ANILAM

4200T
CNC Motion Setup/Testing Utility

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Introduction

This section describes how to use the ANILAM Motion Setup/Testing (MST) Utility. The MST provides commands that carry out motion-specific setup and testing in order to tune the servo system and the Proportional, Integral, and Derivative (PID) filter parameters of a CNC.

A basic knowledge of machine operation and programming is required. Refer to the *4200T CNC Programming and Operations Manual*, P/N 70000412, for details on how to program and operate the control.

Setup includes the following procedures:

- Servo Amplifier Balancing
- Servo Amplifier Signal Gain Setting (motor step response is displayed in open loop)

Instructions are provided for amplifier balancing and signal gain setting when using the ANILAM AC Brushless Digital Servo Amplifiers and motors. The servo amplifiers provided by ANILAM are completely digital; parameter settings are done by communicating to the amplifier using the Servo Amplifier Communications Cable, P/N 33001389, between the amplifier's **J1** connector and the CNC's RS-232 port. The digital amplifier eliminates the need for adjusting trim pots and provides overall better performance. Make sure cable is connected when doing any amplifier adjustments; disconnect cable when done. If using amplifiers not provided by ANILAM, follow the manufacturer's guidelines for balancing, signal gain setting, and overall adjustments.

The CNC provides the following troubleshooting tools:

- Detection of Index Pulse
- Detection of counts between index pulses (actual resolution)
- Tuning for the optimal PID values

The following General Status information is displayed:

- Display of active CNC status codes
- Display of machine position, feedrates, RPM, dwell, and override

Accessing the MST Utility

Access the Motion Setup/Testing Utility (MST) from the Software Options Screen. This screen activates automatically once the CNC has started successfully.

To activate the MST Utility:

1. Start the CNC.
2. Press (**F10**) to continue, as prompted. The Software Options screen is displayed.
3. Highlight **Motion Setup/Testing**, and press **ENTER**. The MST screen activates.

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Activating the MST Screen

The axis positions displayed in **Figure 1** correspond to the current position. The Graphic Area displays step responses for the Signal Gain and Tuning functions. Refer to **Figure 1** and **Table 1**.

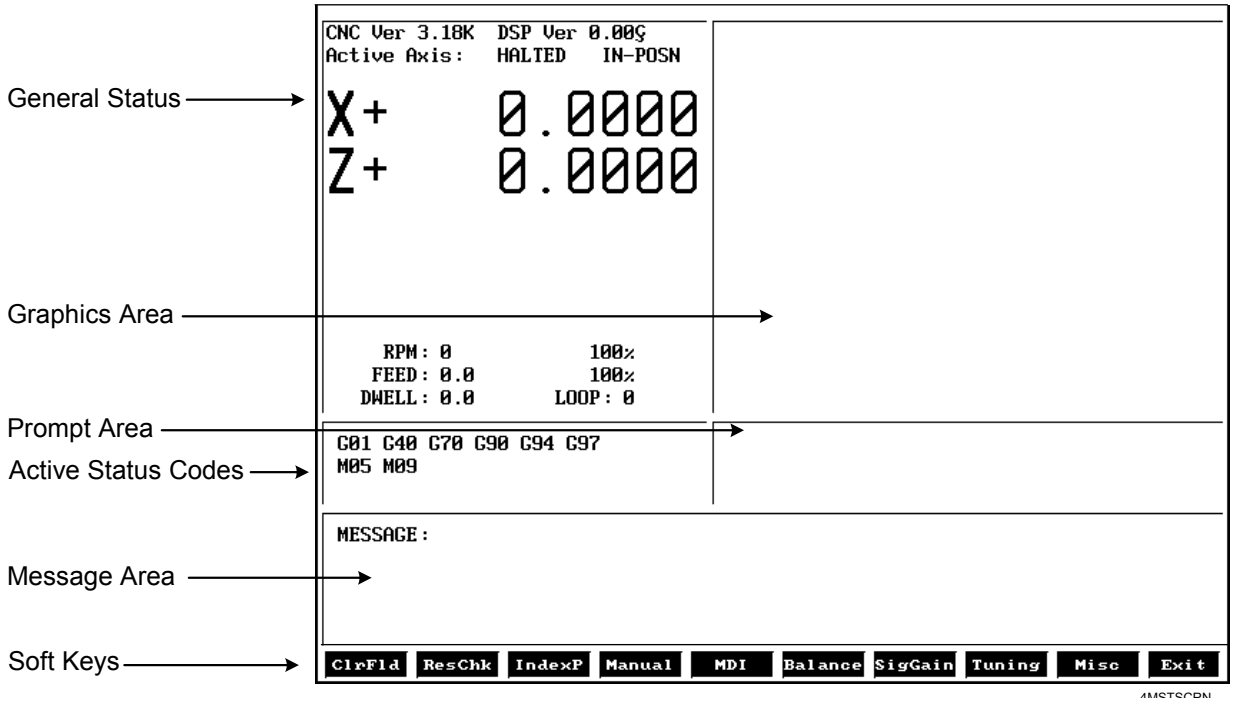

Figure 1, CNC Motion Setup/Testing Screen

Table 1, MST Screen Areas

MST Screen Area	Description
General Status	Shows Active Modes, Machine Position for each axis, RPM, Dwell, Spindle Speed and Feedrate, Active Axis, and other information regarding the status of the CNC.
Graphic Area	Displays step responses for the Signal Gain and Tuning functions.
Prompt Area	Displays messages regarding information that must be entered.
Active Status Codes	Active G-codes.
Message Area	Displays error messages.
Soft Keys	Function keys (**F1**–**F10**) located below the LCD on the console used to activate the functions, as labeled.

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MST Soft Keys

NOTE: Select an active axis before you select an MST command (**F1**–**F10**).

NOTE: MST soft keys are displayed while the MST screen is active.

Access MST utility features using the labeled soft keys located below the screen on the console. Press the corresponding soft key (**F1**–**F10**) to activate the function.

Refer to **Table 2** for soft key names and functions.

Table 2, MST Soft Key Functions

Soft Key	Name	Function
F1	**ClrFld**	Clears prompt field in SigGain and Tuning tests.
F2	**ResChk**	Calculates the resolution of the active axis. Troubleshooting tool.
F3	**IndexP**	Detects Index Pulse and displays an indicator over the Active Axis line of the MST screen. Troubleshooting tool.
F4	**Manual**	Cancels active MDI or test command.
F5	**MDI**	Activates an MDI prompt.
F6	**Balance**	Sends out the signal needed to Balance the outputs of the system (0.0 VDC). Used to balance the Motion Control Board and the Servo Amplifiers.
F7	**SigGain**	Allows you to set the servo amplifier signal gain for the active axis.
F8	**Tuning**	Activates the Tuning Pop-Up menu, which allows the CNC to determine optimum PID filter values from the specified parameters and save the results.
F9	**Misc**	Miscellaneous tests displays a pop-up menu with options for CanBus Test. For AC motors only additional options display on the pop-up menu: Amplifier Test Link, Reset Amplifier, Backup Amp Settings, and Restore from Backup. These tests can only be activated with the Servo Amplifier Test Board installed. See "Servo Amplifier Test Board."
F10	**Exit**	Returns the CNC to the Software Options screen.
(SHIFT+F4)	**Home**	Performs a Homing Sequence on all axes configured for homing.

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Clearing a Prompt Field or Message (F1)

Press **ClrFld** (**F1**) to clear an erroneous entry. This soft key is available during the Signal Gain and Tuning tests.

Selecting an Axis

NOTE:	Select an active axis before you select an MST command (**F1**–**F10**). If you do not select an axis, the CNC displays an **Error** message that prompts you to select an axis.

Use the following keypad keys to select and activate the corresponding axes:

X	Activates/Deactivates X-axis
Z	Activates/Deactivates Z-axis
S or C	Activates/Deactivates Spindle Axis

The CNC displays the active axis in the upper-left corner of the General Status area of the MST Screen.

Entering a Password

When you enter the MST Utility and press **Balance** (**F6**), **SigGain** (**F7**), or **Tuning** (**F8**), the CNC prompts for the password. Type the appropriate password and press **ENTER**. Refer to *4200T CNC Setup Utility Manual*, P/N 70000414, "Section 1, Password Restricted Parameters."

The soft key activates. If you have entered the password successfully, the CNC will not prompt for the password again, unless you exit and re-enter the MST Utility.

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Checking Axis Resolution (F2)

Refer to **Figure 2**. Press **ResChk (F2)** to calculate the actual resolution for the active axis. In the Graphic Area of the screen, the actual resolution and the resolution in the Setup are displayed for comparison. In addition the screen displays:

- The number of times the system tested for resolution (Total Cycles:)
- The number of times the encoder lines detected do not match the number of encoder lines in the setup (Errors:). An error indicates that something is wrong, either in the setup parameters or in the hardware.
- The actual number of encoder lines found by the test (Encoder Lines:)
- The resolution and counts per revolution found. (Encoder Resolution:)

NOTE: Resolution should be four times the number of encoder lines.

Once this test is activated, you must move the axis for at least two encoder revolutions via MDI Mode, Jog Mode, or manual move. The CNC performs the calculation continuously until motion stops.

NOTE: This test is not available for axes with linear encoders.

NOTE: Do not perform this test during Rapid Mode. Use it in Feed Mode only.

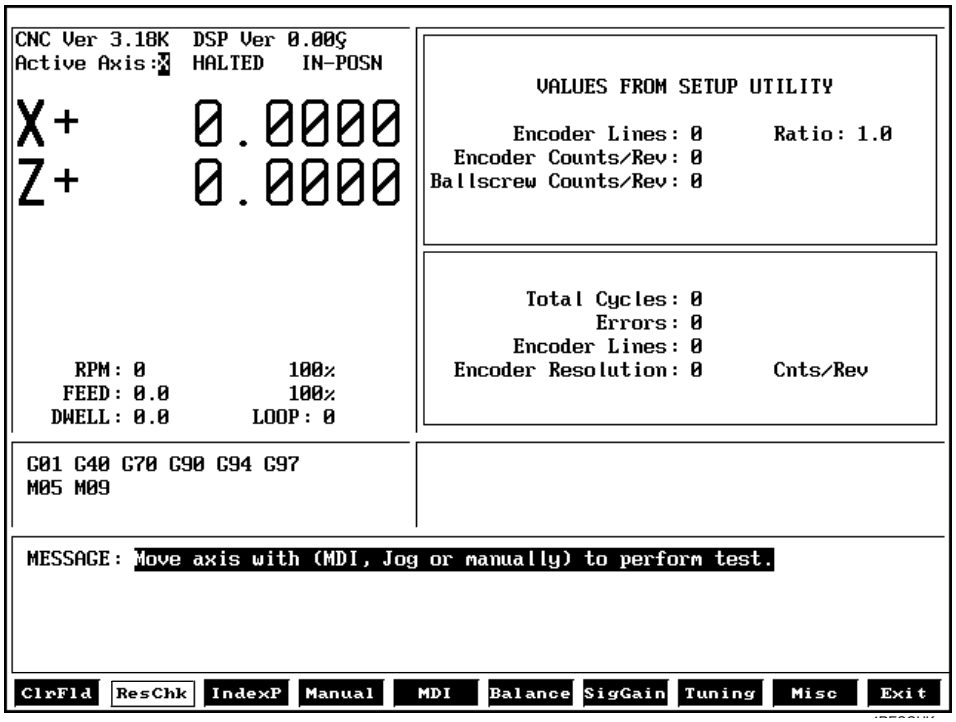

Figure 2, CNC Resolution Check (ResCheck) Screen

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Detecting the Index Pulse (F3)

Refer to Figure 1, CNC Motion Setup/Testing Screen. When you press **IndexP** (**F3**), the CNC displays a flashing "**I**" each time it detects an Index Pulse. The flashing "I" replaces the axis name (X, Z, or S) of the active axis. The index pulse indicator (flashing "**I**") for the spindle axis is displayed on the RPM field. The figure shows the axis display when the CNC has detected an index pulse in the (active) X-axis. Refer to **Figure 3**.

To detect an index pulse:

1. Move the active axis to check for the presence of an index pulse.
2. On systems with rotary encoders with index pulses, the index pulse should be detected once per revolution.
3. On systems having linear scales, the index pulse should be detected where the linear scale specifies location of the index pulse.

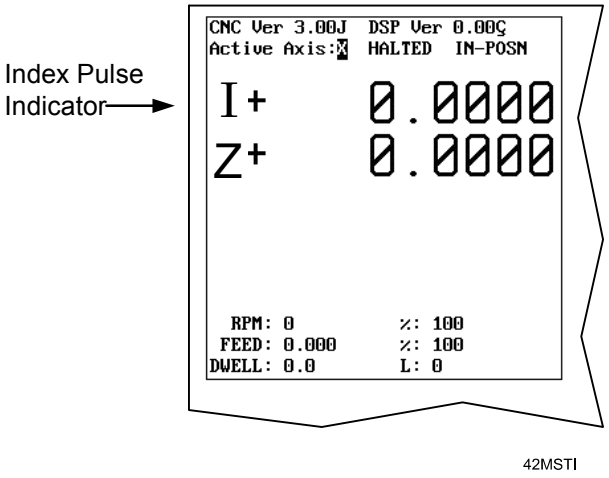

Figure 3, Index Pulse Indicator

Canceling the Active MDI or Test Command

Press **Manual** (**F4**) to cancel an active MDI or test command.

Activating Manual Data Input Mode (MDI)

Press **MDI** (**F5**) to activate the MDI prompt. (Refer to the *4200T CNC Programming and Operations Manual*, P/N 70000412, for information on MDI programming.)

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Balancing Motion Control Axes

To balance the outputs properly, all connections between the CNC and the servo amplifiers must be complete.

Perform all adjustments on one axis at a time. Make the adjustments in the following order:

1. Select an axis
2. Balance the Motion Control Board outputs
3. Balance the Servo Amplifier outputs
4. Set Servo Amplifier gain
5. Repeat for all axes

Servo Amplifier Test Board

Each CNC that uses ANILAM AC motors and amplifiers, P/N 33001279, includes a Servo Amplifier Test Board, P/N 33001399. During machine operation, the board provides convenient access to critical signals for alignment and troubleshooting. Refer to **Figure 4**.

NOTE: The test board works only with amplifiers supplied by ANILAM.

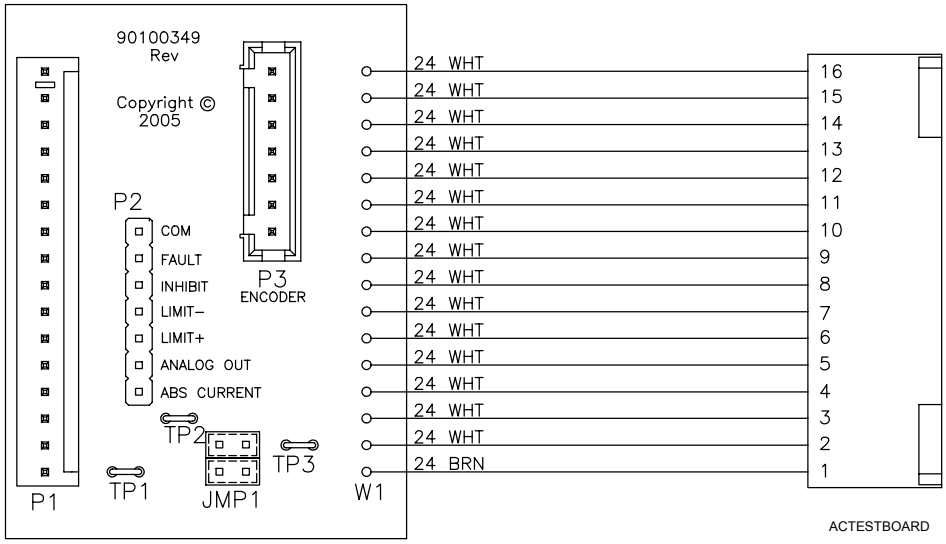

Figure 4, ANILAM Servo Amplifier Test Board, P/N 33001399

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Test Board Installation

IMPORTANT: Press **E-STOP** to de-energize servos before installing the test board.

1. Remove the cable attached to **J2** of the Servo Amplifier you wish to monitor and connect it to **P1** of the test board.
1. Attach **W1** of the test board to **J2** of the servo.
2. Re-energize the servos.

Test Points

Refer to **Table 3** for a description of test points and signals.

Table 3, Servo Amplifier Test Board: Test Points and Jumpers

Test Point	Pin	Signal
TP1	**1**	Command Signal
TP2	**3**	Common for all servo signals and potentiometers. All readings are referenced to **TP2**.
P2-1	**4**	Motor Current output monitor. The scale factor is 1V = 7.5A.
P2-2	**5**	Analog Out
P2-3	**6**	+Limit In
P2-4	**7**	–Limit In
P2-5	**8**	Clamp input from the SCB. When pulled to chassis ground, the servo's output is forced to 0 VDC.
P2-6	**9**	Fault output. When the servo card is faulted, the output is pulled low.
P2-7	**3**	Common
JMP1	**1**	Signal. If **JMP1** is removed, the Command signal will open at Pin 1 of **J1**.
JMP2	**3**	Common. If removed, **JMP2** will open the common line at Pin 3 of **J1**.

Jumpers

While troubleshooting, you can remove jumpers to isolate the Servo Amplifier from the DAC outputs of the Motion Control Board during troubleshooting. If Pin 2 of **JMP1** and **JMP2** are shorted together, the Servo Amplifier's input is fixed at 0 VDC; this can be useful in troubleshooting balance problems.

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Balancing the DSP^2 Board (F6)

On systems that use an ANILAM Servo Amplifier Board (see Figure 6, Digital Brushless AC Servo Amplifier, P/N 33001279), measurements for this procedure can be made at the **J2** input connector with the Servo Amplifier Test Board, (see Figure 4, ANILAM Servo Amplifier Test Board, P/N 33001399).

NOTE: If ANILAM did not provide the servo amplifiers, follow the guidelines for balancing supplied by the manufacturer.

Refer to Figure 5, ANILAM DSP2 Board Balance Pots, P/N 33001102. Measure command voltages across **TP1** and **TP2** of the test board.

NOTE: These signals can also be found on Pin #1 and Pin #3 of the **J2** input connector on the ANILAM Servo Amplifier Board.

All DSP^2 Boards are adjusted at the factory and should be within limits. Only balance the DSP^2 Board if it is not at 0 VDC (±0.001 V).

NOTE: On 4200T systems, the DSP^2 Board is located inside the CNC console. Open the CNC chassis by loosening the thumbscrews and opening the cover. **Balance the DSP^2 Board with the servos off, initially**. Next, verify the DSP^2 Board balance with the servos on, and correct for voltage offset as required.

1. Press **Balance** (**F6**) to output a zero voltage signal to the axis.
2. Press **START**.
3. Refer to Figure 5, ANILAM DSP2 Board Balance Pots, P/N 33001102. Make adjustments for axis outputs 0–3 on the DSP^2 Board at potentiometers R108-R111 respectively.
4. Adjust the potentiometer for the selected axis until the voltage across the pins is 0 VDC (± 0.001 V).
5. Press **MANUAL** (**F4**) to cancel the test.

Table 4, Axis Output Port Assignments

Port	Axis
0	X
1	C/S
2	Z

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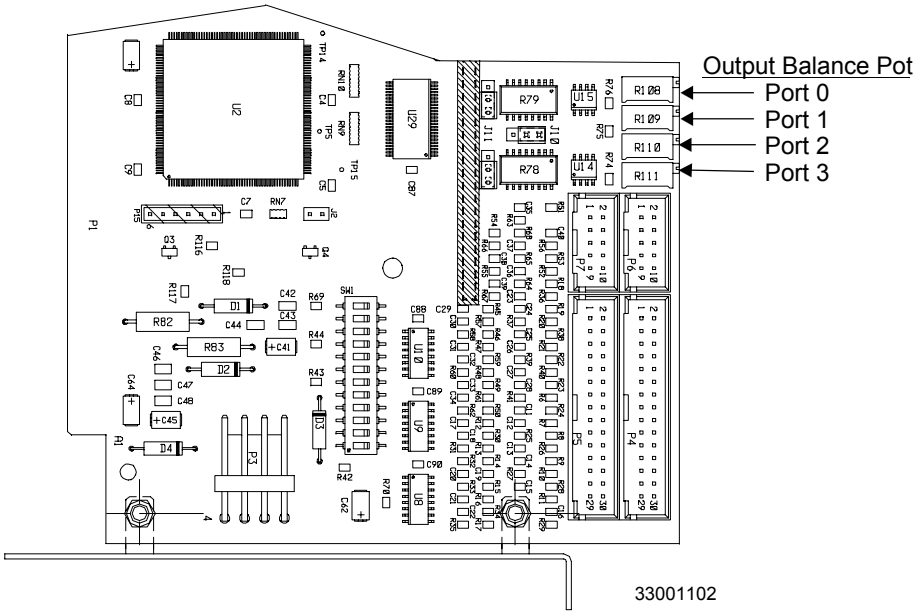

Figure 5, ANILAM DSP^2 Board Balance Pots, P/N 33001102

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ANILAM Amplifier Parameter Files

If using the ANILAM AC Brushless Servo Amplifier (refer to Figure 6, Digital Brushless AC Servo Amplifier, P/N 33001279) make sure that the amplifier's communications cable, P/N 33001389, is connected between the amplifier **J1** and the CNC. All servo amplifier settings are done digitally through the communications cable and the CNC. Parameter settings can be sent from the CNC to the amplifier and vice versa. The parameter settings are saved on the CNC in C:\P4T under the filename **DIGAMP-*.BK** (where * corresponds to the specific axes).

It is recommended that after making any amplifier parameter settings that these settings be saved on the CNC for easy restore, if needed. To save the parameter settings on the CNC:

1. Select the Axes
2. Press **Misc** (**F9**)
3. Select **Backup Amp Settings**

For later restore of the saved parameter settings from the backup:

1. Select the Axes
2. Press **Misc** (**F9**)
3. Select **Restore from Backup**

Balancing Servo Amplifier Outputs (F6)

Refer to "Servo Amplifier Test Board."

Use the following procedures for:

- Setup parameter verification
- Motion setup and testing (MST)

Setup Parameter Verification

Refer to Figure 6, Digital Brushless AC Servo Amplifier, P/N 33001279.

1. At the Software Options menu, select **Setup Utility**.
2. Select **Builder Setup**.
3. Select **General Axis**.
4. Select **Digital Amplifier Settings**.

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NOTE: Step 5 values are valid only when you are using ANILAM AC Brushless Digital Servo Amplifiers. If using amplifiers not provided by ANILAM, follow the manufacturer's guidelines for balancing, signal gain setting, and overall adjustments.

5. Verify the following Digital Amplifier Settings menu values as follows and change as required:
   - Balance adjustment (mV): 0.5
   - Signal Gain adjustment (%): 0.10
   - Compensation adjustment (%): 0.02
6. Select **Active digital amplifiers**, to display the Active Digital Amplifiers menu. Press **ENTER** to toggle to Enable when using ANILAM AC amplifiers. Toggle to Disable when using any other amplifier.

IMPORTANT: For ANILAM AC Brushless Digital Servo Amplifiers, set **Active digital amplifiers** to ENABLE. If using amplifiers not provided by ANILAM, set to DISABLED.

7. Press **Exit** (**F10**) to exit the Digital Amplifier Setting menu and display the General Axis Setup Menu.
8. Select **Invert DAC Output**, and press **ENTER** to toggle to **Yes**, if necessary.
9. Press **Exit** (**F10**) until you return to the Software Options startup screen.

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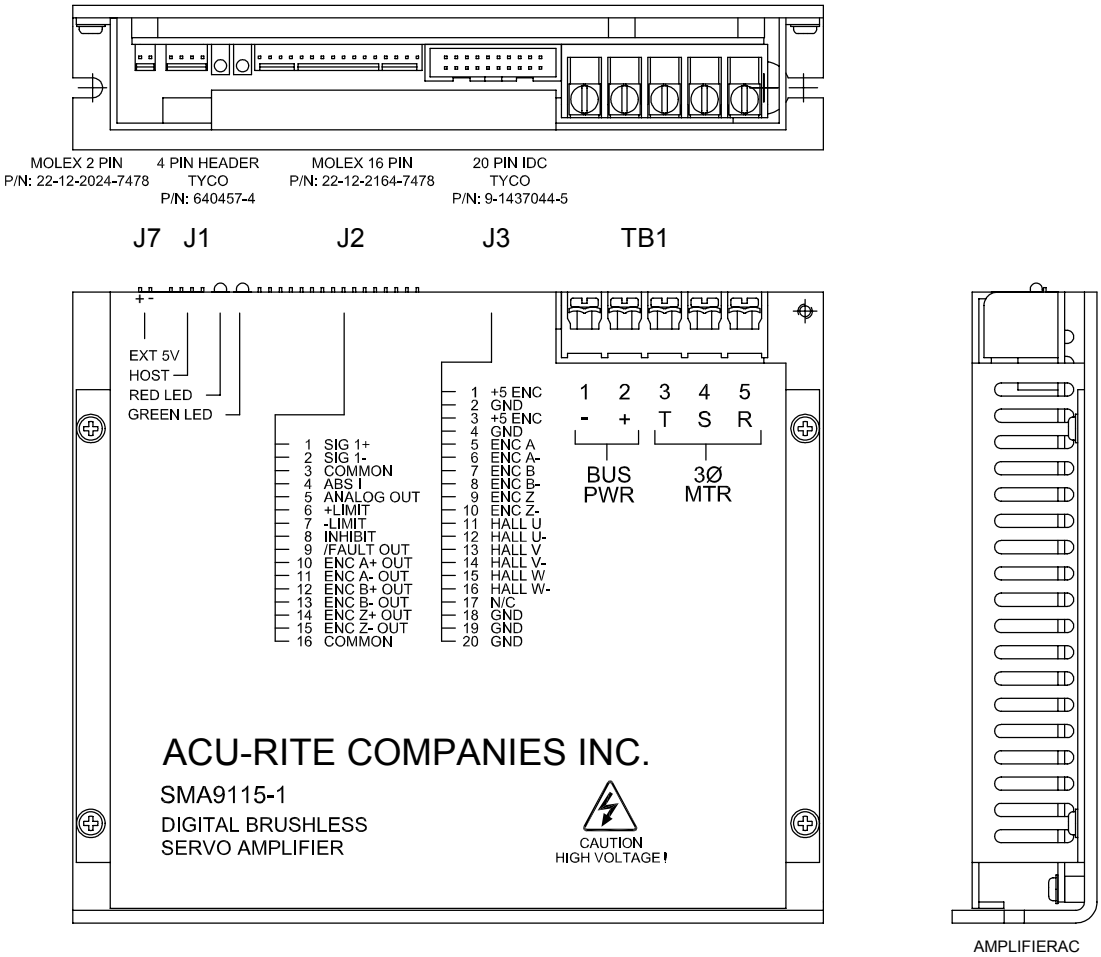

Figure 6, Digital Brushless AC Servo Amplifier, P/N 33001279

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Motion Setup and Testing (MST)

1. At the Software Options menu, select **Motion Setup/Testing**.
2. Press and release the **E-STOP** button.
3. Press the **SERVO RESET** to energize the system.
4. Select an axis to be tested by pressing the corresponding key on the keypad (**X**, **Z**, or **S**).
5. Press **Balance** (**F6**) to perform the balance test on the selected amplifier (axis) and display the balance test screen. Refer to **Figure 7**.

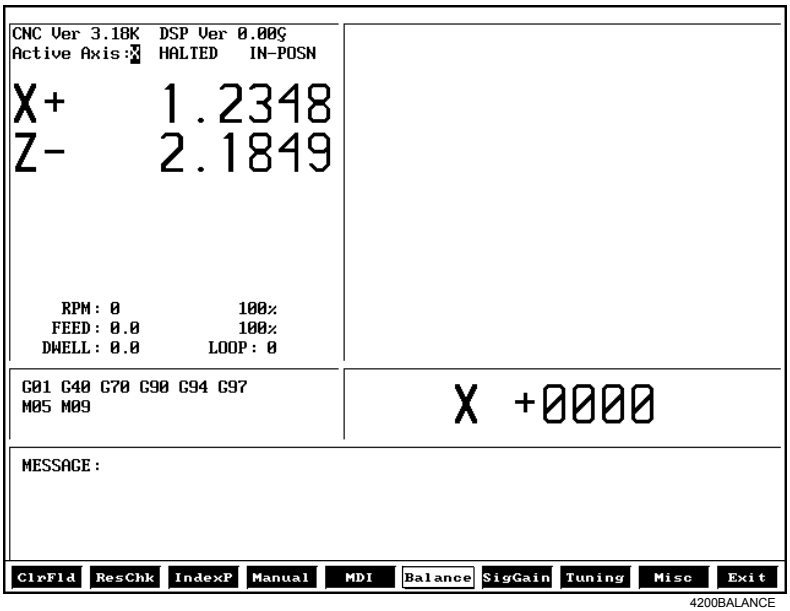

Figure 7, Balance Test Screen

6. Use the keypad up and down **ARROW** keys to change the axis offset until the selected axis reads: +0000. Use the left and right **ARROW** keys to change the Offset value.
7. To cancel the balance test, press **MANUAL** (**F4**); otherwise, press **SigGain** (**F7**) to perform the signal gain test for the selected amplifier.

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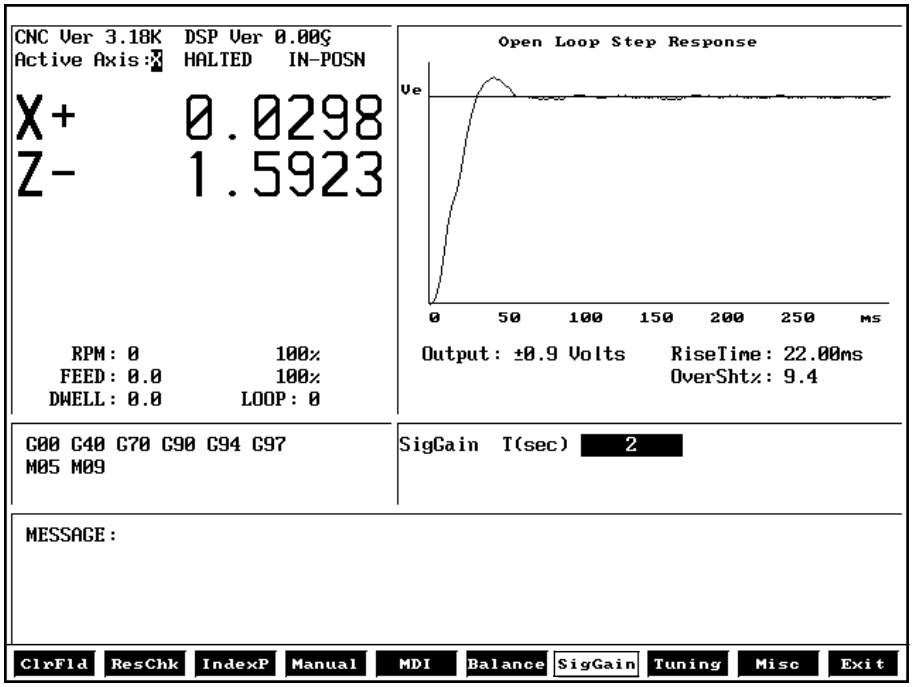
8. Select **2** for the time (i.e., 2 seconds). Refer to **Figure 8**. The following screen will be displayed:



4200SIGGAIN

Figure 8, Signal Gain Test Screen

IMPORTANT: Steps 9–13 apply only to ANILAM brushless AC amplifiers. For other amplifiers, refer to the manufactures guidelines to set the signal gain in the amplifier.

9. Use the keypad up and down **ARROW** keys to change the signal gain until **FEED:** reads: 20.0 or 10% of Rapid.

10. To cancel the signal gain test, press **MANUAL** (**F4**); otherwise, press **Misc** (**F9**) to display the Miscellaneous Menu.

11. Select **Save Amp Settings** to save the amplifier settings to the amplifier.

12. Press **Misc** (**F9**) to display the Miscellaneous Menu

13. Select **BackUp Amp Settings** to backup the amplifier settings to a file on the CNC. The backup filename is DIGAMP-*.BK where '*' is the selected axis name (i.e., X, Z). This file is stored on the hard disk drive.

14. Repeat steps in "Setup Parameter Verification" and "Motion Setup and Testing (MST)" for each amplifier axis.

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Amplifier Faults

ANILAM amplifiers do not require any scheduled maintenance, although it is a good idea to occasionally check for dust build up or other contamination.

If an amplifier should cease to operate or one or more of the fault Light Emitting Diodes (LEDs) are lit, refer to **Table 5**.

NOTE: A fault can on be caused by abnormal conditions. Locate and correct the cause of the fault before repeated recycling of power to the amplifier to prevent possible damage.

Table 5, Amplifier – LED Indicators

Red	Green	Condition
Off	Off	No power
Off	On	Enabled
On	Off	Fault
On	On	Inhibit

Tuning (F8)

NOTE: ANILAM recommends that you set signal gain and balance the servo amplifier, as discussed in previous text, before tuning.

CAUTION: Most machines will operate correctly with the default filter parameters. Only qualified technicians who have knowledge of motion control tuning parameters should use this tool.

The Tuning function can determine optimum values within constraints you specify. The default values are usually correct for most machines. To fine-tune, enter values manually or use this test. Refer to Figure 10, Tuning Parameters Test Results Screen.

The Tuning Test has a setup screen that enables you to configure the extent of the test. Check the setup parameters, run the test, and then save the results. Refer to **Figure 9** and Table 6, Tuning Test Parameters.

Tuning Setup

1. Tune Ki ..... No
2. Tune Kd ..... No
3. Tune All Axis ..... No
4. Match Axis Lag ... No

Figure 9, Tuning Setup Menu

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Table 6, Tuning Test Parameters

Parameter	Function
Tune Ki	Switches integral tuning ON or OFF. [Default: **No**]
Tune Kd	Switches derivative tuning ON or OFF. [Default: **No**]
Tune All Axis	If set, tunes all axes sequentially. [Default: **No**]
Match Axis Lag	If set, calculates the inch/min/mil (Imm) of each axis, chooses the smallest one and matches the inch/min/mil of the other axes to the smallest by decreasing Kp. **Tune All Axis** must be set to use this option. [Default: **No**]

If you have selected Kd (derivative gain), the CNC begins by measuring derivative sampling time (Ds). It measures the time between 10% and 90% of the final velocity (rise time) and divides it by five. A portion of this time is determined to be the Ds.

WARNING: If you select the Kd test, you must have at least 2.5" (63 mm) of travel in the positive (+) direction.

Next, the CNC calculates Kp (proportional gain). If the current overshoot is smaller than the set one, Kp is increased by 1. If it is larger, Kp is decreased by 0.1.

If you have selected Ki (integral gain), the CNC then calculates Ki and Il (integral limit). If the lag between the commanded position and the actual position is not zero, Il is increased by 5 and this portion of the test is repeated.

The CNC calculates Kd, if selected. The CNC will attempt to decrease the overshoot until the set value (Kd overshoot) is matched. When this condition is not matched, Kd is increased by 2.

If you have chosen to test only one axis, the test is completed at this point. If you have chosen to test multiple axes, and have not selected "Lag Matching" the test will repeat the procedure on each axis in turn, until complete.

If you have chosen all axes and Lag Matching, the CNC calculates the inch/min/mil (Imm) of each axis being tested and matches the inch/min/mil to the lowest value of all axes tuned.

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To test:

1. Energize the servos and select an axis.
2. Press **Tuning** (**F8**). A pop-up is displayed with the following choices: **Tuning Test**, **Save Results**, and **Tuning Setup**.
3. Refer to Table 6, Tuning Test Parameters. Check the Tuning Setup menu to determine which parameter(s) you wish to change. Select **Tuning Test**, and press **ENTER**. Choose the parameter(s) you wish to include in the test.
4. Refer to **Table 7**. Enter values for the following tuning parameters:

NOTE: Kp overshoot must be greater than Kd overshoot.

Table 7, Tuning Functions Values

Parameter	Function
Kp Overshoot %	Determines amount of overshoot the CNC will seek before ending the Kp cycle. 1% to 5% is a normal overshoot range for this test. If detected overshoot exceeds the entered OvSht%, the cycle ends. [Default: **5**]
Kd Overshoot %	Sets limit for Kd overshoot. [Default: **2**]
Kp min	Sets Kp to starting value during proportional tuning. [Default: **1**]

5. Press **START**. The CNC begins the test.
6. Refer to Figure 10, Tuning Parameters Test Results Screen. After the test, the CNC plots the final step responses for all axes tested, and displays them in the graphics area of the screen.
7. To save results of the test, press **Tuning** (**F8**) and select **Save Results**.
8. Press **MANUAL** (**F4**) to exit or cancel the test.

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Saving Final Values

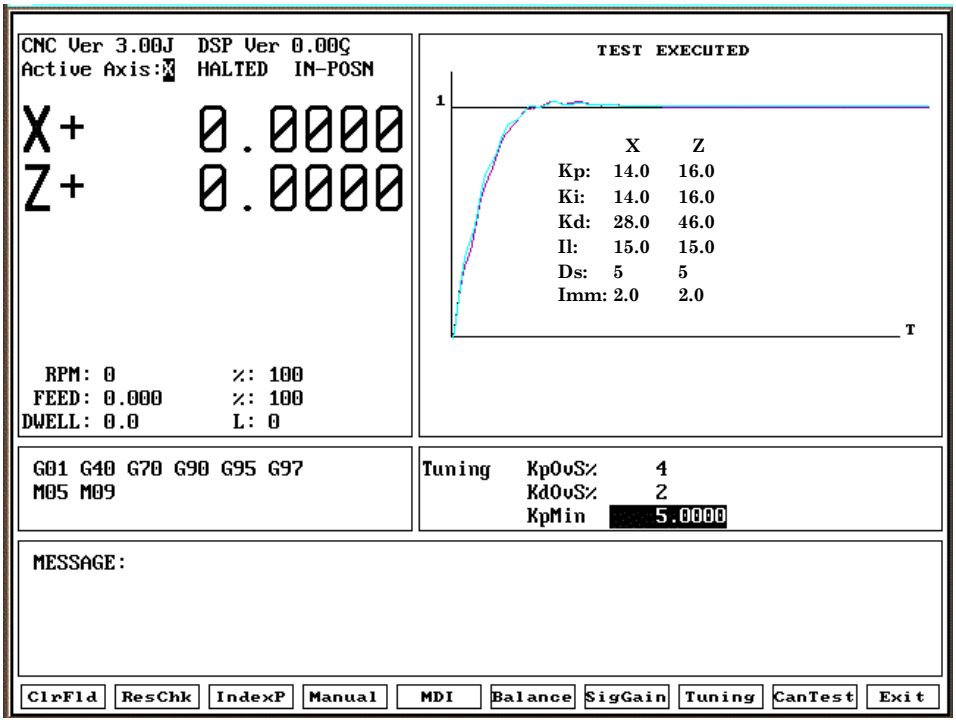

Figure 10, Tuning Parameters Test Results Screen

To save the Tuning Test values:

1. Refer to **Figure 10**. After the Tuning Test, the results are displayed in the Graphics Area of the screen. Press **TUNING** (**F8**) and highlight **Save Results**.
2. A pop-up is displayed with the following options: **[No Motion]**, **[Feed]**, **[Rapid]**, **[ALL Tables]**. Highlight the table to which you wish to save the final values, and press **ENTER**. This overrides the values in the Setup Utility. Normally, choose **All Tables**.
3. The CNC stores the new values in the configuration file.
4. Or, press **Cancel** (**F9**).

NOTE: ANILAM recommends that you back up your configuration file before you save tuning results. This allows you to recover the filter parameters if necessary. Refer to *4200T CNC Setup Utility Manual*, P/N 70000414, for details on backing up and restoring setup parameters.

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Miscellaneous Tests (F9)

Press **Misc** (**F9**) to display a pop-up menu with eight (8) selections. The tests marked ** on the right apply only for systems equipped with an ANILAM AC Amplifier (P/N 33001279). These tests can only be activated with the Servo Amplifier Test Board installed. See "Servo Amplifier Test Board." The pop-up does not display the ** notation.

- CanBus Test
- Save Amp Settings**
- Amplifier Test Link**
- Reset Amplifier**
- BackUp Amp Settings**
- Restore from BackUp**

CanTest

Refer to **Figure 11**. Press **Misc** (**F9**) to display the Miscellaneous Test pop-up window. Select **CanBus Test** to display the graphic area and to troubleshoot the status of all inputs and outputs for the nodes.

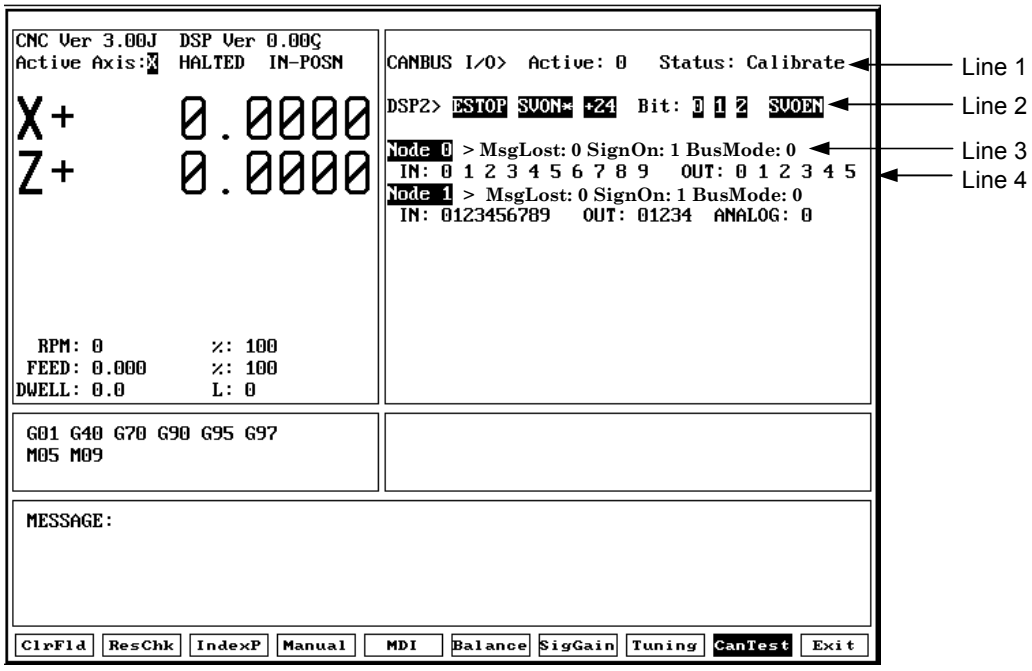

Figure 11, CanBus Test Screen

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Table 8 lists the CanBus test results displays.

Table 8, CanBus Test Results Displays

Display	CanBus Status
Normal	Normal operation.
Calibrate	Node found and CNC is calibrating.
Warning	CNC lost a node and is actively searching for active nodes.
Bus off	Fatal error. The bus has turned itself off due to errors.

1. Line 1 of the graphic area indicates the number of active CanBus I/O nodes and their status.
2. Line 2 of the graphic area indicates the basic machine I/O status.
3. Line 3 of the graphic area indicates:
   - The address of the active node. Possible values are 0 to 5.
   - The number of message packets lost between the node and the controller. This should be 0.
   - The number of times the node has signed on since the control started. This should be 1 unless power was interrupted.
   - The node bus type. This is normally 0.
4. Line 4 indicates:
   - The status of the ten inputs of each node.
   - The status of the six outputs of each node.
   - The three-digit decimal value of the digital/analog converter output for nodes configured as digital/analog.
5. Subsequent lines indicate the I/O status of any additional nodes.

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Save Amp Settings

This feature is only for systems equipped with an ANILAM AC Amplifier (P/N 33001279) and with the Servo Amplifier Communications Cable, P/N 33001389, connected. Refer to "Motion Setup and Testing (MST)."

Saves all modified amplifier parameters to non-volatile memory. This must be done after performing a signal gain test and/or a balance test.

Balance Test – When Balance test [**Balance** (**F6**)] is selected and if the Communication link between the CNC and ANILAM AC Drive is enabled/open, the Parameter IAO (Analog 1 Input Offset) will be displayed and you will be able to modify it by using the up/down **arrow** keys. Use right/left **arrow** to change the increment amount (which is set on Setup Utility). Save the final value by selecting **Save Amp Settings** [**MISC** (**F9**)].

Signal Gain Test – When Signal Gain test [**SigGain** (**F7**)] is selected and if the Communication link between the CNC and ANILAM AC Drive is enabled/open, the Parameter IAS (100% PWM RPM Value) will be displayed and you will be able to modify it using the up/down **arrow** keys. Also, the Compensation (equivalent to Comp Pot) parameter GVC (Velocity Loop Master Gain) will also be displayed; you will be able to modify it by using right/left **arrow** keys. Every time you press the **arrow** keys, the value will be incremented by the amount entered in the Setup Utility. Save the final value(s) by selecting **Save Amp Settings** [**MISC** (**F9**)].

These two tests should cover the equivalent of Signal, Balance & Comp Pots on the analog drives.

Amplifier Test Link

This feature is only for systems equipped with an ANILAM AC Amplifier (P/N 33001279) and with the Servo Amplifier Communications Cable, P/N 33001389, connected.

This enables/disables the communications monitor. The communications monitor has two modes of operation: Monitor and Command. Using an external keyboard, use hot key (**CTRL** + **F7**) to switch between the two modes.

Monitor: (Default) During this mode, you can monitor all communication between the Amplifier and the Control.

Command: During this mode, it not only monitors all communications; but also, allows you to send direct commands to the Amplifier.

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Reset Amplifier

This feature is only for systems equipped with an ANILAM AC Amplifier (P/N 33001279) and with the Servo Amplifier Communications Cable, P/N 33001389, connected.

This resets the AC Amplifier.

BackUp Amp Settings

This feature is only for systems equipped with an ANILAM AC Amplifier (P/N 33001279) and with the Servo Amplifier Communications Cable, P/N 33001389, connected. Refer to "Restore from Backup."

To backup amplifier parameters:

1. Select an axis (i.e., X, Z).
2. Press **Misc** (**F9**) to display the pop-up menu.
3. Highlight **BackUp Amp Settings** and press **ENTER**. A message is displayed indicating the amplifier backup file is created.

This reads all parameters from the amplifier and creates a backup file named DIGAMP-*.BK, where '*' is the selected axis name (i.e., X, Z). This file is stored on the hard disk drive.

NOTE: The backup file is compatible with the file generated by MotionMaestro. When functions pertaining to ANILAM AC Drive are selected, the user needs to have a RS-232 communication cable connected between the amplifier and the CNC.

Restore from BackUp

This feature is only for systems equipped with an ANILAM AC Amplifier (P/N 33001279) and with the Servo Amplifier Communications Cable, P/N 33001389, connected.

To restore amplifier parameters from backup:

1. Select an axis (i.e., X, Z).
2. Press **Misc** (**F9**) to display the pop-up menu.
3. Highlight **Restore from BackUp** and press **ENTER**. A message is displayed indicating the amplifier backup file is restored created.

This sends the parameters in the backup file to the amplifier.

Exiting the MST Screen (F10)

Press **Exit** (**F10**) to exit the MST Screen and return to the Software Options screen in the Setup Utility.

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Setting Up and Tuning the C Axis

IMPORTANT: You must set up and tune the X-axis and Z-axis together before you set up and tune the C axis.

To set up and tune the C axis, repeat the procedures for setting up and tuning the X-axis and Z-axis in the previous sections. Substitute **C axis** whenever the procedures require you to select an axis.

Use **M19** to enable C-axis programming and M05 to disable C-axis programming. After you enable the C-axis, you can use the **C** key on the keypad to activate or deactivate the C axis. For additional information on C-axis programming, refer to the *4200T CNC Programming and Operations Manual*, P/N 70000412.

Figure 12 displays the test results screen for the C-axis tuning parameters.

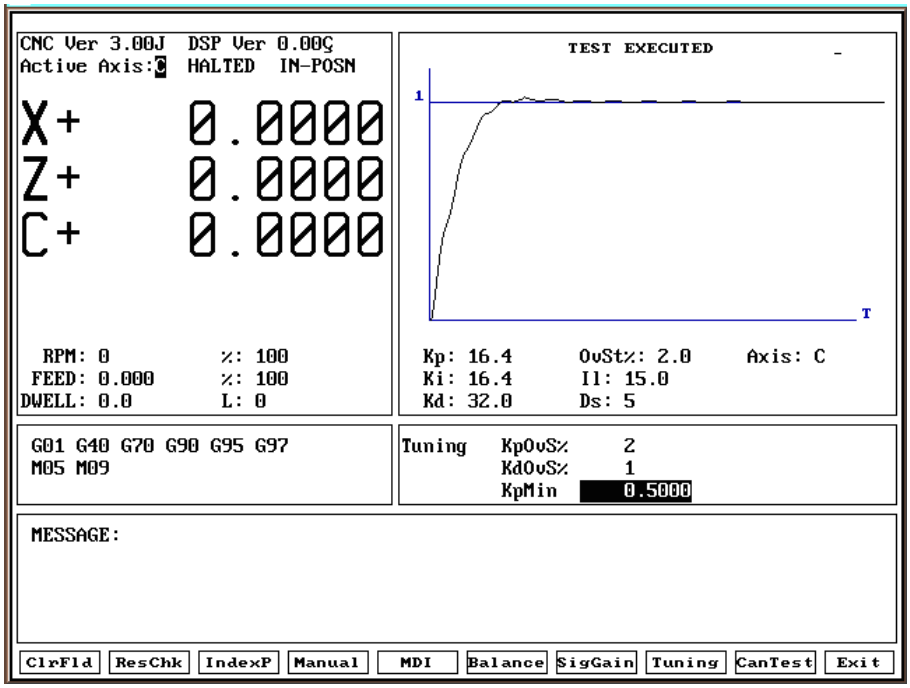

Figure 12, Tuning Parameters Test Results Screen for C Axis

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