Yokogawa Instruction Manual

Technical
Information

DYNASERV
Direct Drive Motor <DYNASERV>
Intelligent Drive <DrvGIII>
G3 TUNING INFORMATION   TI 71M01D03-01E

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Safety Issue:

Check servo motor first by turning the motor a resolution manually to confirm there is no object obstructing the motion.

Make sure there is no human present nearby the servo motor when tuning is ongoing.

Hit emergency switch immediately when notice there is something going wrong.

Ignoring the above warning will cause serious injuries.

Section 1

How To Load A Preset Program Into DrvX3st

1. Start up DrvX3st by clicking on the icon.

Figure 1: DrvX3st icon

2. Check the connection from industrial computer's comm. port to servo motor driver's comm. port. Refer technician if assistance needed.

3. The window below will appear. Click on the "Connect" button.
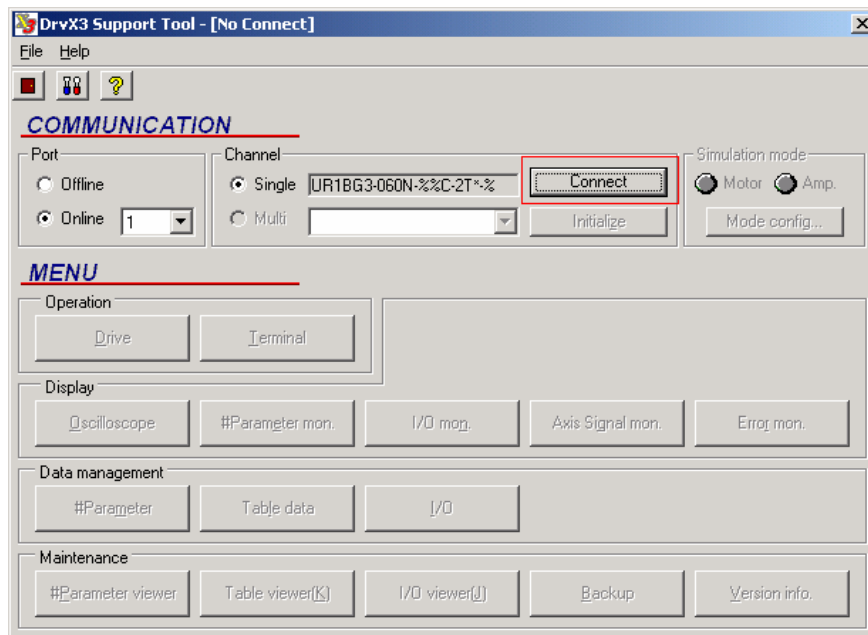

Figure 2: Offline screen

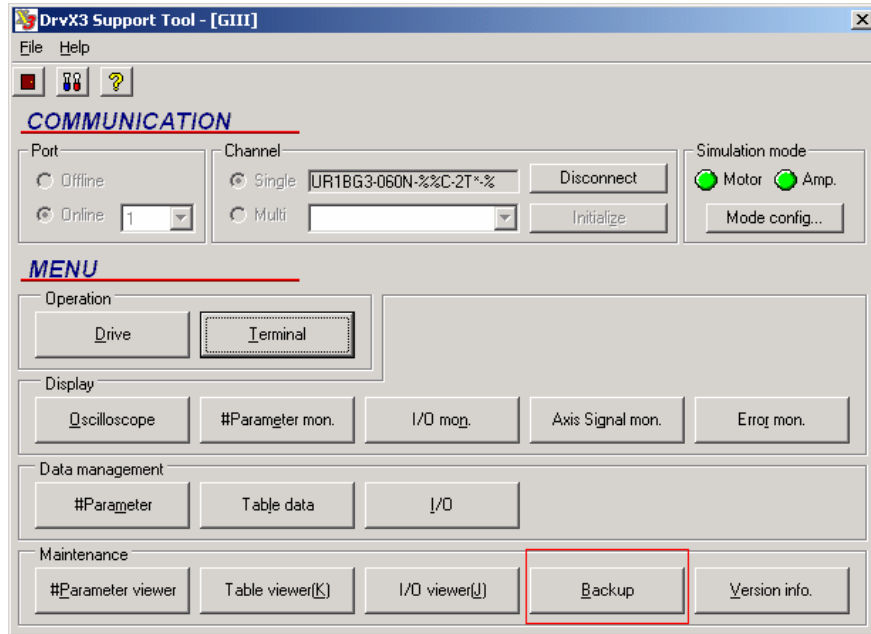4. Than click on "Backup" button to load a preset program into the driver.

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Figure 3: Connected screen

5. A popup will appear and click on "Open" than choose the specific file to be restored into the driver.
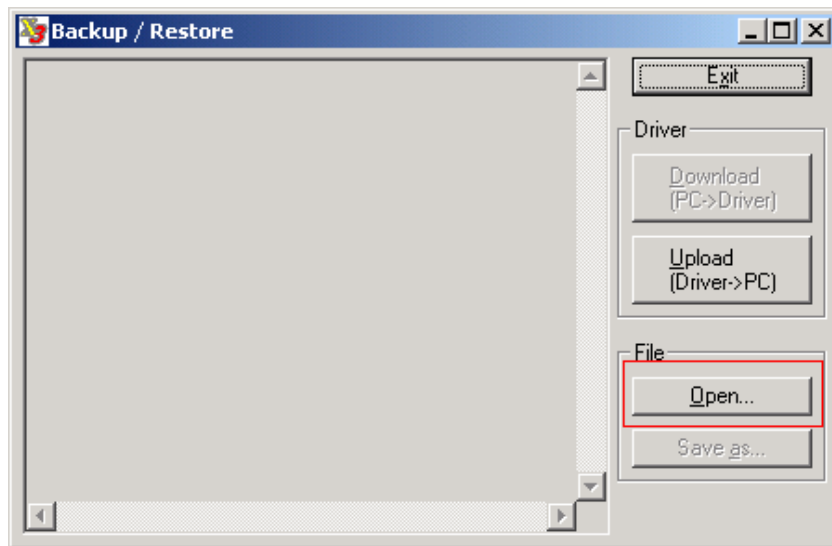

Figure 4: Backup screen

6. Example below will restore a program for G3 servo motor. Make sure the file extension is .wha and than click on "Open" to load it.
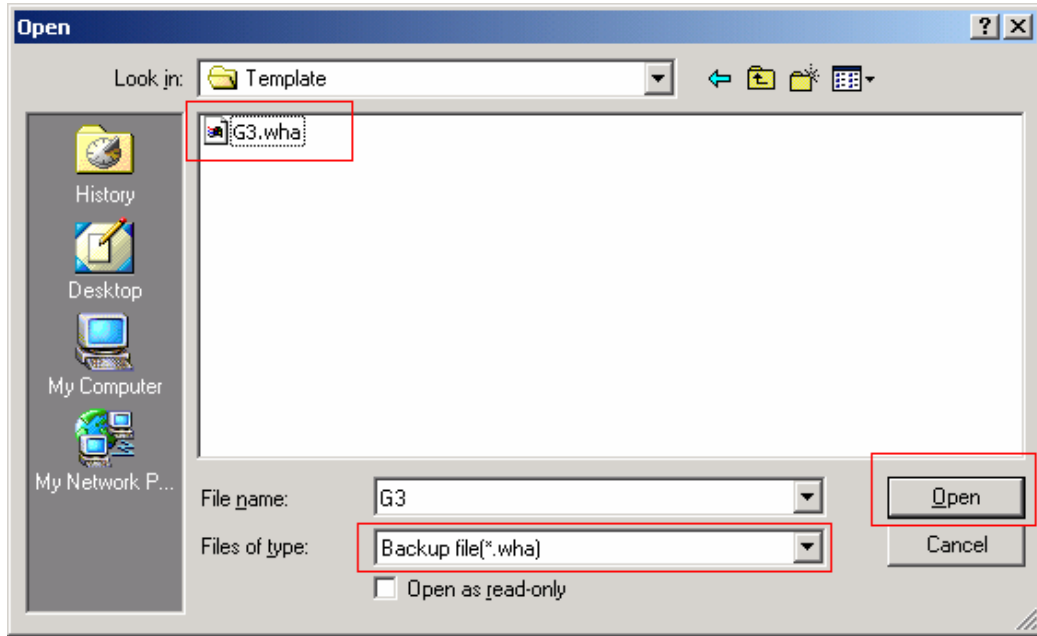
Figure 5: Open screen

7. Detail of the setting will be presented and click on "Download (PC->Driver)" button and the servo motor are ready to be tested.
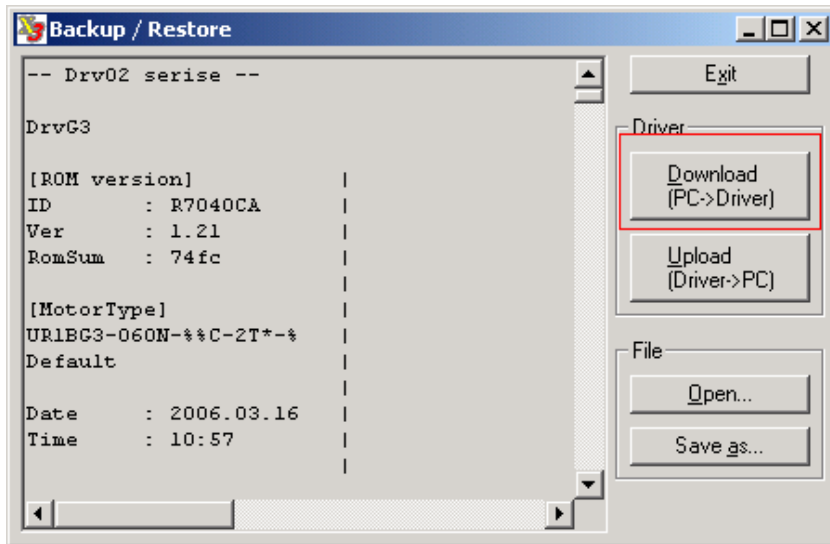

Figure 6: Download screen

8. To test, open terminal screen and key in the code "@5:0" than enter to set the controller to serial comm. than key in "@3:1" for homing purpose follow by "@3:2" for single index. Continue doing single index for a few times to see if there is any offset of the turret. If yes, proceed to section 2.
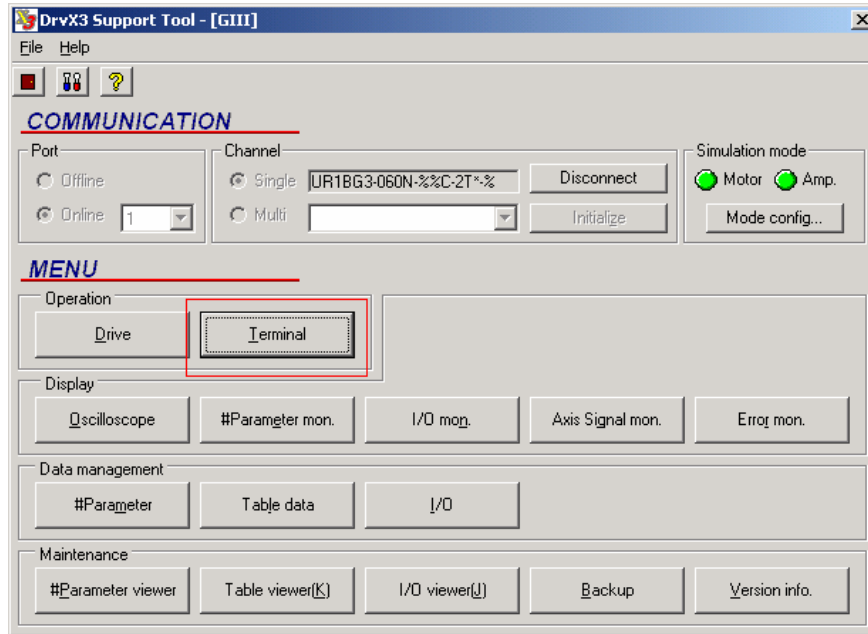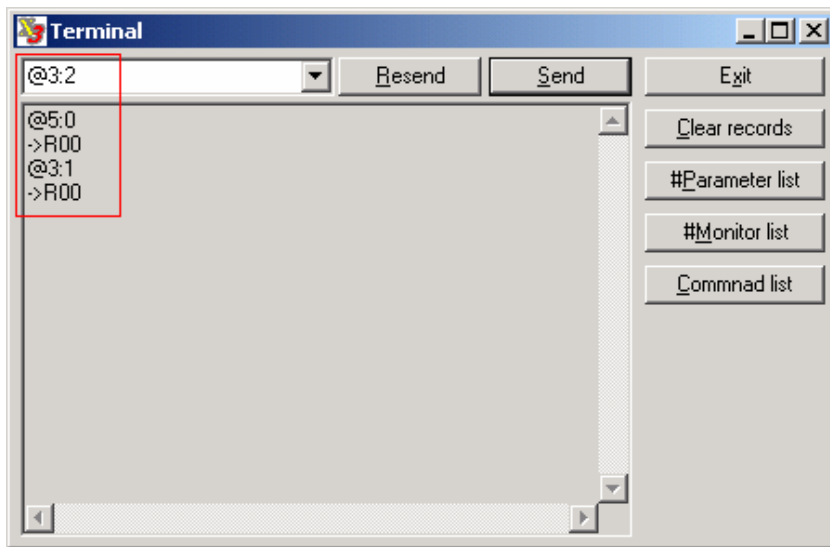
Figure 7: Main screen

Figure 8: Terminal window

Section 2

How To Tune G3 Servo Motor Using DrvX3st

1. Assuming the servo motor is brand new or the loaded program needs more tuning, user must make sure DrvX3st is already in the connected status. Than open "Parameter" as shown.
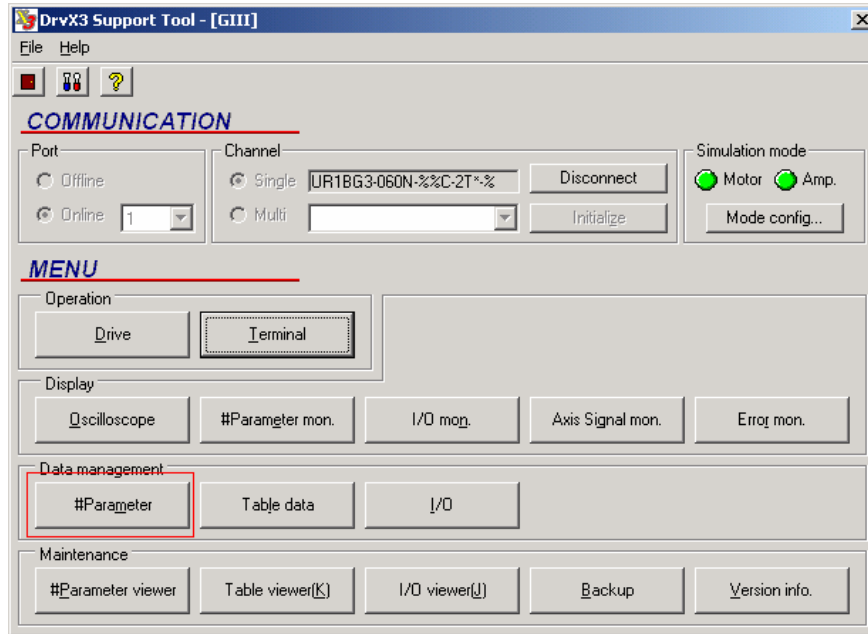
Figure 9: Main screen

2. User need set the servo stiffness to "8" as shown below than click "Regist". Soon after that click on "Register parameter".
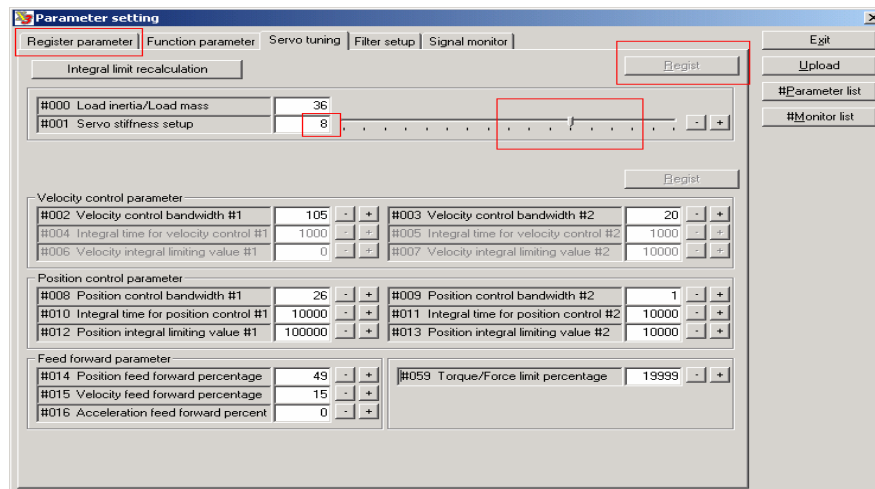

Figure 10: Parameter setting

3. Direct to "System setup register 1" and follow the value as show below. After changing the value click on "Regist" and exit.
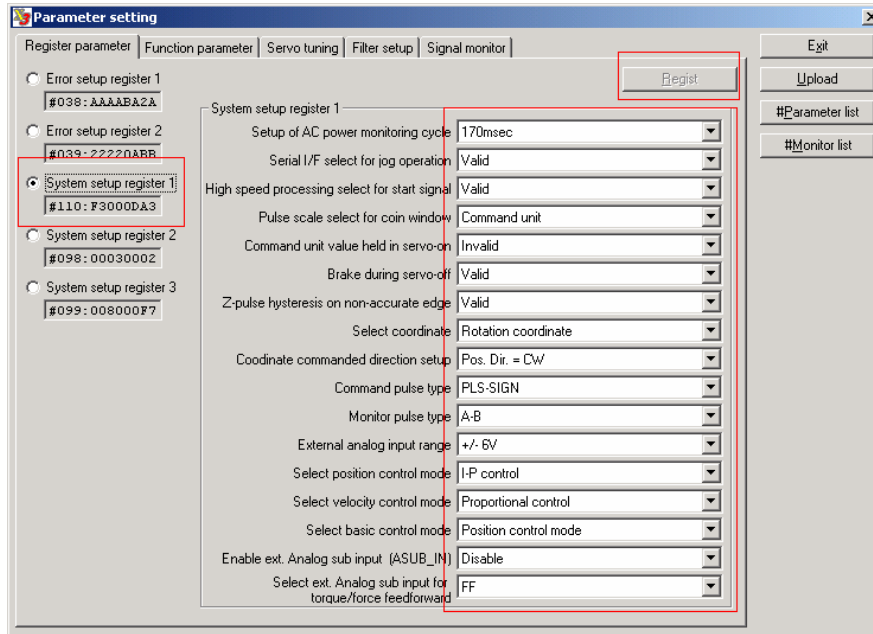
Figure 11: Parameter values

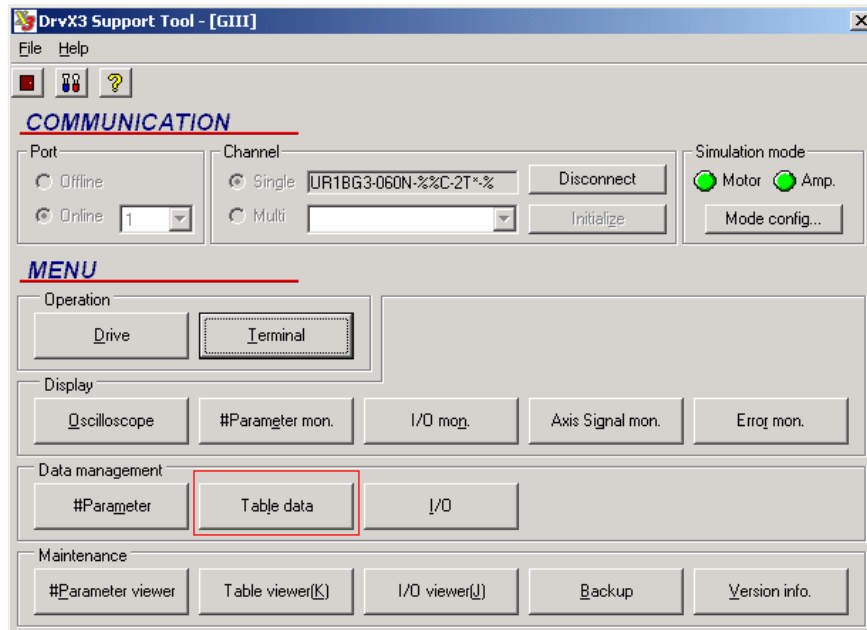4. In main menu click on "Table data".

Figure 12: Main screen

5. Enter three of the values as below by clicking twice on each parameter to edit it. The others are change to the value as shown.

Figure 13: Table setup

6. This is how user can change the value. By clicking twice on a parameter, a popup will appear and there is where user can change the value. Below is the value specified for "Homing operation". After altering the values, user must click "Regist".

Figure 14: Homing operation

7. Same goes for "INC positioning" setup. Below are the values of it.
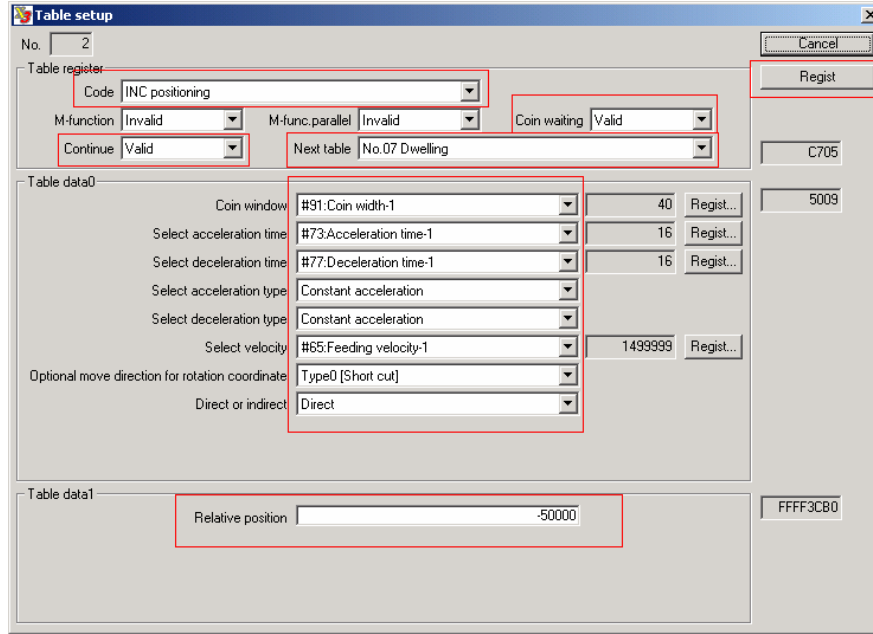
Figure 15: INC positioning

8. Again same for "Dwelling" number "007". Below are the values of it.
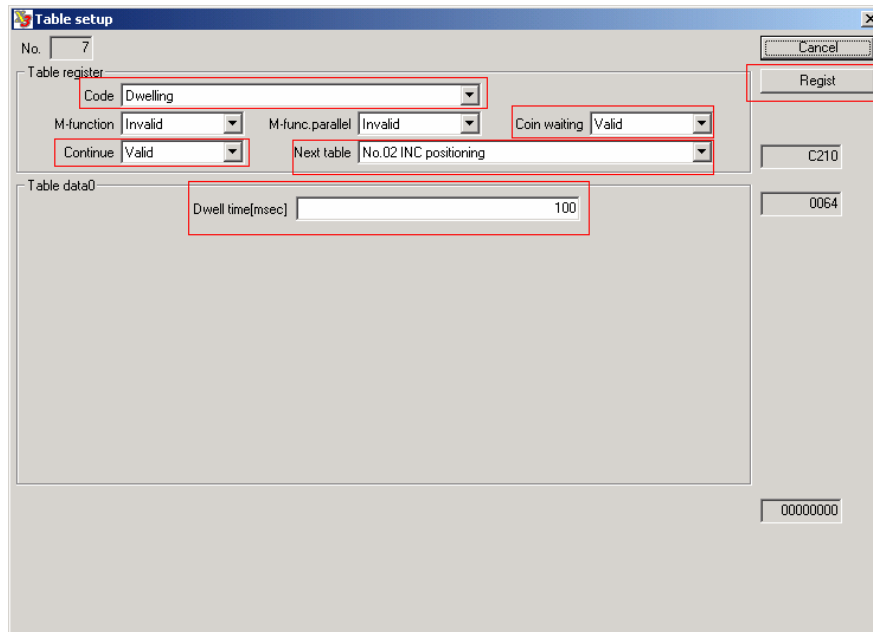
Figure 16: Dwelling screen

9. User than need to exit to the main screen and click on "I/O".

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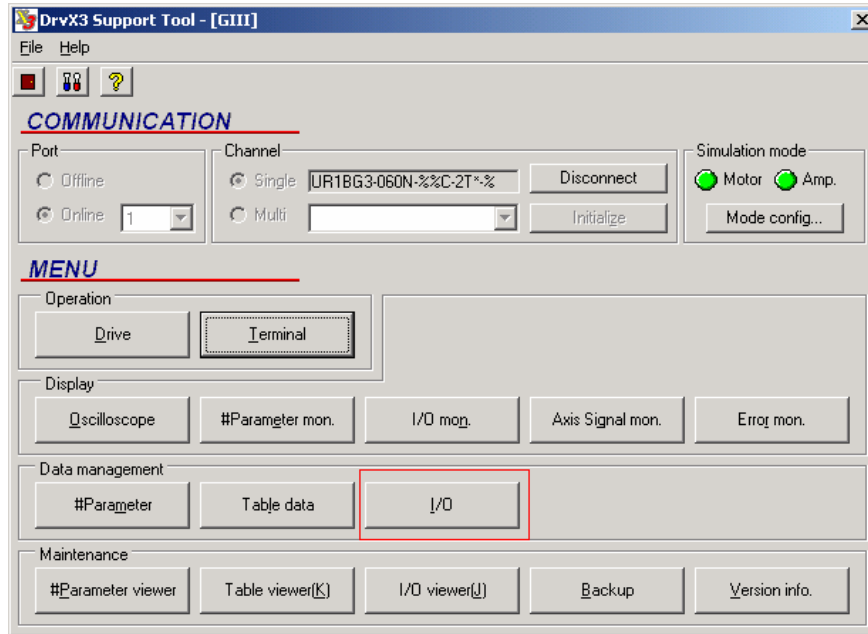
Figure 17: Main screen

10. Below is the popup of I/O window. Values as shown need to be set.
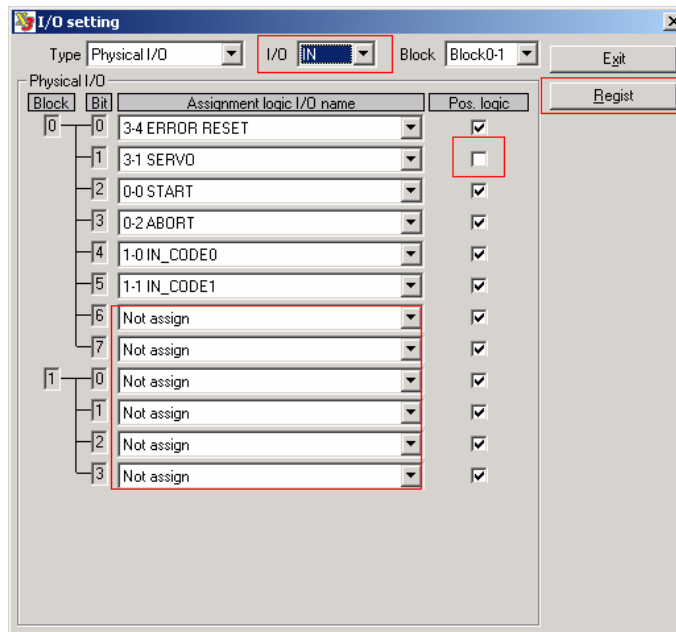
Figure 18: I/O setting

11. Than user will need to set "I/O" to "Out" and again follow the values as shown than exit to main menu.

Figure 19: I/O setting

12. User now need to enter "Terminal"

Figure 20: Main screen

13. At the terminal window, key in "@5.0" to set the controller to serial comm.
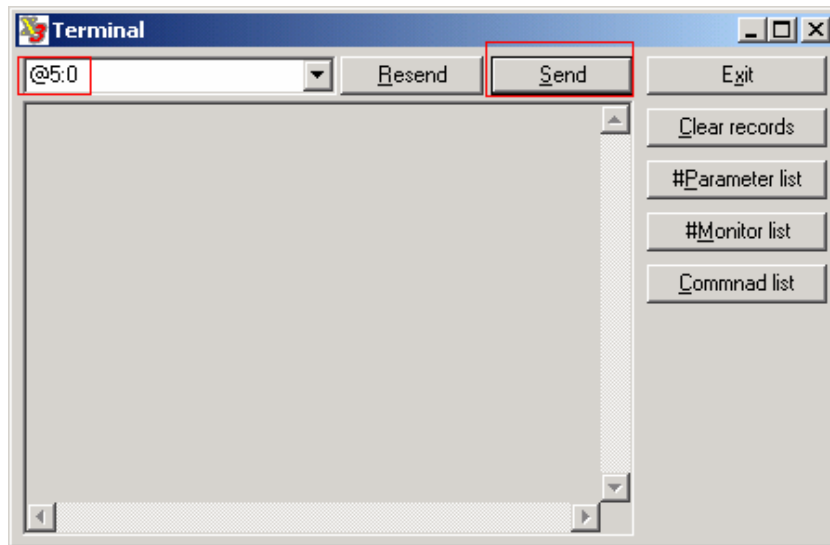
Figure 21: Terminal window

14. Than key in "@3:1" for homing purpose and "##112=1000000" for one resolution setting.

Figure 22: Homing

15. Lastly is to reset driver software with the command "@96"
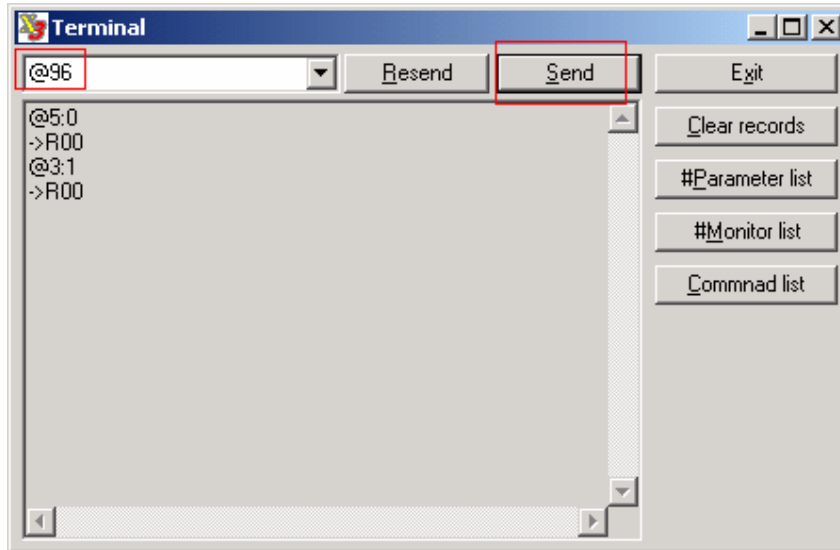
Figure 23: Resetting
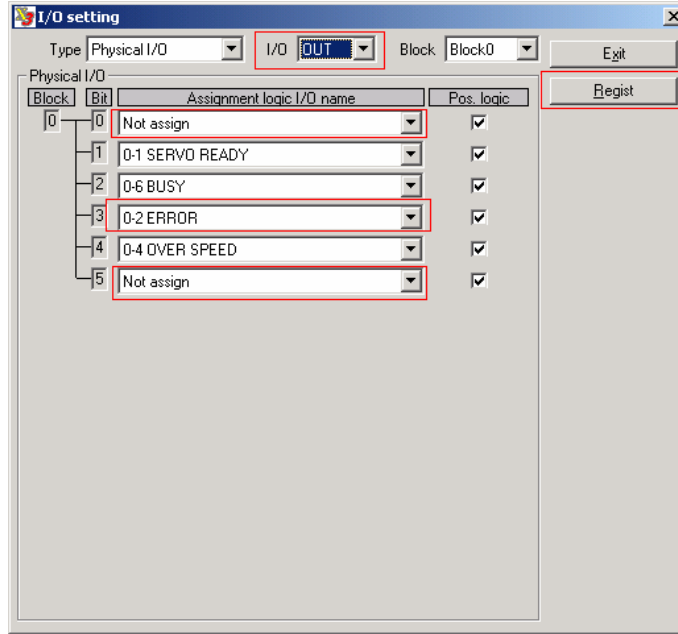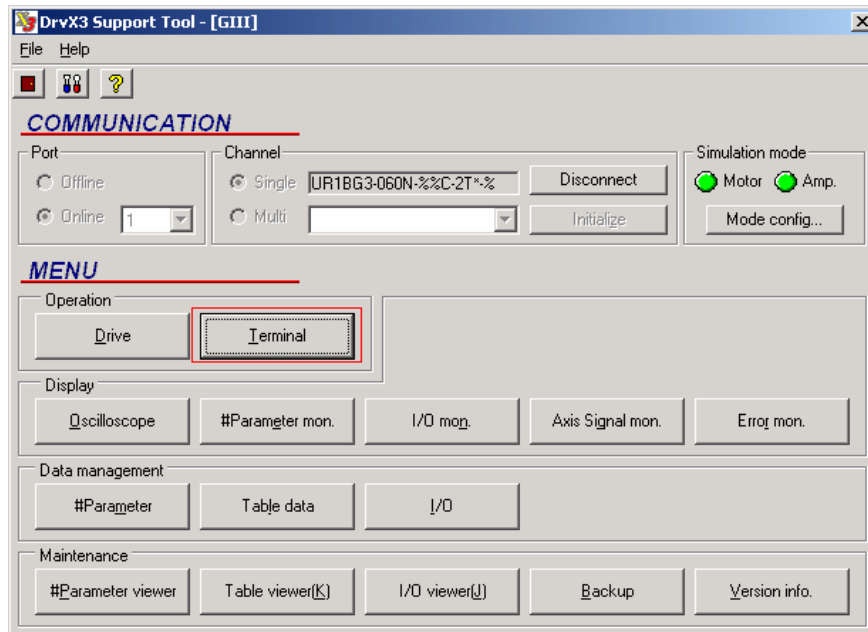
16. Disconnect the servo from driver at the main menu and than reconnect back again.
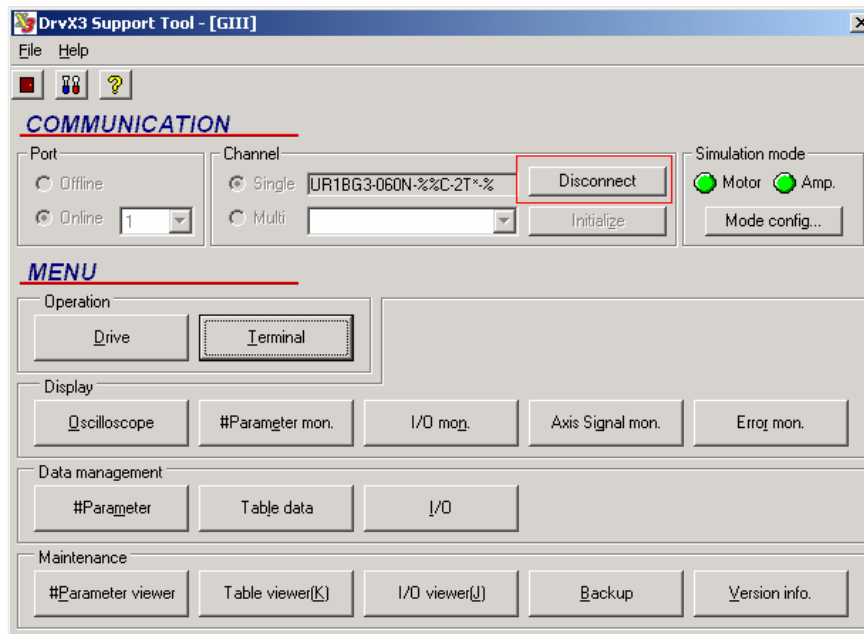
Figure 24: Disconnect and Connect

17. Than go to "Terminal" and key in "@5:0" for serial communication than exit. Now user needs to click on "Drive" for auto tuning setting.
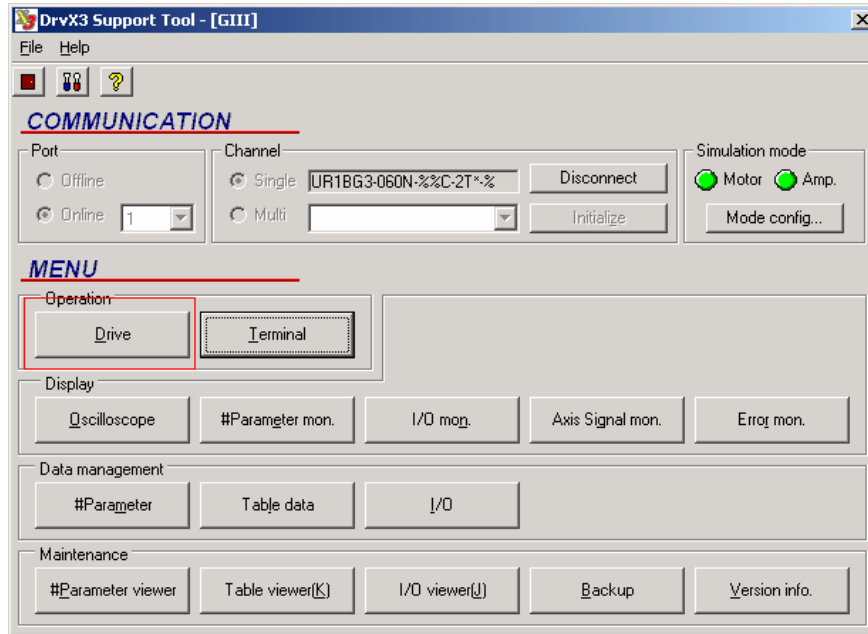
Figure 25: Main screen

18. Popup window will appear and click on "Drive" than "Regist". Exit the window and return to main menu.
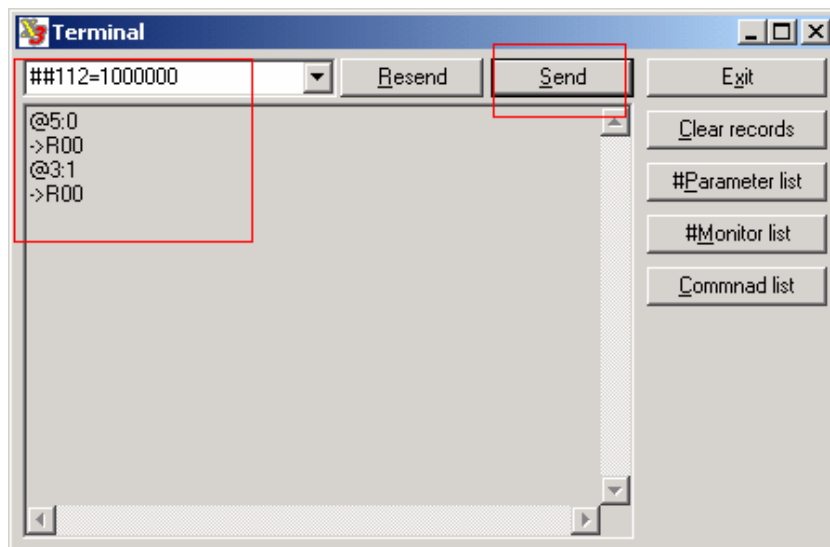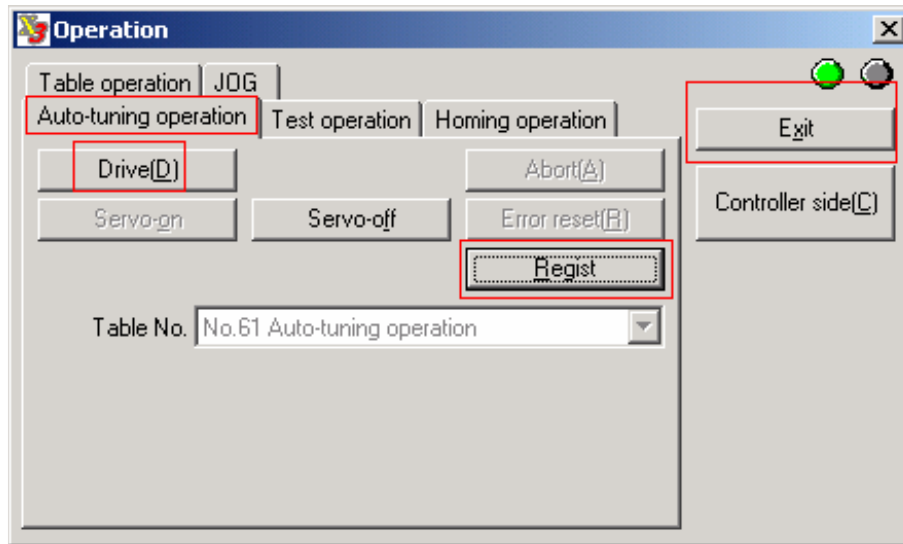

Figure 26: Auto tuning

19. Open "Terminal" again from main menu and key in "@5:0" follow by "@3:1" for homing purpose.

Figure 27: Homing

20. Than start tuning by key in "@3:2" as shown. The servo motor should now run single index continuously.

Figure 28: Start single index

21. Select "Oscilloscope" at main menu to view timing graph.

Figure 29: Main menu

22. Click "Start" to start collecting information. A proper tuned graph should looks about the same as Figure 31.
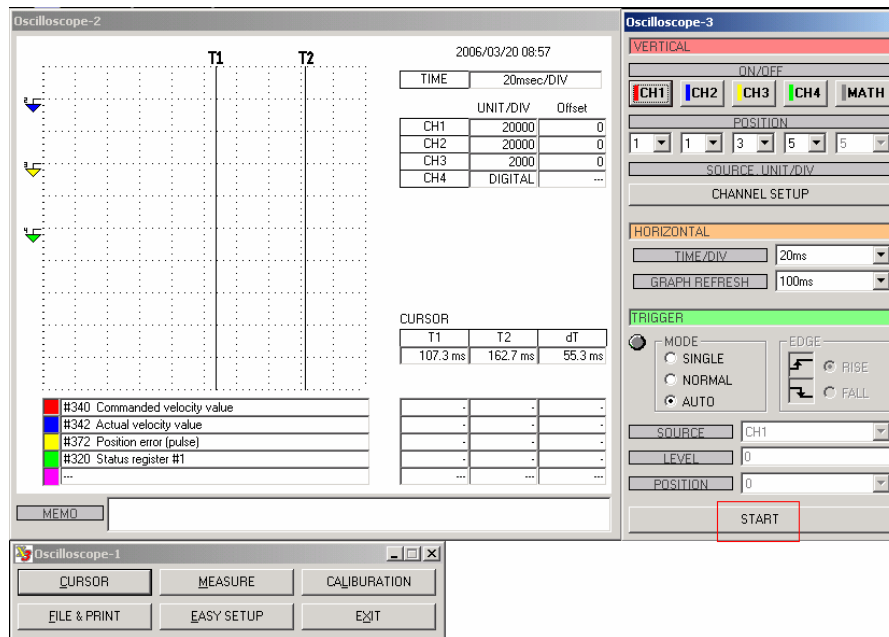
Figure 30: Oscilloscope
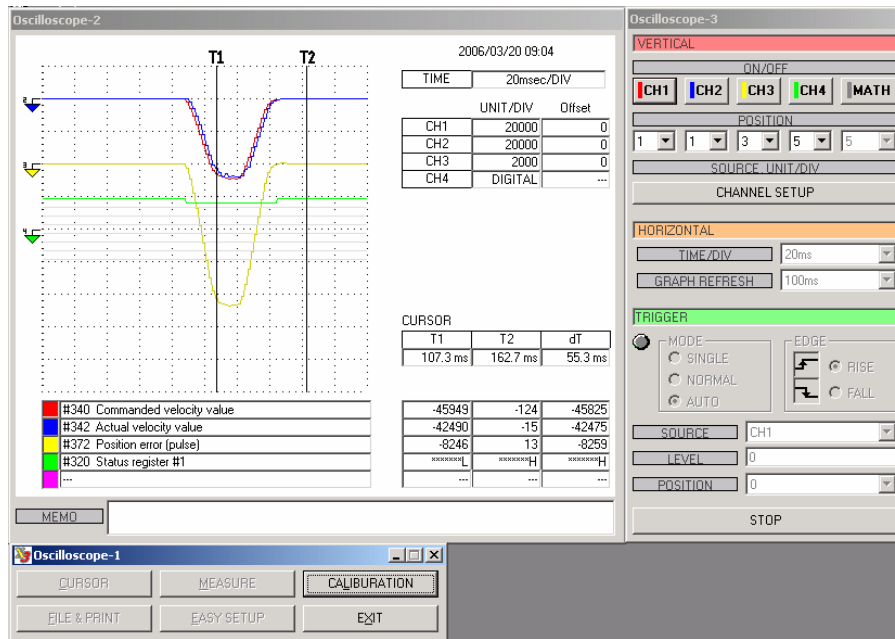
Figure 31: Expected result

23. There are three main values tuner can use to tune the servo motor.
    a. #12: Integral Limit
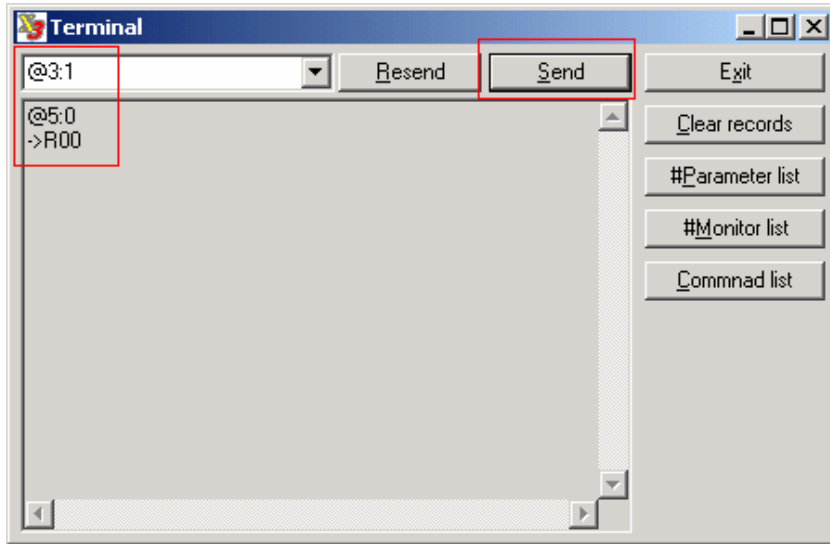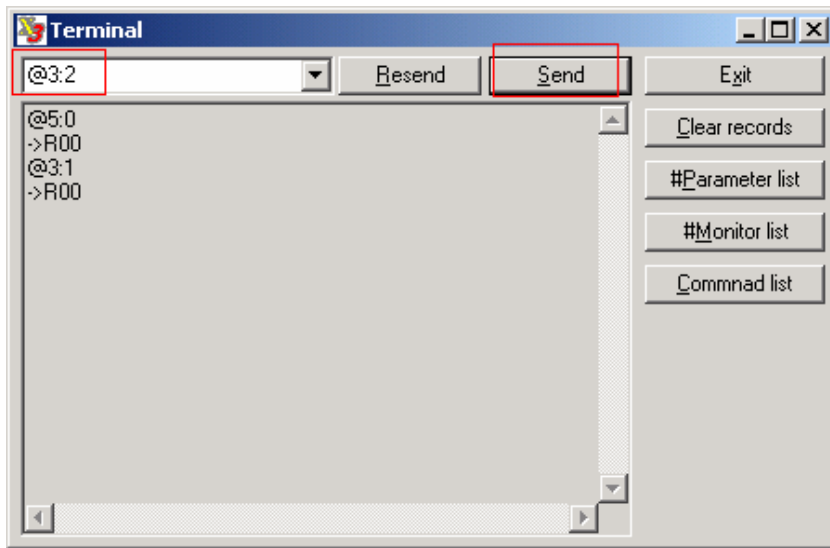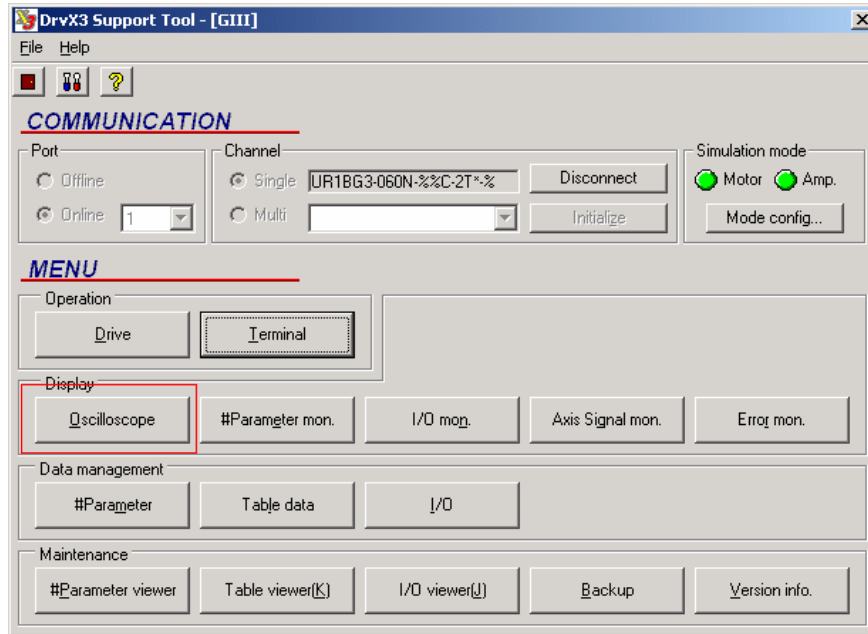   b. #14: Position Feed Forward
    c. #15: Velocity Feed Forward

24. Each of these main values corresponds to a certain curve at the graph. Refer snapshoot below.

Figure 32: Corresponding values

25. Given an example below. The values that user need to increase is "#15". In this case the values should reduce to lift up the line. **E.g. type "##15=20" in the terminal window and enter. The same way as shown in Figure 22.**

Figure 33: Dampen to high

26. Minor adjustment can be made by using the parameter below. Minor value adjustment to these values can create big impact to the result. So use it carefully.
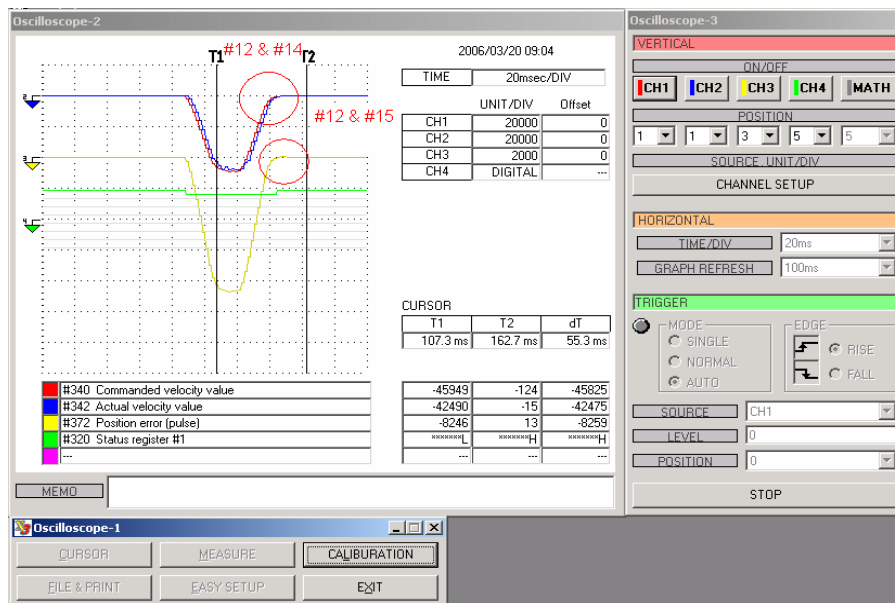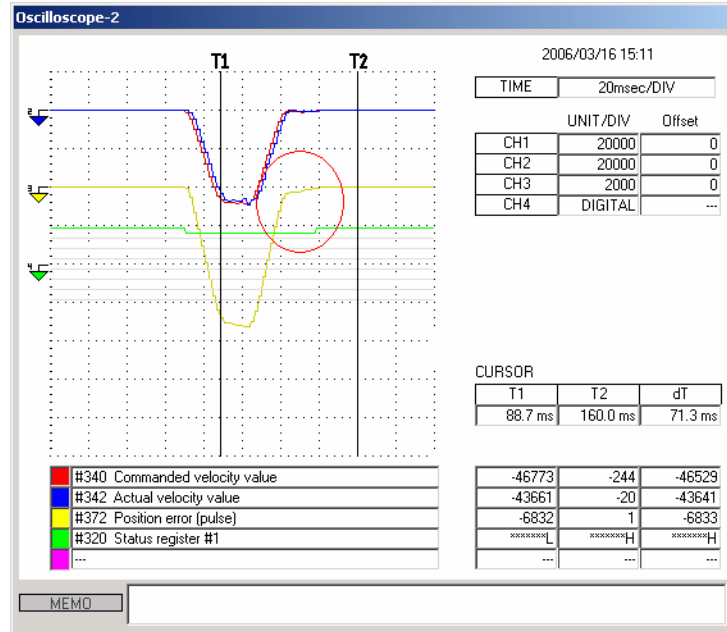   a. #2: Velocity Control
    b. #8: Position Control

27. The table below summaries the values normally involves and effect of adjusting it.

Parameter	Default	Value Increase	Value Decrease
#2	105	Lesser time	More time
#8	26	Damping high	Damping low
#12	250000	Damping high	Damping low
#14	50	Damping high	Damping low
#15	15	Damping high	Damping low

Table 1: Summaries of parameter values

28. Parameter "#2" and "#8" normally are used to correct minor noise as shown below.
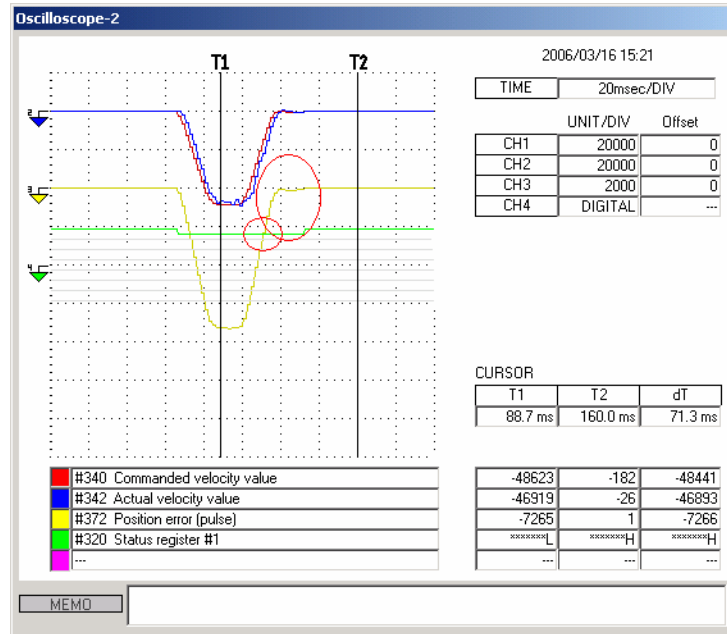
Figure 34: Noise distortion

29. When an expected graph is acquired, user need to measure the duration of the active pulse. The value in "dT" should be around 57-60 milliseconds. To measure the graph accurately, user will need to "Stop" the graph execution and click on "Cursor" to move the "T1" and "T2" line as shown.
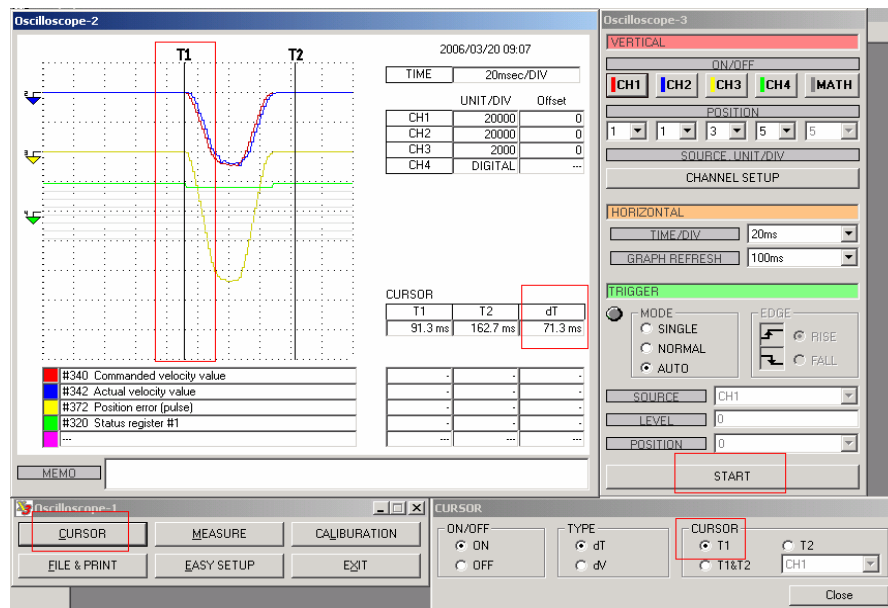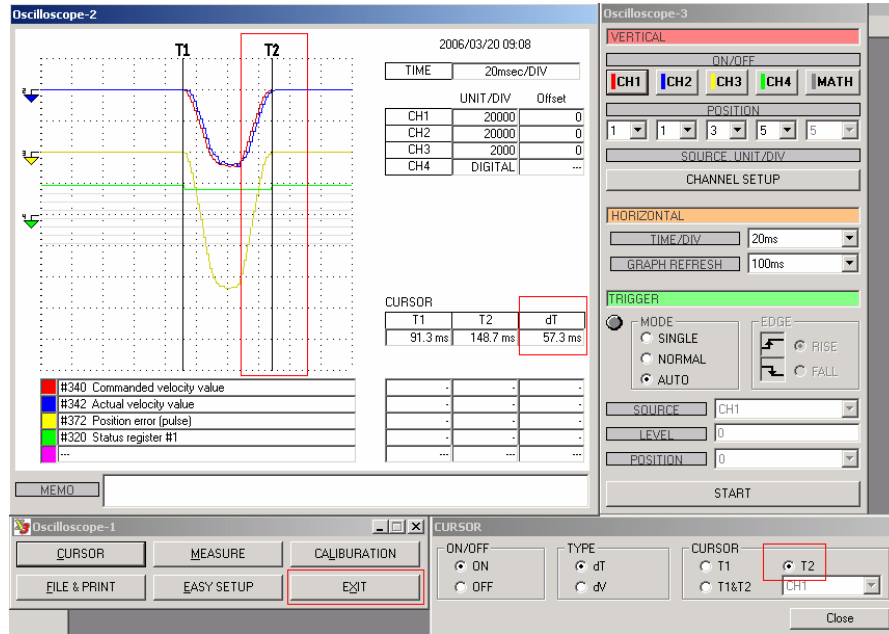

Figure 35: T1 line in position

Figure 36: T2 line in position

30. Figure 36 also represent the duration measured. If the duration met the user's expectation, "Exit" the oscilloscope else start the oscilloscope and return to terminal window and start fine tuning again.

31. Command to stop the servo is "@2" as shown and when user finish tuning the servo, final confirmation need to be done by entering "##2, ##8, ##12, ##14 and ##15" to save all the values entered.
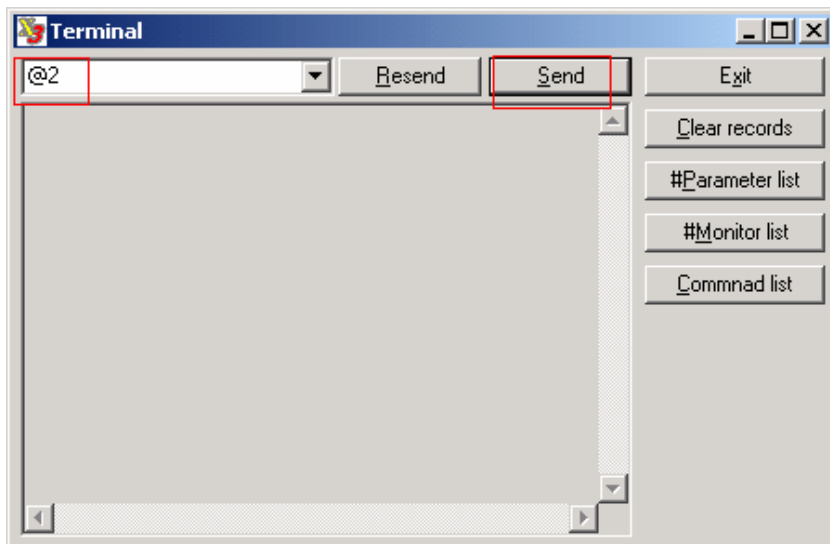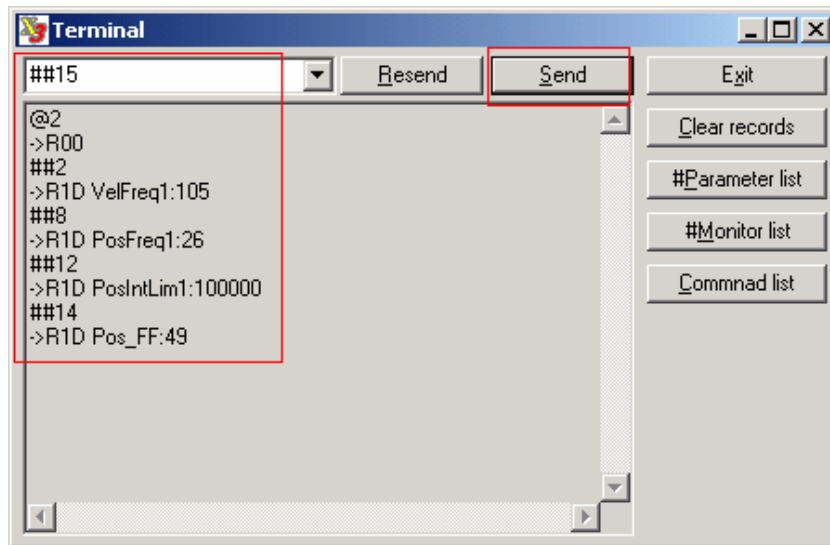

Figure 37: Stop servo

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Figure 38: Saving final changes

32. Exit everything and return to main menu. Finally, click "Disconnect" to end the session and plug out any unnecessary cables that are used to tune the servo motor.