
 SEGMENT D
 SEGMENT E
 PASSED TEST ##### TIMES.

If the card is present, it is tested automatically the same as function #2. When a card is not found, you will get the message “Not Present.”

**NOTE: THERE IS A MORE THOROUGH RAM TEST AVAILABLE ON MENU PAGE 5*

Function #4 – RS232 Test:

This function tests the RS232 port. Install the Fadal jumper or just jumper pins #2 & #3. After selecting the baud rate, the CNC sends and receives a flow of characters until a fault is found or the manual key is pressed to stop the test.

There are two procedures that can be performed with this test.

- 1) Install the jumper plug directly in the back of the CNC RS232 port and cycle the test. This tests the machine for a possible failure with the ribbon cable, wiring or a bad communications card (1030-X).
- 2) Install the test plug at the computer’s end of the cable. This will check not only the cable but also the environment. A bad cable, solder connection or an electrical noise problem could cause the first test to pass and the second test to fail.

Function #5 – Non-destructive loop test:

This causes all tests to be continuously performed until a failure has occurred or the manual key is pressed.

The table below is the diagnostic machine switch menu.

DISPLAY	DESCRIPTION
ATCXTNDD	Switch closes when the ATC slide is extended
ATCTURET	Switch closes momentarily when the ATC turret motion is complete. May not be seen because closure may occur between screen updates.
ORIENSP	Switch closes when the spindle is at the proper angle for orientation.
ATCHOME	Switch closes when the ATC slide is fully retracted.
ATCFAULT	Switch closes when the ATC is subjected to excessive up or down forces.
DRAWBAR	Switch closes when the drawbar cylinder is pressurized.
OIL LEVEL	Switch closes when the oil level is low for waylube and spindle lube reservoir.
HIGH IDLER	Switch closes when the idler wheel is retracted. (Low range engaged).
LOW IDLER	Switch closes when the idler wheel is retracted. (High range engaged).
PROBE	Switch is open when probe switch is engaged.
SLIDE HOLD	Switch is open when doors are closed (external slide hold).
X	Exit the switch display screen.



Function #1 on page 2: Keyboard test

This will test the keyboard by echoing the key to the screen. Pressing the JOG key allows the hand wheel to be tested.

Function #2 on page 2: START CNC. Do not use this command.

Function #3 on page 2: 1010-4 axis controller diagnostics intended for a Fadal tech only.

Function #4 on page 2: START MOS. Used by Fadal service tech only.

Function #5 on page 2: ZERO MEMORY. This writes zeros to segments 6, 8, 9, A, B, C, D, E.

Function #1 on page 3: VIDEO TEST. This test has two functions.

- 1) A testing of the video ram, which you will see as a quick flicker on the screen. If a failure is found, then there is a possible failure in your 1420 card, or the 1030 card.
- 2) A visual test. The screen should show a repeating pattern of characters. If the pattern is not repeating then there is a possible failure on the 1420 or the 1030 card.

Function#2 of page 3: 1010 axis controller test

This tests all the axes and if a slot is not populated then the No Response counter will be incremented. If an axis slot is populated and either the No Response or Failure counter has been incremented then you have a possible 1420 video card has failed or the 1030 card or even the processor. The expected and received checksum the spindle card is F0 and 80 respectively.

Function #3 of page 3: Testing the clocks

All three of the VMC clocks will be tested with this function. Interrupt 6 counts from -200 to 0 and then interrupts, interrupt 2 interrupts after approximately .1 seconds, and interrupt 3 interrupts after approximately .3 seconds. Therefore as interrupt 1 counts to 0 interrupt 3 should count to 6 (Note that the counting doesn't have to be perfect but should be in the general area). A message should appear if an interrupt is not counting properly. A message should appear if an interrupt is not counting properly. A failure could indicate a problem with the clock card or communication problem with the computer interface (1030) or CPU.

Function #4 of page 3: Test Mill Interface Card

The pass counter will be incremented with successful pass. Otherwise, a failure message will appear, which possibly indicates a 1040 or 1030 or 1400 CPU card.

Function #5 of page 3: Program memory checksum

This test calculates a 4 byte checksum of all the current programs in memory. This checksum is used to verify that the memory has not been changed during a power on/off test or during a long period of time with the power off.



Function #1 of page 4: Fill memory with a pattern. (Intended for a Fadal Tech only)

Function #2 of page 4: Check Memory for Pattern. (Intended for a Fadal Tech only)

Function #3 of page 4: Enable remote diagnostics. (Intended for a Fadal Tech only)

Function #4 or page 4: Echo RS232 port data.

The CNC's back serial port will act just like a test plug. It will echo back any data that it receives on the port.

Function #5 on page 4: Destructive RAM test. (Intended for a Fadal Tech only)

Function #1 of page 5: Count INT1, INT2, INT6. (Intended for a Fadal Tech only)

Function #2 of page 5: Full DAC with INT6 count of ed4h. (Intended for a Fadal Tech only)

Function #3 of page 5: Quarter DAC with INT6 count of ed4h. (Intended for a Fadal Tech only)

Function #4 of page 5: Test encoders. This will test the encoders on AC machines.

Function #5 of page 5: Test ADC. (Intended for a Fadal Tech only)