



**Documentation of the EasySteps Application of the  
following Controller Series:**

**- E1100 & B1100**



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**EasySteps V3.7**  
User Manual

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Document version 3.7 / December, 2007

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## 1 System Overview

Where the two controller families E1100/B1100 differs in the notation this is mentioned with / separator e.g. X4/X14 the two different connector identifiers of the controllers.

The EasySteps 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)
- 8/6 digital IO/Inputs mapping to different 'Motion Commands'

All of this functionality could be wired to the X4/X14 connector that is available on all servos of the E1100/B1100 series. The MC-SW allows a free mapping of the X4 IO's resp. X14 Inputs to the Control Word respective Status Word bits, so no additional mapping is done in the EasySteps SW regarding this functionality. Every unused/undefined PIN on the X4 connector could be used as normal general purpose IO or in Special Function functionality as defined in the MC-SW parameter tree.

## 2 E1100 X4 IO Mapping

Descriptor	Special Function	EasySteps Function
X4.1	GND	GND
X4.2	24 VDC	24 VDC
X4.3	Brake (Output)	-
X4.4	Analog In	Motion Cmd Ch1 / An UPID Scale Ch1
X4.5	Capture Input	Motion Cmd Ch2
X4.6	Trigger (Input)	Motion Cmd Ch3
X4.7	Home Switch (Input)	Motion Cmd Ch4 / An UPID Scale Ch2
X4.8	Limit IN (Input)	Motion Cmd Ch5
X4.9	Limit OUT (Input)	Motion Cmd Ch6
X4.10	PTC 1 (Input)	Motion Cmd Ch7
X4.11	PTC 2 (Input)	Motion Cmd Ch8
X4.12	SVE Safety Voltage Enable (Input)	-

## 3 E1100 Input Mapping

Descriptor	Special Function	EasySteps Function
X14.13	GND	Supply GND
X14.25	24 VDC	Supply 24 VDC
X14.8/X14.21	Diff Analog Input -10V..+10V	Analog UPID Scale Ch1
X14.20	Analog input 0V..10V	Analog UPID Scale Ch2
X14.14		Motion Cmd Ch1
X14.2	Home Switch	Motion Cmd Ch2
X14.15	Trigger	Motion Cmd Ch3
X14.3		Motion Cmd Ch4
X14.16		Motion Cmd Ch5
X14.4		Motion Cmd Ch6

## **4 Smart Control Word Behavior**

All Control Word actions that are configured in the EasySteps 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.

### **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 testing system it might be helpful if the systems starts up automatically of powered on, for this case the switch On could be set to autostart.

### **Intf Home Flag Behavior**

Setting the Intf Home Flag Behavior to 'Autohome' starts automatically the homing if the state 8 'Operation Enabled' is reached and Statues Word bit 11 'Homed' is not set. Then when the homing sequence has finished the interface Control Word Bit 11 'Home' is reset and the state 8 is entered again.

### **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.

### **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.

## 5 Analog Parameter Scale

On the two analog capable inputs X4.4/X14.20 and X4.7/X14.8&X14.21 any live parameter upid could be mapped for analog scaling of its value.

### Analog Input On X4.4/X14.20

In the following example the live parameter 'P Gain' of the position controller Set A with the UPID 13A2h/6198h is scaled in the range 1..10 A/mm with the analog value on X4.4.

Parameter Name	Parameter Value	Parameter UPID E1100	Parameter UPID B1100
UPID	13A2h/6198h	30E0h	6460h
0V Scale	10	30E1h	F231h
10V Scale	100	30E2h	F232h

The scaled value of the parameter could be monitored in the Variable section of the EasySteps application SW with the variable 'Scaled Value On X4.4' (UPID 3A98h/F448h).

### Analog Input On X4.7/X14.8&X14.21

In the following example the live parameter 'Maximal Current' of the position controller Set A with the UPID 13A6h/E19Ch is scaled in the range 0..8 A with the analog value on X4.7.

Parameter Name	Parameter Value	Parameter UPID E1100	Parameter UPID B1100
UPID	13A6h/E19Ch	30F0h	6461h
0V/-10V Scale	0	30F1h	F233h
10V Scale	8000	30F2h	F234h

The scaled value of the parameter could be monitored in the Variable section of the EasySteps application SW with the variable 'Scaled Value On X4.7' (UPID 3ACAh/F449h).

## 6 IO Motions

The third functionality of the EasySteps application SW is to define different motion commands evaluated on a rising edge of the Inputs on X4.4 through X4.11.

The motion command could be selected with parameters:

Parameter Name	Parameter UPID E1100	Parameter UPID B1100
X4.4/X14.14 Rising Edge Function	3500h	6408h
X4.5/X14.2 Rising Edge Function	3600h	6418h
X4.6/X14.15 Rising Edge Function	3700h	6428h
X4.7/X14.3 Rising Edge Function	3800h	6438h
X4.8/X14.16 Rising Edge Function	3100h	6448h
X4.9/X14.4 Rising Edge Function	3200h	6458h
X4.10 Rising Edge Function	3300h	-
X4.11 Rising Edge Function	3400h	-

The table below shows the supported motion commands they are supported identically on all four inputs. The motion command parameters are parameters of the EasySteps-SW and may be used for different Motion Command, the table in the detailed description of the Motion Commands shows the mapping of the EasySteps parameters to the Motion Command parameters.

The last evaluated Motion command could be readout with the LinMot-Talk 1100 SW in the control panel.

The EasySteps-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 EasySteps Motion Commands are used together with Motion Commands over a serial bus interface.

## Overview of supported Motion Commands

Motion Command Name	UPID (3x00h) Value E1100	UPID (64x8h) Value B1100
None	0	0
Goto Abs Position	1	1
Increment Target Position	2	2
Increment Demand Position	3	3
Goto Abs Position From Actual Position	4	4
Increment Actual Position	5	5
Goto Analog Position	6	6
Start Curve From Actual Position	8	-
Eval Command table Command	12	-
CAM Go To Synch Pos	13	13
VAI Infinite Motion Positive Direction	14	14
VAI Infinite Motion Positive Direction	15	15
CAM Enable	17	-
Encoder Winding Start With Def Par	24	-
Encoder Curve Winding Start With Def Par	25	-
Teach In	31 (X4.9 only)	31 (X14.4 only)

### None

If none is selected no action is taken on Rising edge on this input. Input could be used as normal genera purpose input and be configured therefore in the MC-SW.

### Goto Abs Position

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

Motion Command Parameter Names	UPID's E1100	UPID's B1100
Position (Absolute Target Position)	3x10h	F2x0h/F2x8h
Max Speed	3x11h	F2x1h/F2x9h
Acceleration	3x12h	F2x2h/F2xAh
Deceleration	3x13h	F2x3h/F2xBh



**Increment Target Position**

On a rising edge of the input the target position of the last VAI- motion is incremented and the VAI motion is started or continued. (MC-SW Motion Command 010xh).

Motion Command Parameter Names	UPID's	UPID's B1100
Position (Target Position Increment)	3x10h	F2x0h/F2x8h
Max Speed	3x11h	F2x1h/F2x9h
Acceleration	3x12h	F2x2h/F2xAh
Deceleration	3x13h	F2x3h/F2xBh

**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's	UPID's B1100
Position (Demand Position Increment)	3x10h	F2x0h/F2x8h
Max Speed	3x11h	F2x1h/F2x9h
Acceleration	3x12h	F2x2h/F2xAh
Deceleration	3x13h	F2x3h/F2xBh

**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's	UPID's B1100
Position (Absolute Target Position)	3x10h	F2x0h/F2x8h
Max Speed	3x11h	F2x1h/F2x9h
Acceleration	3x12h	F2x2h/F2xAh
Deceleration	3x13h	F2x3h/F2xBh

**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's	UPID's B1100
Position (Actual Position Increment)	3x10h	F2x0h/F2x8h
Max Speed	3x11h	F2x1h/F2x9h
Acceleration	3x12h	F2x2h/F2xAh
Deceleration	3x13h	F2x3h/F2xBh

### Goto Analog Position

On a rising edge of the input a motion from any position to the analog position of X4.4 is started. (MC-SW Motion Command 019xh). For this reason this command is not available on input X4.4.

Motion Command Parameter Names	UPID's E110	UPID's B1100
Max Speed	3x11h	F2x1h/F2x9h
Acceleration	3x12h	F2x2h/F2xAh
Deceleration	3x13h	F2x3h/F2xBh

### 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's
Curve/Cmd ID	3x20h

### 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's
Curve/Cmd ID	3x20h

### VAI Stop

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

Motion Command Parameter Names	UPID's E1100	UPID's B1100
Deceleration	3x13h	F2x3h/F2xBh

### CAM Go To Synch Pos

On a rising edge of the input a motion to the CAM synchronous position is started (MC-SW Motion Command 102xh).

### CAM Enable

On a rising edge of the input the encoder CAM is enabled (MC-SW Motion Command 100xh).

### **Encoder Winding Start With Def Par**

On a rising edge of the input the encoder winding without curve is started (MC-SW Motion Command 300xh).

To stop the winding use an other motion command on an other input e.g. Goto Abs Position.

### Encoder Curve Winding Start With Def Par

On a rising edge of the input the encoder winding with curve is started (MC-SW Motion Command 310xh).

To stop the winding use an other motion command on an other input e.g. Goto Abs Position.

Motion Command Parameter Names	UPID's
Curve ID	3x20h

### Teach In IO Motion

Used to teach change the Position parameter of a IO motion (UPID 31x0h/F2x0h or F2x8h). For this reason the teach in could 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 X4.9/X14.4 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.

## 7 Contact Addresses

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