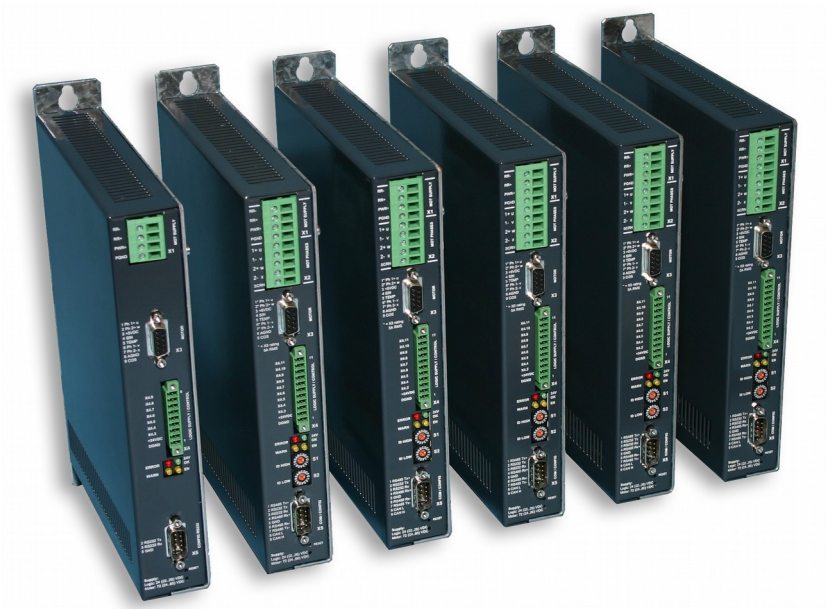
LinMot®

Easy Steps

Documentation of the EasyStepsX6 Application of the following Drive Series:

- **E1100-GP (-HC, -XC)**



EasyStepsX6 Application

User Manual

Note
The information in this documentation reflects the stage of development at the time of press and is therefore without obligation. NTI AG reserves itself the right to make changes at any time and without notice to reflect further technical advance or product improvement.

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1. System Overview

The EasyStepsX6 Application SW is an easy to use SW with the following functionality:

- Smart Control Word behavior (Enable, Home and Error Acknowledge over one single IO possible)
- 2 analog channel mapping to a any live Parameter (e.g. Adjust Maximal Current with analog input) on X4
- 8 digital IO/Inputs mapping to different 'Motion Commands', on X6

The MC-SW allows a free mapping of the X4 inputs to the control word respective status word bits, so no additional mapping is done in the EasyStepsX6 SW regarding this functionality. Every unused/undefined pin on the X4 connector can be used as normal general purpose IO or in special function as defined in the MC-SW parameter tree.

2. Installation on Drive

For installing the EasyStepsX6 firmware on the drive, start the LinMot-Talk software and press the install firmware button  . Choose the file "Firmware_Buildxxxxxxxx.sct" and press "Open". The wizard will guide you through the installation. When asking for the application software choose "EasyStepsX6":

Press Ok and follow the rest of the wizard.

3. X4 IO Mapping

Descriptor	Special Function	EasyStepsX6 Function
X4.1	GND	GND
X4.2	24 VDC	24 VDC
X4.3	Brake (Output)	-
X4.4	Analog In	An UPID Scale Ch1
X4.5	Capture Input	-
X4.6	Trigger (Input)	-
X4.7	Home Switch (Input)	An UPID Scale Ch2
X4.8	Limit IN (Input)	-
X4.9	Limit OUT (Input)	-
X4.10	PTC 1 (Input)	-
X4.11	PTC 2 (Input)	-

4. X6 IO Mapping

With the Parameters (UPIDs 0x3381..0x3388) the logic of each input could be inverted separately.

Descriptor	EasySteps6 Function
X6.5	Motion Cmd Ch1
X6.18	Motion Cmd Ch2
X6.6	Motion Cmd Ch3
X6.19	Motion Cmd Ch4
X6.7	Motion Cmd Ch5
X6.20	Motion Cmd Ch6
X6.8	Motion Cmd Ch7
X6.21	Motion Cmd Ch8
X6.9	Linked Output to Motion Cmd Ch1
X6.22	Linked Output to Motion Cmd Ch2
X6.10	Linked Output to Motion Cmd Ch3
X6.23	Linked Output to Motion Cmd Ch4
X6.11	Linked Output to Motion Cmd Ch5
X6.24	Linked Output to Motion Cmd Ch6
X6.12	Linked Output to Motion Cmd Ch7
X6.25	Linked Output to Motion Cmd Ch8

5. Smart Control Word Behavior

All Control Word actions that are configured in the EasyStepsX6 SW are done to the Interface Control Word bits. So if a Control Word bit is mapped to a X4 IO or forced by parameter this still has priority and the behaviour rests unchanged.

5.1. Intf Switch On Flag Behavior

It is strongly recommended to influence the Control Word bit 0 ‘Switch On‘ over a serial bus connection or a digital input. For a test system it might be helpful if the system starts up automatically when powered on. For this case the switch on can be set to autostart.

5.2. Intf Home Flag Behavior

Setting the Intf Home Flag Behavior to ‘Autohome’ starts the homing procedure automatically if the state 8 ‘Operation Enabled’ is reached and Status Word bit 11 ‘Homed‘ is not set. After the homing sequence has finished, the interface Control Word bit 11 ‘Home’ is cleared and the state 8 is entered again.

5.3. Intf Error Acknowledge Flag Behavior

Setting the Intf Error Acknowledge Flag Behavior to ‘/Switch On Flag’ sets the interface Control Word bit 7 ‘Error Acknowledge’, when releasing the ‘Switch On’ Flag.

5.4. Intf Go To Initial Pos Flag Behavior

Setting the Intf Go to Initial Pos Flag Behavior to ‘Enter Operation Enabled’ sets the interface Control Word bit 13 ‘Go To Initial Position’ in state ‘Ready to Operate’ (State: 6), normal operation of this behaviour is to move to the ‘Initial position’ after an enabling.

6. Analog Parameter Scale

On the two analog inputs X4.4 and X4.7 any live parameter UPID can be mapped for analog scaling of its value.

6.1. Analog Input On X4.4

In the following example, the live parameter ‘P Gain’ of the position controller set A with the UPID 13A2h is scaled in the range 1..10 A/mm with the analog value on X4.4.

Parameter Name	Parameter Value	Parameter UPID
UPID	13A2h	30E0h
0V Scale	10	30E1h
10V Scale	100	30E2h

The scaled value of the parameter can be monitored in the variable section of the EasyStepsX6 application SW with the variable ‘Scaled Value On X4.4’ (UPID 3A98h).

6.2. Analog Input On X4.7

In the following example the live parameter ‘Maximal Current’ of the position controller set A with the UPID 13A6h is scaled in the range 0..8 A with the analog value on X4.7.

Parameter Name	Parameter Value	Parameter UPID
UPID	13A6h	30F0h
0V Scale	0	30F1h
10V Scale	8000	30F2h

The scaled value of the parameter can be monitored in the variable section of the EasyStepsX6 application SW with the variable ‘Scaled Value On X4.7’ (UPID 3ACAh).

7. IO Motions

The third functionality of the EasyStepsX6 application SW is to define the different motion commands evaluated on a rising edge of the inputs on X6.

The motion command can be selected with parameters:

Parameter Name	Parameter UPID	Linked Output
X6.5 Rising Edge Function	3500h	X6.9
X6.18 Rising Edge Function	3600h	X6.22
X6.6 Rising Edge Function	3700h	X6.10
X6.19 Rising Edge Function	3800h	X6.23
X6.7 Rising Edge Function	3100h	X6.11
X6.20 Rising Edge Function	3200h	X6.24
X6.8 Rising Edge Function	3300h	X6.12
X6.21 Rising Edge Function	3400h	X6.25

The table below shows the supported motion commands. The motion command parameters are parameters of the EasyStepsX6-SW and may be used for different motion commands, the table in the detailed description of the motion commands shows the mapping of the EasyStepsX6 parameters to the motion command parameters.

The last evaluated motion command can be read out with the LinMot-Talk configuration software in the control panel.

The EasyStepsX6-SW writes directly into the copied ‘Motion Command Interface’ therefore it doesn’t change the value of the motion command counter of the interface ‘Motion Command Interface’. Of course it has to be programmed very carefully if the EasyStepsX6 Motion Commands are used together with motion commands over a serial bus interface.

With the linked output the “In Target Position” or “/Motion Active” of the selected rising edge input motion can be mapped.

7.1. Overview of the supported Motion Commands

Motion Command Name	UPID (3x00h) Value
None	0
Goto Abs Position	1
Increment Target Position	2
Increment Demand Position	3
Goto Abs Position From Actual Position	4
Increment Actual Position	5
Goto Analog Position	6
Start Curve From Actual Position	8
Goto Abs Position With Max Current	9
Eval Command Table Command	12
VAI Stop	13
VAI Infinite Motion Positive Direction	14
VAI Infinite Motion Positive Direction	15
Master Homing	26
Teach In	31 (X6.16 only)

7.1.1. None

If none is selected, no action is taken on a rising edge on this input. The input can be used as a general purpose input and be configured therefore in the MC-SW.

7.1.2. Goto Abs Position

On a rising edge on the input, a motion from any position to the defined absolute position will be started. (MC-SW Motion Command 010xh).

Motion Command Parameter Names	UPID
Position (Absolute Target Position)	3x10h
Max Speed	3x11h
Acceleration	3x12h
Deceleration	3x13h

7.1.3. Increment Target Position

On a rising edge of the input, the target position of the last VAI- motion will be incremented and the VAI motion started or continued. (MC-SW Motion Command 012xh).

Motion Command Parameter Names	UPID
Position (Target Position Increment)	3x10h
Max Speed	3x11h
Acceleration	3x12h
Deceleration	3x13h

7.1.4. Increment Demand Position

On a rising edge of the input the target position is set to (demand position + demand position increment), then the VAI motion is started or continued. (MC-SW Motion Command 011xh).

Motion Command Parameter Names	UPID
Position (Demand Position Increment)	3x10h
Max Speed	3x11h
Acceleration	3x12h
Deceleration	3x13h

7.1.5. Goto Abs Position From Actual Position

On a rising edge of the input the demand position is set to the actual position then the VAI motion is started or continued. (MC-SW Motion Command 013xh).

Motion Command Parameter Names	UPID
Position (Absolute Target Position)	3x10h
Max Speed	3x11h
Acceleration	3x12h
Deceleration	3x13h

7.1.6. Increment Actual Position

On a rising edge of the input the target position is set to (actual position + actual position increment) then the VAI motion is started or continued. (MC-SW Motion Command 015xh).

Motion Command Parameter Names	UPID
Position (Actual Position Increment)	3x10h
Max Speed	3x11h
Acceleration	3x12h
Deceleration	3x13h

7.1.7. Goto Analog Position

On a rising edge of the input, a motion from any position to the analog position defined with X4.4, is started. (MC-SW Motion Command 019xh).

Motion Command Parameter Names	UPID
Max Speed	3x11h
Acceleration	3x12h
Deceleration	3x13h

7.1.8. Start Curve From Actual Position

On a rising edge of the input, the curve offset is calculated then the specified time curve started. (MC-SW Motion Command 041xh).

Motion Command Parameter Names	UPID
Curve/Cmd ID	3x20h

7.1.9. Goto Abs Position With Max Current

On a rising edge of the input, a motion from any position to the defined absolute position is started. (MC-SW Motion Command 0C5xh), deceleration = acceleration and the maximal current is limited to the maximal current value.

Motion Command Parameter Names	UPID
Position (Absolute Target Position)	3x10h
Max Speed	3x11h
Acceleration = Deceleration	3x12h
Maximal Current	3x21h

7.1.10. Eval Command Table Command

On a rising edge of the input, the specified Command Table command is evaluated. (MC-SW Motion Command 200xh).

Motion Command Parameter Names	UPID
Curve/Cmd ID	3x20h

7.1.11. VAI Stop

On a rising edge of the input a running motion can be stopped (ramped down). (MC-SW Motion Command 017xh).

Motion Command Parameter Names	UPID
Deceleration	3x13h

7.1.12. VAI Infinite Motion Positive Direction

On a rising edge of the input, an infinite motion in positive direction is started (MC-SW Motion Command 0CExh).

Motion Command Parameter Names	UPID
Max Speed	3x11h
Acceleration = Deceleration	3x12h

7.1.13. VAI Infinite Motion Negative Direction

On a rising edge of the input, an infinite motion in negative direction is started (MC-SW Motion Command 0CFxh).

Motion Command Parameter Names	UPID
Max Speed	3x11h
Acceleration = Deceleration	3x12h

7.1.14. Master Homing

On a rising edge of the input, the motion command ‘Master Homing’ is setup (MC-SW Motion Command 009xh).

Motion Command Parameter Names	UPID
Position (Home Position)	3x10h

7.1.15. Teach In IO Motion

Used to change the value of the position parameter of a IO motion (UPID 31x0h). For this reason teach in can also be used to change the target position increment of the “Increment Target Position” IO motion command, with stacking, de-stacking applications.

Teach In sequence:

1. Select the IO motion to teach in, by setting the corresponding input high
2. Set the teach in input X6.20 high, this makes the motor currentless
3. Move the currentless motor manually to the new wanted position
4. On the falling edge the new position is stored remanent (is still available after a power cycle) and the motor is powered and position controlled again.

8. Contact Addresses

SWITZERLAND

NTI AG
Bodenaeckerstrasse 2
CH-8957 Spreitenbach

Sales and Administration: +41-(0)56-419 91 91
office@linmot.com

Tech. Support: +41-(0)56-544 71 00
support@linmot.com

Tech. Support (Skype) : skype:support.linmot

Fax: +41-(0)56-419 91 92
Web: http://www.linmot.com/

USA

LinMot USA Inc.
N1922 State Road 120, Unit 1
Lake Geneva, WI 53147

Phone: 262-743-2555

E-Mail: usasales@linmot.com
Web: http://www.linmotusa.com/

Please visit http://www.linmot.com/ to find the distribution near you.

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