DspHost2 Operation Manual

2004.9.

This manual is applicable for LMDX driver with interface firmware version 2004/07/30

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1. Introduction

DspHost2 is the user interface of LMDX driver. It is for users to observe and set parameters, display servo statuses, motion profiles (position, speed, current). It has menu for setting parameters. Users can set common parameters through the interface. It is also possible to use a traditional terminal interface to observe and set parameters.

Caution

The program is only running under Windows 98, Windows XP (not including Windows NT, 2000 and Me).

Setting motor parameters and driving motor involve many technical issues. Before using this program, it is advised to read also "LMDX Command and Parameter Manual.pdf".



2. How to install

The following describes how to install DspHost2 user interface.

1. <u>Please close all other application programs.</u> Execute Lm_Driver\Terminal program \DspHost2 in the CD with shipment and Fig. 1 appears.

1	安裝 DspHost2	×
	歡迎使用 DspHost2 安裝程式。	
	- — 安裝程式無法安裝使用中的系統檔案,也無法更新使用中的共用檔案 。建議您在安裝前,關閉所有的應用程式。	
	確定 結束安裝(X)	



2. Click OK to confirm and Fig. 2 shows up.

🥵 安裝 DspHost2	×					
諸按一下下面的按鈕來進行安裝。						
按下此按鈕來安裝 DspHost2 軟體到指定的	目錄上。					
- 目録:	総面日籍(の)					
C. Urogram Files Uriwin Usphosiz (
結束安裝(医)						

Fig. 2

3. As shown in Fig. 2, the default directory for installation is C:\Program File\Hiwin\DspHost2\, it is also possible to change the directory. Clicking the install icon, it will start installing DspHost2 and Fig. 3 shows up.



🛃 DspHost2 - 월	針澤程式群組 🛛 💌	1
安裝程式將在 可以輸入新的 。	群組 (顯示於「程式群組」方塊中) 中加入項目。您 群組名稱,或從「現有群組」清單中選取一個群組	
程	式群組(<u>P</u>): <mark>(win</mark>	
ST C	2月64年組(点): Code Composer Dr.eye 2001 譯典通 Lash_Writer	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ACLOS ItELSOFT Application Iticrosoft Office 工具 Iticrosoft Visual Basic 6.0 Iticrosoft Visual C++ 4.0 Iticrosoft Visual Studio 6.0	
·		
	繼續(C) 取消	



4. Click Continue in Fig. 3. Then Fig. 4 shows starting installation of DspHost2

∰ 安裝 DspHost2	×
目的檔案:	
C:\WINDOWS\SYSTEM\WINSKCHT.DLL	
56%	
取消	



5. When installation finishes, Fig. 5 is shown. This means installation is done. Click OK.



Fig. 5

3. Operation Explanation

Refer to Fig. 6 and choose DspHost2 to execute it.





When this program is executed, it will appear like Fig. 7 and detect connection between PC and LMDX. After detecting the communication if it shows like Fig. 8(up), please click 'yes' to load parameters from driver and it shows like Fig. 8(down). Then it shows user interface like Fig. 10. Otherwise, it shows warning message like Fig. 9. The communication is not correct.

	Check the communication between PC and LMDX	
	Fig. 7	
	DspHost2	
	Do you want to load all parameters from LMDX now?	
	<u>是做</u> 否N	
📇 Receiving pa	rameter data from LMDX	×
0%	50%	100%

Fig. 8





	DspHost2	Communication I	Error! Please ch	neck the LMDX power and 確定	💌 1 RS232 transfer line.	
			F	ig. 9		
	<mark>∞∞</mark> DspHost 2					1
Plot Tool 4	File Settings D	isplay [nitialize <u>C</u> omm	unication <u>A</u> bout ◀			- Main Menu
1100 1001	Setup M	lotion S	etup Capturing	Setup Graph	Pos. Gains	
	Velocity	300	(mm/s)	Step Move C Relative	C Absolute	
	Acceleration	25	(m/s^2)	Distance 0	(um)	
		Homing				
	□ SVON	Move Direction —				
	✓ Open loop ✓ No current		Plo	t Receive	Save Graphic Data	
	COM 1 Setting	:9600,0,8,2 ◄				Status Bar

Fig. 10

3.1 Main menu

The DspHost2 main menu choices are described below.

Menu	Selection	Description		
File	Load parameters from LMDX	Load parameters from driver		
	Save parameters to LMDX	Save parameters to driver		
	Load parameters from file	Load parameters from file (Fig. 11)		
	Save parameters to file	Save parameters to file (Fig. 12)		
	Exit	Exit DspHost2		
Settings	Common	PID gains	Refer to section 4.1	
		Pulse/Stand-alone	Refer to section 4.2	
		In-Position	Refer to section 4.3	
		Tracking error window	Refer to section 4.4	



		Software limits	Refer to section 4.5	
	Advanced	Field weakening	Refer to section 4.6	
		Homing	Refer to section 4.7	
		Power on	Refer to section 4.8	
		Error Compensation	Refer to section 4.9	
		Axis directions	Refer to section 4.10	
		Filter	Refer to section 4.11	
	Save parameters to flash	Before closing this prog	gram, if there was any	
	ROM	parameter changed, use	ers must execute this to	
		save parameters to flash ROM. To Avoid		
		parameters disappearing after turning off LMDX.		
Display	Position and Status	Display position and status of motor, refer to		
		section 4.12.1		
	Position sensor signals	Display sensor position of motor, refer to section		
		4.12.2		
Initialize	Motor type	Refer to section 4.13.1		
	Quick initialize	Motor quick initialize, refer to section 4.13.2		
	Advanced initialize	Motor advanced initialize, refer to section 4.13.3		
Communication	Terminal	Terminal program		
	Rs232 setting	Set RS232 communication parameters, refer to		
		section 4.14		
About	About	DspHost2 information	(Fig. 13)	



Fig. 11



Save as				? ×
儲存於①:	合 我的文件夾	-	🖻 🗹	🗃 🔳
🗋 My eBooks	;			
🗋 My Music				
🔰 🚞 My Pictures	\$			
🛛 🚞 smufer2000)			
🛄 taiyen				
, 檔案名稱(N):				存檔(S)
存檔類型(I):	Text File (*.txt)		-	取消
	□ 以唯讀方式開啓(R)			

Fig. 12

🔤 About DspHost2	×
Hiwin	
DspHost 2 Hiwin Mikrosystem Corp, 30.Jul.2004	
www.hiwinmikro.com.tw	

Fig . 13

3.2 Plot Tool

DspHost2 has a plot function. Users can observe motion response and trajectory planning command so that PID gains could be adjusted easily.

How to use it:

- Stand-alone mode:
 - 1. In **Setup Capturing**, set the physical quantities to capture.
 - 2. In Set Motion, set velocity and acceleration.
 - 3. Set **Distance** to move.
 - 4. Click (\leftarrow) or (\rightarrow) or (\uparrow) or (\downarrow) to move and start capturing.
 - 5. Click (Plot) to transfer all captured data from LMDX and plot. If clicking Plot too early so that capturing is still under process, it shows waiting message.

• Pulse mode:

- 1. In **Setup Capturing**, set the physical quantities to capture.
- 2. Click (Receive) to start capturing.
- 3. Send pulses to make movement.
- 4. Click (Plot) to transfer all captured data from LMDX and plot.

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3.2.1 Setup Motion

The Setup Motion tab shown in Fig. 14 is to set basic parameters for movements under stand-alone mode.

- **Velocity** : trajectory maximum velocity, unit is mm/s.
- Acceleration : trajectory acceleration, unit is m/s^2
- **Homing** : searching the wall, related parameters refer to section 4.7
- Motion : there are three types
 - Step Move : Single step move. Please click (↑)or(↓)or(←)or (→) to move. The moving distance is set in the field of Distance.
 - Relative : Relative coordinate move, Fig. 15(left) is shown. Please click
 (←)or(→) to move.
 - Absolute : Absolute coordinate move, Fig. 15(right) is shown. Please click (→) to move. Before using this function, make sure homing is performed.

Setup Motion	Setup Capturing	Y Setup Graph	Pos. Gains
Velocity Acceleration	300 (mm/s) 25 (m/s^2)	Motion Step Move C Relative Distance 0	C Absolute (um)
Homing			

Fig. 14 Setup Motion

Motion	_ Motion
C Step Move C Relative C Absolute	C Step Move C Relative C Absolute
Distance X 0 (um)	Distance X 0 (um)
Distance Y 0 (um)	Distance Y 0 (um)

Fig. 15 Relative and Absolute motion settings

3.2.2 Setup Capturing

Setup Motion	Setup Capturing	Setup Graph	Pos. Gains
Sampling Time	0.001 (sec) Total Da	ata Number 7995	Confirm
Data 1	Data 2	, Data 2	
11: Y Command Posi	tion - 9: Y Feedback Pos	sition - 20: Y Position	Error

Fig. 16 Setup Capturing

There are five fields to set including **Data1**, **Data2**, **Data3**, **Sampling Time** and **Total Data Number**. **Data1** to **Data3** are physical quantities to capture; please see Table 1 for definitions. **Sampling Time** is the time interval for each capturing. **Total Data Number** is the whole number of captured physical quantities. It is free to choose repeated physical quantities. However, **Data1** could not be 0. When **Data1** and **Data3** were not 0, **Data2** could also not be 0. After setting, please click (**Confirm**) to finish settings.

The maximum value to input for **Total Data Number** is 8000. If input value was more than 8000 and less than 0, after clicking (**Confirm**), they would be adjusted. This number does not mean for each physical quantity, but the whole selected quantities. For example, if it is set to be 900 and only one physical quantity is chosen, the same quantity would be captured 900 times. But if 3 physical quantities were selected, there would be 300 values captured for each. Furthermore, the **Total Data Number** should normally be multiple of number of physical quantities to capture. If strange combination of number were input, DspHost2 adjusts it automatically after clicking

(Confirm

D.

Number	Explanation
1	Sensor signal, X1 A
2	Sensor signal, X1 B
3	Sensor signal, X2 A
4	Sensor signal, X2 B
5	Sensor signal, Y A
6	Sensor signal, Y B
7	Feedback X1-position
8	Feedback X2-position
9	Feedback Y-position
10	Command X-position
11	Command Y-position
12	Error rotational, (n-1)
13	Error X, (n-1)
14	Error Y, (n-1)
15	Force rotational
16	Force X
17	Force Y
18	Error rotational
19	Error X
20	Error Y
21	Feed-forward X



22	Feed-forward Y
23	Feed-forward Y

Table 1

3.2.3 Setup Graph

Setup Graph tab shown in Fig. 17 is to set parameters for graph tool.

- **Ratio** : The captured data is multiplied by this ratio, then displayed.
- **Offset** : The captured data is added by this value, then displayed
- Differentiate : Check this to differentiate the captured data. For example, in order to observe velocity for Y-axis, please choose physical quantity 9(Feedback Y-position). Then please check this, the captured data is differentiated when plotted.
- **Time Min** : Set the minimum value in time axis.
- **Time Max** : Set the maximum value in time axis.
- Y Min : Set the minimum value in vertical axis.
- **Y Max** : Set the maximum value in vertical axis.
- **X** Grid : Check this to display horizontal lines.
- **Y** Grid : Check this to display vertical lines.

Setup	Motion	Setup	Capturing	Setup Graph		Pos. Gains	
	Ratio	Offset	Differentiate	Graphic Coordinate			
Data 1	1	0	Γ		Min	Max	
Data 2	1	0		Time	0	1	
Data 3	1	0		Y	-20000	40000	
Lissajo	us				TX Grid T	Y Grid	

Fig. 17 Setup Graph

- Lissajous : Lissajous Circle is for displaying the phase A and B sensor signals. Phase A is taken as horizontal axis, while phase B vertical. In Setup Capturing, Data1 and Data2 must be set as physical quantities between 1 to 6. So it is possible to check whether sensor signals are OK. Click Lissajous to show the circle. Fig. 18 is an example of A, B phases for X1 sensor. At the right side of Fig.18:
 - 1. **Sensor signals offset** : This is to show the offset for sensors. These values are correct only after finishing initialize of motor.
 - 2. **X offset** : It is offset for horizontal axis. In the example, X-axis is Sensor X1_A. User can input the X1-A offset with reverted sign in sensor signals offset.
 - 3. **Y offset** : It is offset for vertical axis. In the example, Y-axis is Sensor X1_B. User can input the X1-B offset with reverted sign in sensor signals offset.
 - 4. **X**, **Y** Grid : This is to set the value for each grid in both X and Y direction.
 - 5. **Plot** : Plot Lissajous Circle





Fig. 18 Lissajous Circle

3.2.4 Pos. Gains

This is to adjust the closed loop PID gains. User can adjust these gains to increase stiffness of motor according to actual movement with help of the captured data and graph.



Fig. 19 Pos. Gains

- **P** : Proportional gain
- I : Integral gain
- **D**: Differential gain

3.2.5 Function operation

Fig. 20 is shown for operation like SVON, start motion, data capturing, plot data and save captured data to files.

□ SVON	Move Direction	1		
🔽 Open loop		Plot	Receive	Save Graphic Data
🗆 No current				

Fig. 20 Function operation

• **SVON** : Check this to make motor SVON, then Fig. 21 is shown. And motor performs alignment. If motor alignment is not successful, it means the motor was not initialized correctly. Please refer to section 4.14 about setting parameters for initialize.



- **Open loop** : Open loop mode
- No current : Servo off mode



direction. This is only for stand-alone mode.

- **Receive** : At pulse mode, click this button to start data capturing.
- **Plot** : Click this to plot, please refer to section 3.2
- Save Graphic Data : This will save captured data into a file. File type is *. csv.

3.3 Status Bar

This shows communication status and data capturing status.

COM 1 Setting:9600,0,8,2

Fig. 22 Status Bar

4. Function Explanation

4.1 PID gains

There are three axes in LMDX, X-axis, Y-axis and rotary axis. Each axis has their PID gains. Please see Fig. 23. This setting is the same as Fig.19.

- **P gain** : Proportional gain
- I gain : Integral gain
- **D** gain : Differential gain

PID gains settings				×
	X Axis	Y Axis	Rotary Axis	07
P gain	150	150	50	
I gain	0.2	0.2	0.1	Cancel
D gain	2000	2000	1000	

Fig. 23 PID gains

4.2 Pulse / Stand-alone

User can chooses between stand-alone mode and pulse mode.

Mode selection OK
C Pulse mode Cancel
Pulse weight of V-avia 1 mm/nulse
Advanced
Pulse weight of Y-axis 1 1 um/pulse

Fig.24 operation setting

At pulse mode, the following parameters need to be set.

- **Pulse weight of X-axis** : The distance to move in X-axis for each pulse.
- **Pulse weight of Y-axis** : The distance to move in Y-axis for each pulse.

User can click Advanced shown in Fig.25 at pulse mode. Please refer to command SD.2 and SD.3 in "LMDX command and parameter manual.pdf".



Pulse mode command advanced settings			×
Speed for moving to the nearest grid zero, when Reset signal of ID4 interface is engaged.	1	mm/s	OK
Delay this time after the reset signal of ID4 interface is engaged, then Ready signal becomes high.	50	sec	Cancel

Fig. 25 Advanced setting at pulse mode

4.3 In-Position

In-Position settings :

- **In-Position window** : After tracking error becomes within this window, In-Position becomes active.
- **In-Position delay time** : This is to stablize In-Position signal.

In-Position settings		×
In Position window	5 um	ОК
In Position delay time	10 ms	Cancel

Fig. 26 In-Position settings

4.4 Tracking error window

In closed loop mode :

- **Permissible error for close loop in XY direction** : If tracking error of X or Y axis is over this, there is a alarm "Tracking error too big".
- **Permissible rotational error** : If tracking error for rotary axis is over this, there is a alarm "Tracking error too big".
- **Fatal rotational error** : If tracking error in rotary axis is over this, it means that the motor can't keep SVON and will change to Servo off mode immediately.

Tracking error window settings			2	<]
Permissible error for close loop in XY direction	5000 τ	um	ок	
Permissible rotational error	450 v		Cancel	
Fatal rotational error	1200 v	um 🛄	Cultor	

Fig. 27 tracking error settings

4.5 Software limits

This is to set software limits for X and Y axis to prevent inadeguate position commands.

Software limit	ts settings		×
	Positive direction	Negative direction	OF
X Axis	1000000 um	-1000000 um	
Y Axis	1000000 um	-1000000 um	Cancel

Fig.28 Software limits settings

4.6 Field weakening

It is to set parameters for field weakening.



Fig. 29 Field weakening settings



Fig. 30 Field weakening advanced settings

4.7 Homing

It is to set Homing velocity. Regarding other advanced settings refer to command 'GSS' and 'GP' in "LMDX command and parameter manual.pdf".

Homing settings		×
		OK
Homing velocity	15 (mm/s)	Cancel
		Advanced

Fig. 31 Homing settings

Homing advanced set	tings		×
Stop force Stop error Stop noise time	0.699999 Free for 100 um Free err 20 ms Free noi	ce 0.4 or 10 ise time 50	OK um ms
Homing direction	X Axis C Positive C Negati	ve C Positive	Negative
Homing mode	X Axis The nearest grid zero Grid zero negative din	rection Y Axis rection C The nearest grid zero	• Grid zero in negative direction
Back distance after	X Axis r wall is found 5 p	Y Axis er 640um	5 per 640um
Coordinate at hom	ue 🔽 🛛 w	m 🗌	0 um
Display of sub-per wall finding proce	iod of previous <mark> -1</mark> ∞	-	-1

Fig. 32 Homing advanced settings

4.8 Power on

Clicking Power on, Fig.33 is shown. Close loop mode and open loop mode can't be clicked at the same time. If open loop mode is chosen, Automatic homing and Automatic alignment can not be set.





Fig. 33 Power on settings

4.9 Error compensation

For error compensation, there are X-axis and Y-axis. Each axis has forward and backward values. An example for Forward of X-axis, explain how to compensate error with laser result.

- 1. Prepare error data in *.txt file according to file format in Appendix 2
- 2. Click Load...
- 3. Choose "from Text file" and "X Axis forward"
- 4. Click OK
- 5. Choose the prepared file
- 6. Click open to load data and it shows like Fig.34
- 7. Click Save...
- 8. Choose "to LMDX" and "X Axis forward"
- 9. Click OK
- 10. It will ask whether data should be saved to ROM, click 'Yes'

Procedure for the other three error compensate table is similar to the above. Furthermore, there are the following points to notice.

- Maximum number of each compensate table is 599.
- pitch : Measurement pitch.
- dat# : Sequential number for data.
- Data : The data for the above dat#
- Graph Limits :

Number of data : This is the number of data to display.

Y-max : Set the maximum value in vertical axis.

Y-min : Set the minimum value in vertical axis.

If the compensate value need to be modified, click **Load...** and select "from LMDX" to load data from LMDX. After modification, click **Save...** to save it to LMDX or file.

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There is a skill in Fig.34. When clicking and draging with mouse in the graphic filed, in the above area of window, the data# changes according to mouse movement.

Error con	npensation					×
X Ba Ba Y Fo Ba	nrwand [ackward [prward [ackward [Pitch 3	dat# 1 1 1 1 1 1 1	Data 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	 ✓ Display X Forward ✓ Display X Backward ✓ Display Y Forward ✓ Display Y Backward 	Load Save
-Grap Nur	h Lumits —— nber of data	20	Y-max Y-min	10 -10		Cancel
10 - 0 - 10 -	- 		-			20

Fig. 34 Error compensated table

4.10 Axis directions

This is to set definition of direction for XY axes. To swap direction definition, please change from Positive to Negative or from Negative to Positive.

Axis directions settings		X
– X Axis direction — C Positive	Negative	ОК
- Y Axis direction	C Negative	Cancel

Fig.35 Axis direction settings

4.11 Filter

There are three closed loops, X-axis, Y-axis and rotary axis. This is to set their filter parameter. The range of this parameter is 0 to 1.0. Smaller value means stronger filtering.



Filter settings		X
X Axis	0.2	ок
Y Axis	0.2	Cancel
Rotary Axis	0.2	

Fig. 36 filter settings

4.12 Display

This shows internal information like status, current position and help user to debug. Two sections below explain this.

4.12.1 Position and status

Status is described below in each axis:

Item	Description	Remark
Command position	Command position in LMDX	Only for closed loop
Real position	Feedback position from sensor	Only for closed loop
Homing result	Status for homing (True or False)	Only for closed loop
Error code	0000-No error	
	0400-Out of the range of software limits	
	0800-Tracking error too big	

Reset error : Clear all alarms

Renew : Refresh all statuses

Position and status			×
	X Axis	Y Axis	
Command position	0	0	
Real position	0		
Homing result	False	False	
Error code	X Axis	Y Axis Rotary Axis	Reset error
			Renew

Fig. 37 Display driver status

4.12.2 Position sensor signals

Show the values of sensor:

- **Display** : Begin display continuously.
- **Stop** : Stop display.

Position sensor signals				×
		Phase A	Phase B	
Display	X1 Axis	523	1011	
Stop	X2 Axis	477	725	
<u></u>	Y Axis	-994	-783	

Fig. 38 Display status for sensor

4.13 Initialize

It is important to initialize motor before closed loop control. This has only to be done once. Parameters are saved to Flash ROM. Use this tool to help user to make motor initialized.

4.13.1 LMSP Motor Type

Choose motor types. There are three types, LMSPX1, LMSPX2 and LMSPX3.

LMSP motor type	×
Select Motor Type	OK
Unknown Type	Cancel

Fig. 39 Motor type settings

4.13.2 Quick initialize

Before the motor could be driven in closed loop, driver has to be initialized once. It is a quick initialize tool. User only has to follow the steps described here. Fig. 40 shows the procedure for initialization.

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DspHost2
LMSP motor is free now. Please move the forcer to align with the grid of LMSP stator.
DspHost2
LMSP motor is in open loop mode now. Please check the forcer is alignment or not. Select Yes button to continue, No button to remove the forcer, or Cancel button to exit this procedure.
<u>是(型)</u> 否(N) 取消
DspHost2
Please select OK button if the LMSP motor has stopped moving, or Cancel button to exit this procedure. []取消
No Initialize
OK?
Yes
The LMSP is initialized successfully! The motor is in close loop mode now.

Fig. 40 Quick initialize steps

4.13.3 Advanced initialize

Advanced initialize is more complicated. User also can make this to initialize. Because it is more complicated than quick initialize, it is suggested that user choose quick initialize. There are three steps in Advanced initialize.

1. Calibrate Sensor

Motor	Initialization(1/3)			×
С	alibrate sense	or		
	Set calibrate param	neter		
	Calibrate			
	Refresh displa	у		
	off:	xet	Amplitud	e ratio
	A	в	A	В
X1	-247.500015	410	2.410829	1.982575
X2	-220.500015	-102.000007	2.48092	1.729729
Y	-297	-265	2.22367	2.015748
			Cancel	Next >

- Set calibrate parameter : To set related parameters. Please refer to commands 'CLS' in "LMDX command and parameter menual.pdf".
- Calibrate : To execute calibration for sensor. In the bottom half of window, offset and Amplitude ratio for sensor X1, X2 and Y are shown. If Amplitude ratio is out of the range : 2±0.3 the value becomes red.
- 2. Collect data for alignment

Motor Initia	lization(2/3)	Motor Initialization(2/3)			
Colle	ct data for alignme	nt			
	Execute				
	Refresh display	Display sub-period			
X1	119.848266 wm	<u> </u>			
X2	135.380035 um	0 un			
Y	202.926971 um	0 wn			
		< Previous Next >			



Execute (________) and collect related information for alignment. Results are shown on the left in the window. After the above execution is finished, the button Display sub-period can be clicked to show the real position for sensor on the right side. Compare left and right to see whether their difference is more than 18. If yes, please execute again.

3. Save parameters

Saving parameters above to LMDX.

4.14 Communication

This is used for setting the RS-232 serial port. It should be set as 9600 baud, 8 data bit, odd parity, 2 stop bit.

RS232 Settings	×
Properties	
Port: Com1 💌	
Maximum Speed	ок
9600 💌	Cancel
Connection Preferences Data Bits: 8	
Parity: Odd 💌	
Stop Bits: 2	

Appendix 1. How to update firmware of LMDX

Step1: Click menu bar Communication \rightarrow Terminal

🛄 Te	📮 Terminal			
Edit	Firmware			
		A		
		F		
СОМ	1 Setting:9600,0,8,2			

Step2: Keep pressing "Back Space" on keyboard, and turn on power of LMDX driver, then it enters

"Monitor" mode. Now the orange and red LED will blink twice to show that it is under

"Monitor" mode. Now terminal may look like this.

🛄 Terminal	- 🗆 🗵
<u>E</u> dit <u>F</u> irmware	
2	▲
BS pushed	
DSP monitor V5.1. Copyright (C) 2001 Hiwin Mikrosystem Corp.	
D - Dead from address	
W - Write to address	
I - Repeating read from address	
D - Repeating read from address & display	
0 - Repeating write to address	
P - Display parameters	
TOP - Testing Output Port (blinking)	
TM - Testing memory TM [length value]	
TSO - Testing : IOstrb Set INTERNAL_RDY	
TS1 - Testing : IOstrb Set AND_EXT_INT (!!!)	
L - Boot Loading from R5232	
SM - Reptart monitor from Flash	
FF vvv - Frees Flesh to length (bute)	
DF - Write program to flesh from DS232	
B - Baud rate RS232	
ID - ID heard display	
2 - Help	
	$\mathbf{\nabla}$
4	Þ
COM 1 Setting:9600,o,8,2	

Step3: Click Firmware in the menu \rightarrow Download a new firmware



Terminal				
<u>E</u> dit <u>F</u> irmware				
? Download a new firmware	*			
bs pushed				
DSP monitor V5.1. Copyright (C) 2001 Hiwin Mikrosystem Corp.				
D - Deed from address				
W - Write to address				
I - Repeating read from address				
D - Repeating read from address & display				
0 - Repeating write to address				
P - Display parameters				
TOP - Testing Output Port (blinking)				
TM - Testing memory TM [length value]				
TSU - Testing : IUstrb Set INTERNAL_RDY				
ISI - Testing : TOSTED Set AND_EXT_INT (!!!)				
SM - ReStart monitor from Flash				
SP - Start object Program from Flash				
EF xxx - Erase Flash to length (byte)				
PF - Write program to flash from RS232				
B - Baud rate RS232				
ID - ID board display				
? - Help				
>				
1				
Contra troum@isocologia				

Step4: Choose the firmware code file: (*.cod).

Select File				? ×
搜尋位置(I):	Sp040105	•	E	
⋒ Sp040105.	cod			
」 檔案名稱(N):				開啓舊檔①
檔案類型(<u>T</u>):	Binary File (*.cod)		•	取消
	□ 以唯讀方式開啓(图)			

Step5: After choosing the code file, click open to start the programming procedure.

Step6: After programming is finished, type "SP" command to start the newly programmed firmware. Normally it shows the version of the firmware on terminal window.

Appendix 2. File format for error compensation

The format of compensation data is defined like below. Please also refer to the related section in "LMDX Command and Parameter Manual.pdf".

Format of the file:

- 1. It is a text file. (*.txt)
- 2. The first line contains "START" in capital letter.
- 3. From the second line on, it is compensation data.
- 4. 1st data is the period of compensation and they are given in motor mechanical pitches. This is also the measurement pitch.
- 5. 2nd data is error compensation data at period*0
- 6. 3rd data is error compensation data at period*1, and so on.
- 7. There should be only one data in a line. No space or other characters between each line
- 8. The last line contains "END" in capital letter.
- 9. Between START and END it is limited to 600 lines.

Example:

Assumed the measurement period is 3 motor mechanical pitches as and the compensation values are 0, -1, 2, 5, 4, and -3. The file would look like this:

START 3 0 -1 2 5 4 -3 END