

A man in a light blue shirt is shown from the side, holding a tablet computer. The tablet screen displays a software interface with various charts and data. The background is a blurred industrial factory floor with machinery and equipment.

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Application description • 05/2016

SINAMICS G110M AS-i control blocks

With SIMATIC Step7 V13 SP1

<http://support.automation.siemens.com/WW/view/en/109481531>

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1 Task

The digital and the cyclic control and status signals of a SINAMICS G110M AS-I slave should be cyclically written or read by an AS-i master. Further, the acyclic parameter access to read or write parameters or to perform basic commissioning of a SINAMICS G110M via an AS-i master should also be possible. At the one hand varying configurations of SINAMICS G110M AS-i slaves must be possible and on the other various AS-i master should be applicable.

The acyclic communication between AS-i master and AS-i slave is supposed to be done with the function block FB19 "ASI_CTRL" [\5](#).

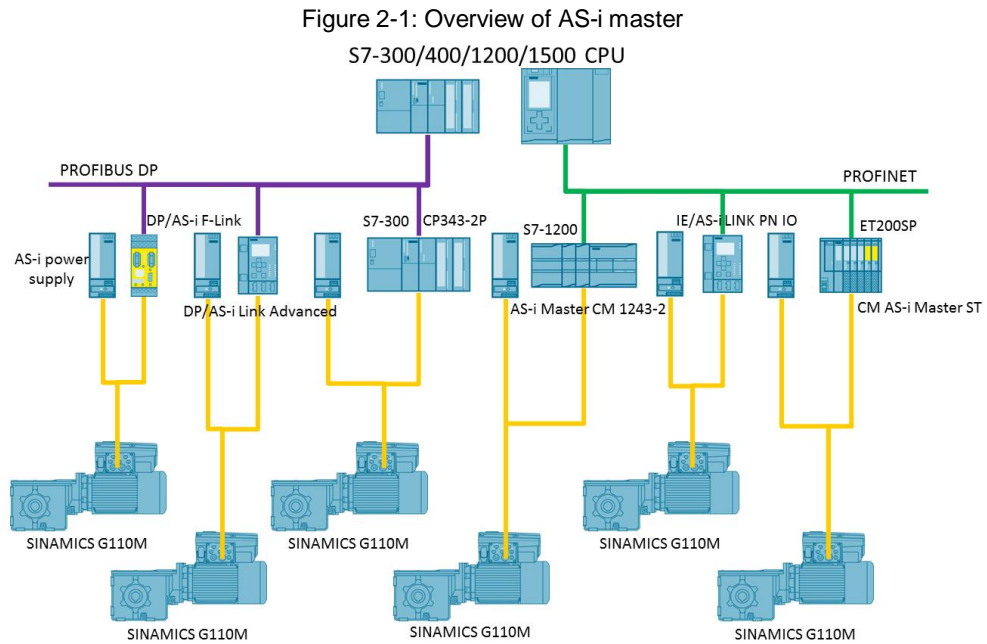
The SINAMICS G110M AS-i implements the AS-Interface specification V3.0 and thus the possible master should also support the specification V3.0.

2 Solution

2.1 AS-Interface fieldbus systems

2.1.1 AS-i master overview

Figure 2-1 gives an overview about the various AS-i master which support AS-i specification V3.0.



Available masters with AS-Interface specification V3.0 are

- CP 343-2, CP 343-2P (S7-300 / ET 200M)
- DP/AS-i LINK Advanced
- DP/AS-i F-Link
- DP/AS-Interface Link 20E
- IE/AS-i LINKPNIO¹
- CM 1243-2 (S7-1200)²
- CM AS-i Master ST (ET 200SP)

2.1.2 SINAMICS G110M with AS-Interface specification 3.0

The AS-Interface specification describes a fieldbus system with one AS-i master and 62 slaves at maximum.

- The normal slaves do have a single address (1 ... 31)
- The SINAMICS G110M also support A/B slaves which have the expanded address range of 1A ... 31A and 1B ... 31B (33 ... 63) with which up to 62 slaves can be operated on one bus.

¹ The control block library does not support the acyclic commands for IE/AS-i Link

² The control block library does not support the CM 1243-2 AS-i Master

- The single slaves and the A/B dual slaves can be mixed on an AS-i bus system without problems. The master knows which slave is connected so that the user does not have to make additional settings.
- One AS-i slave has four digital inputs and four digital outputs.
- The dual A/B slaves implement access to analog values just like the digital signals so that no additional function blocks are necessary.

Maximum cycle times of the digital signals

Table 2-1: Maximum cycle times for SINAMICS G110M AS-I slaves

AS-i bus configuration	Max. cycle time
31 SINAMICS G110M single slaves with A address range 1...31 (4DI/4DO)	20 ms
62 SINAMICS G110M A/B dual slaves (8DI/8DO)	40 ms

2.2 Hardware and software components

The following hardware and software is needed besides from the mentioned AS-i masters.

Hardware

Table 2-2: Hardware

Component	Qty.	Order number	Comment
CU240M AS-i	1	6SL3544-0xB02-1MA0	Shaft heights 71, 80/90, 100/112
PM240M	1	6SL3517-1BExx-xAM0	0,37 – 4 kW
SIMOGEAR geared motor	1	2KJ3xxx-xxxxx-xxxx-Z	wall mounting possible
AS-i-Power	1	3RX950x-xBA00	230VAC input voltage or 24VDC
AS-i M12 branch	1	3RK1901-1NR2x	1m or 2m
AS-i cable yellow	1	3RX901x-0AA00	100m or 1km
AS-i cable black	1	3RX902x-0AA00	100m or 1km

Under [\6\](#) you can find the catalogue for supplementary products.

Software

Table 2-3: Software

Component	Qty.	Order number	Comment
Step7 V13 SP1	1	6ES7822-1AA03-0YA5	
SINAMICS Startdrive V13 SP1	1	6SL3072-4DA02-0XG0	Free Download

3 Configuration

3.1 AS-i-Master configuration

A detailed description regarding the configuration of the AS-i masters can be taken from their respective operations manual.

NOTE Most of the AS-i masters offer functions to automatically address slaves which have the address zero and to read the existing AS-i fieldbus address configuration into the hardware configuration of the programming device. In this case a manual configuration of the AS-i slaves is no longer necessary.

Address range sorting

The gateways offer sorting functions to pack the AS-i slaves within the I/O address space of the master. Further, the slaves can be sorted in classic order or linear order which is described in Table 3-1.

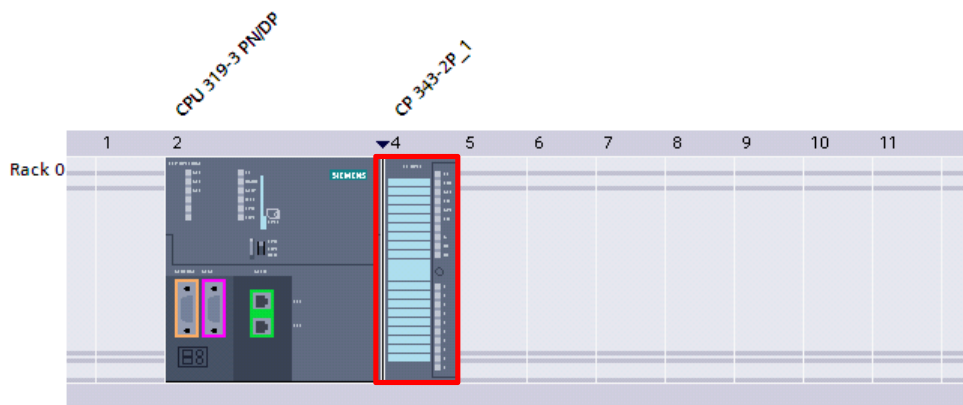
Table 3-1: Address sorting types for the AS-i slaves

Start of I/O address space	Slave address	I/Q address classic sorting	I/Q address linear sorting
100	1A	100	101
100	2A	101	102
100	3B	134	135
256	5A	260	261

3.1.1 Communication processor CP 343-2(P)

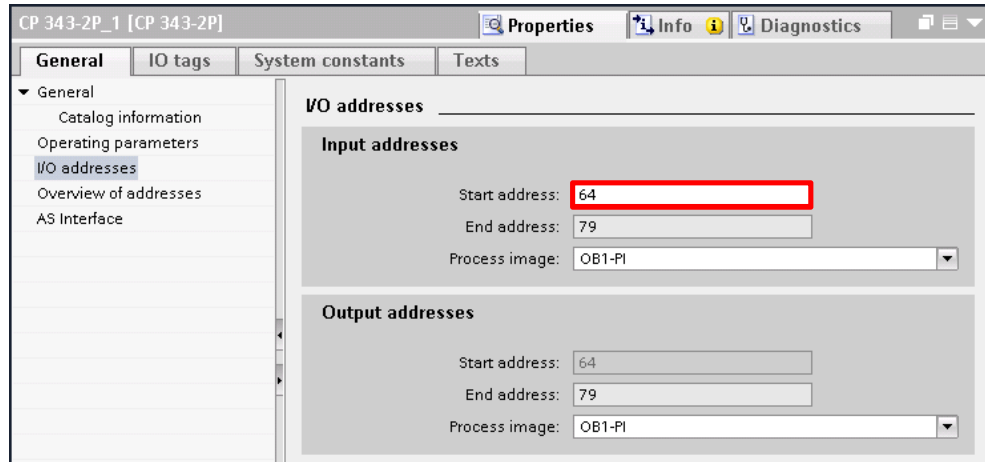
Insert the communication processor from the hardware catalog into the S7-300 Rack, here CP343-2P.

Figure 3-1: S7-300 with CP343-2P



Insert an address for the I/O address space of the process image, here 64 decimal. The slaves with the address from 1A up to 31A can be stored directly in the CP343-2P. To control the B address slaves the function block LASi_Com_Analog343 can be used.

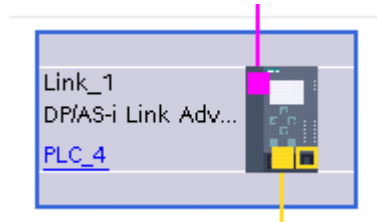
Figure 3-2: I/O addresses of the CP343-2P



3.1.2 Profibus Gateway DP/AS-I Link

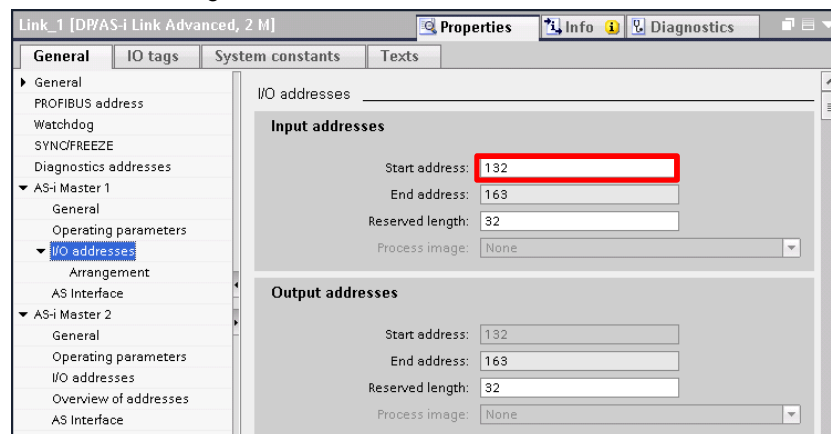
Insert the gateway from the hardware catalog into the Profibus fieldbus system and assign the slaves to one of the two AS-I Master.

Figure 3-3: DP/AS-I Link



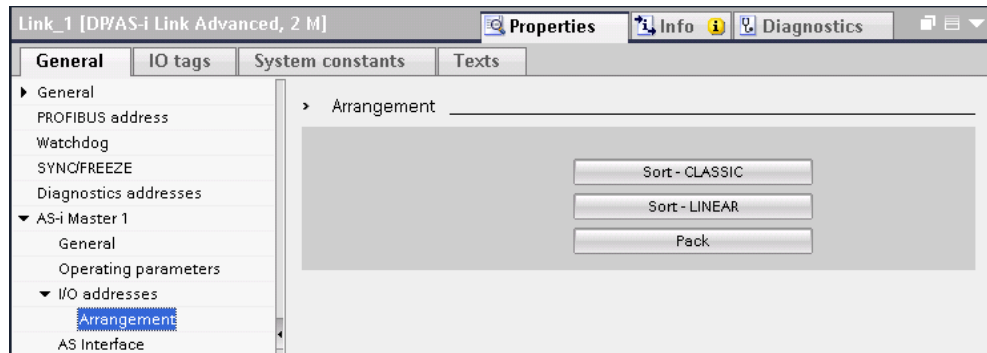
Under “AS-I Master 1 > I/O addresses” you can declare the address range of the AS-I network.

Figure 3-4: I/O addresses of the DP/AS-I Link



Under “AS-i Master 1 > I/O addresses > Arrangement” you find additional functions to sort and pack the AS-i slaves in the address range.

Figure 3-5: I/O address arrangement

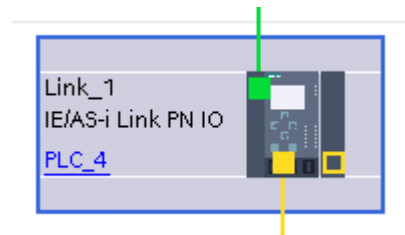


3.1.3 Profinet gateway IE/AS-i Link PN IO

NOTE The control block library does only support the cyclic communication. The function blocks for the acyclic commands cannot be used together with the IE/AS-i gateway. The system functions SFB52/53 must be used instead ASI_CTRL (FB19) to implement acyclic communication.

Insert the IE/AS-i Link PN IO from the hardware catalog into your Profinet fieldbus and connect the AS-i slaves to one of the two AS-i master ports.

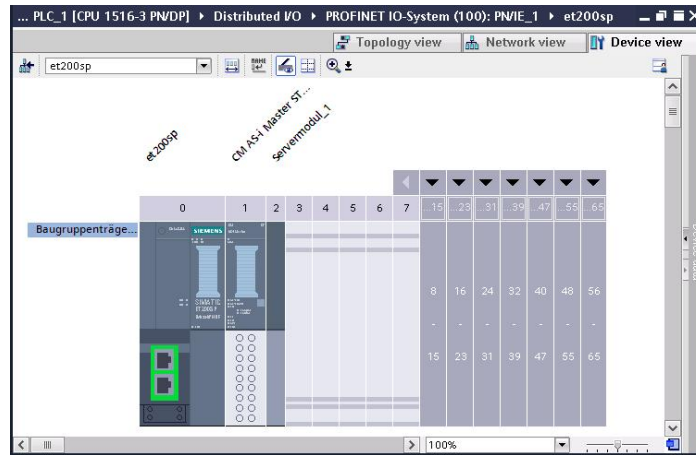
Figure 3-6: IE/AS-i Link PN IO



3.1.4 ET200SP with CM AS-i Master ST

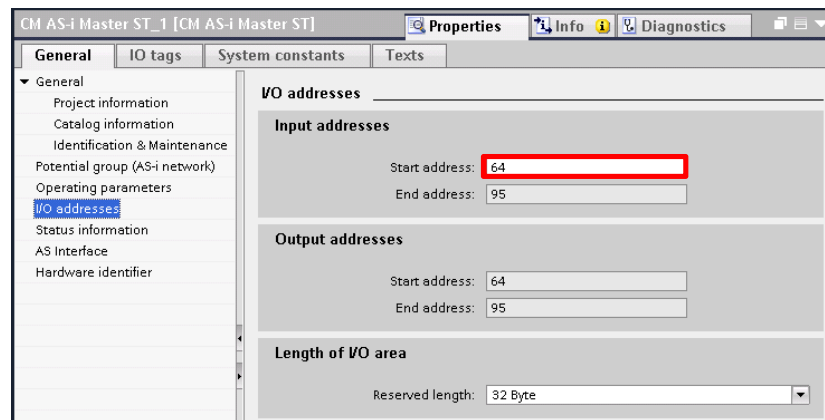
Insert the communication module CM AS-i master ST from the hardware catalog into the ET200SP station.

Figure 3-7: ET200SP with CM AS



Define an I/O start address for the AS-i network. The reserved length determines the amount of slave address of the AS-i master.

Figure 3-8: I/O addresses of the CM AS-i master ST

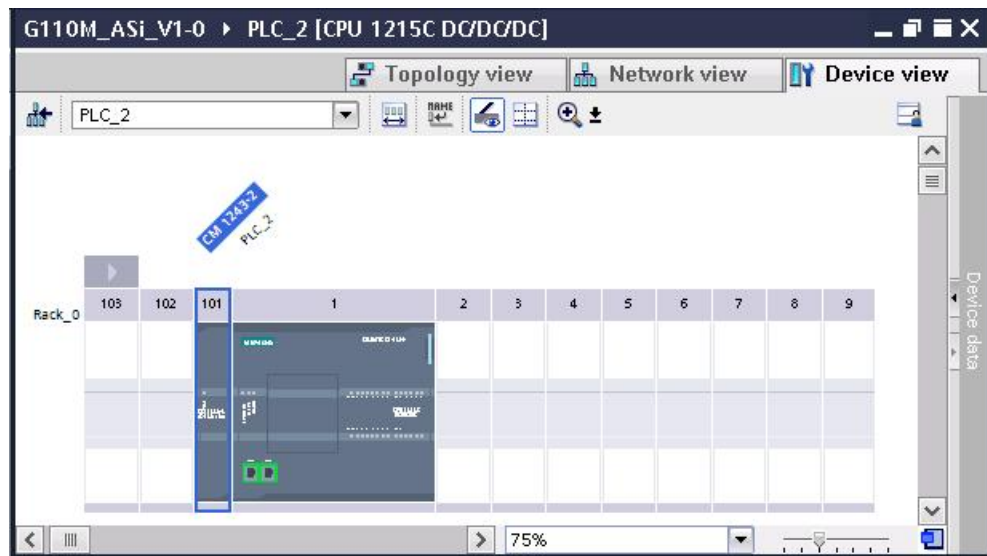


3.1.5 CM 1243-2

NOTE The control block library does not support the S7-1200 AS-i master CM1243-2. With the Hardware-ID one can use the system function for cyclic and acyclic communication. Further, the I/O address of the slave can be used to directly read or write the I/O of the slave.

Insert the communication module CM1243-2 from the hardware catalog into the S7-1200 rack.

Figure 3-9: S7-1200 with CM1243-2



Unter „E/A-Adressen > Adressübersicht“ finden Sie eine Übersicht aller E/A-Adressen und die jeweilige HW-ID für jeden AS-i Slave. Die HW-ID wird für das Schreiben und Lesen mittels Systemfunktionen benötigt.

3.2 G110M AS-i slave configuration

3.2.1 Single slave with A-address range

The AS-i single slave has four control bits and four status bits being transmitted cyclically. The SINAMICS G110M single slave is named slave 2 and the slave 1 is unused in single slave mode. The AS-Interface digital inputs are status bits of the drive to the AS-i master.

Table 3-2: Configuration of the digital inputs of the single slave (slave2)

Status bit	Parameter	Function
DI0	r899.0	Drive ready for switch on
DI1	r807.0	Drive in operation
DI2	r722.0	Digital input 0 is active
DI3	r722.1	Digital input 1 is active

The digital outputs of the AS-i slave are control signals of the AS-i master to the drive. The single slave can be controlled with 14 different fixed speed setpoints activated via the four digital outputs. Table 3-3 shows the combination of the digital outputs and its function.

Table 3-3: Configuration of the digital outputs of the single slave (slave 2)

DO3	DO2	DO1	DO0	Function
0	0	0	0	No speed command
0	0	0	1	Start with speed setpoint 1
0	0	1	0	Start with speed setpoint 2
0	0	1	1	Start with speed setpoint 3
...				...
1	1	1	0	Start with speed setpoint 14
1	1	1	1	Acknowledge fault / OFF2

The SINAMICS G110M single slave has the slave profile 7.F.E according to the AS-Interface protocol 3.0.

Table 3-4: Slave profile of the SINAMICS G110M single slaves

IO	ID	ID2	ID1
7 (B B B B)	F	E	F

3.2.2 Dual-Slave with A/B-address range

Digital values

The SINAMICS G110M offers as a A/B dual slave six digital inputs and four digital outputs. The function of each signal is described in the trailing tables. The shaded signals cannot be accessed directly via the process image but are rather used for serial communication.

Table 3-5: Digital inputs slave 1 of the A/B dual slave

Status bit	Parameter	Function
DI0	r722.2	Digital input 2 is active
DI1	r722.3	Digital input 3 is active
DI2	-	CTT2 receiver clock signal for the serial channel
DI3	-	CTT2 receiver data for serial communication

Table 3-6: Digital inputs slave 2 of the A/B dual slave

Status bit	Parameter	Function
DI0	r899.0	Drive ready for switch on
DI1	r807.0	Drive in operation
DI2	r722.0	Digital input 0 is active
DI3	r722.1	Digital input 1 is active

Table 3-7: Digital outputs slave 1 of the A/B dual slave

Status bit	Parameter	Function
DO0	-	CTT2 sender clock for serial communication
DO1	-	CTT2 sender data for serial communication
DO2	-	Quick stop disabled
DO3	-	Selection for A/B slave (A = 0, B = 1)

Table 3-8: Digital outputs slave 2 of the A/B dual slave

Status bit	Parameter	Function			
		DO2	DO1	DO0	
DO0	P1020	0	0	0	No speed command
		0	0	1	Start with speed setpoint 1
		0	1	0	Start with speed setpoint 2
DO1	P1021	0	1	1	Start with speed setpoint 3
		1	0	0	Start with speed setpoint 4
		1	0	1	Start with speed setpoint 5
DO2	P1022	1	1	0	Start with speed setpoint 6
		1	1	1	Acknowledge faults / OFF2
		Selection for A/B slave (A = 0, B = 1)			
DO3	-				

The SINAMICS G110M dual slave implements two single slaves according to the AS-Interface protocol 3.0 with the following profiles:

Table 3-9: Slave profiles of the SINAMICS G110M A/B dual slave

Slave	IO	ID	ID2	ID1
Slave 1	7 (B B B B)	A	5	7
Slave 2	7 (B B B B)	A	E	7

Analog values

The SINAMICS G110M dual slave with A/B address range can cyclically send and receive two words via the serial communication. These signals are referred to as analog values. The analog values can be used as variable speed setpoint, actual speed value, actual current value or others. PZD 2 and 3 in parameter p2050[1] and p2050[2] are used for the analog values received by the drive. The analog values send to the master can be connected to PZD 2 and 3 in parameters p2051[1] and p2051[2].

NOTE

The 16 bit analog values are normalized with the reference values in p2000 and following according to ProfiDrive

Configuration of the analog address

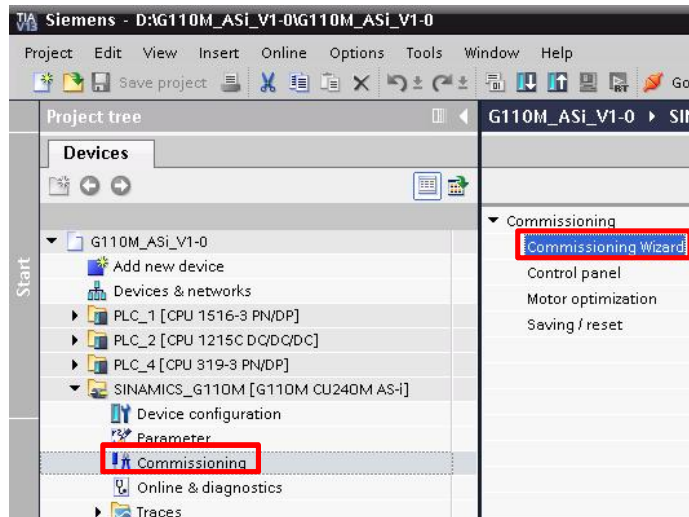
The analog values of the A/B dual slaves are configured in the hardware configuration of the AS-i slave. This can be done under the properties of the first A/B slave by activating the checkmark "Cyclic analog data". The analog value is written and read directly via the given address in the I/O space. Two words exist in send and receive direction.

4 Drive commissioning

4.1 Basic commissioning

The basic commissioning is supposed to be done like described in the operations manual. In the following, the parameters relevant for this application are described. Start the commissioning wizard for the basic commissioning.

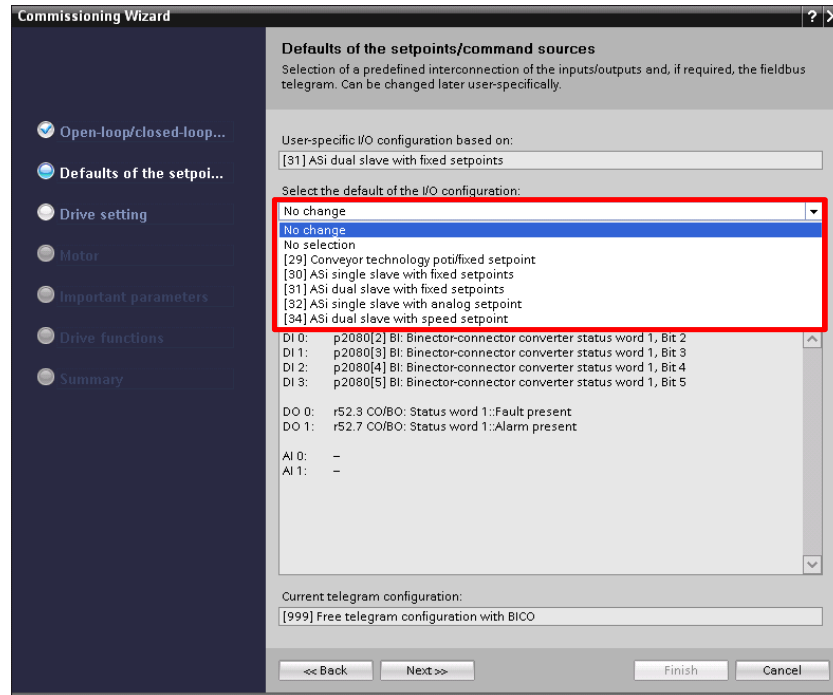
Figure 4-1: Commissioning wizard



Macro for the drive I/O configuration

In the step „Defaults of the setpoint/command sources“ the macro in parameter p15 can be selected to pre configure the AS-i slave operation of the SINAMICS G110M.

Figure 4-2: Defaults of the setpoint/command sources

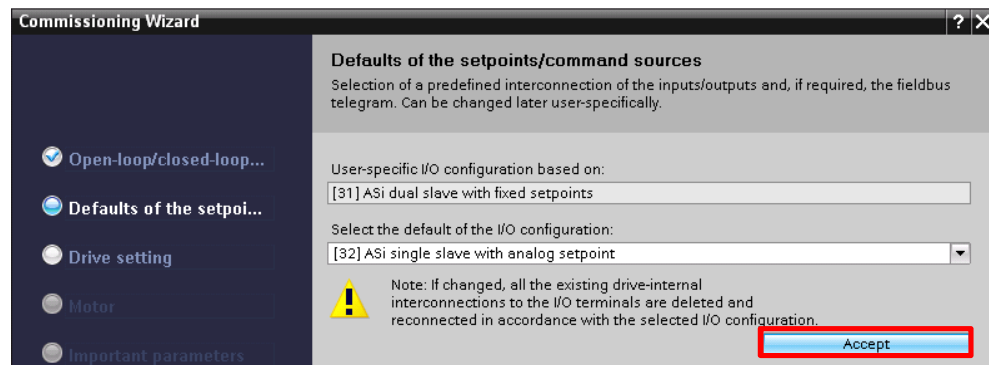


The following macros for AS-i communication exist:

- [30] AS-i single slave with fixed setpoints
- [31] AS-i dual slave with fixed setpoints
- [32] AS-i single slave with analog setpoint
- [34] AS-i dual slave with speed setpoint

The fixed speed setpoints are parameterized in the drive and activated from the PLC with the control bits. The macro [32] connects the speed setpoint with the hardware analog input of the drive. The PLC therefore enables the drive via AS-i communication but the setpoint is directly connected to the drives analog input. In contrast to macro [34] where the speed setpoint is send from the PLC via the serial communication of the AS-i dual slave. The macro [29] is not relevant if AS-i communication is supposed to be used.

Figure 4-3: Accept the changes

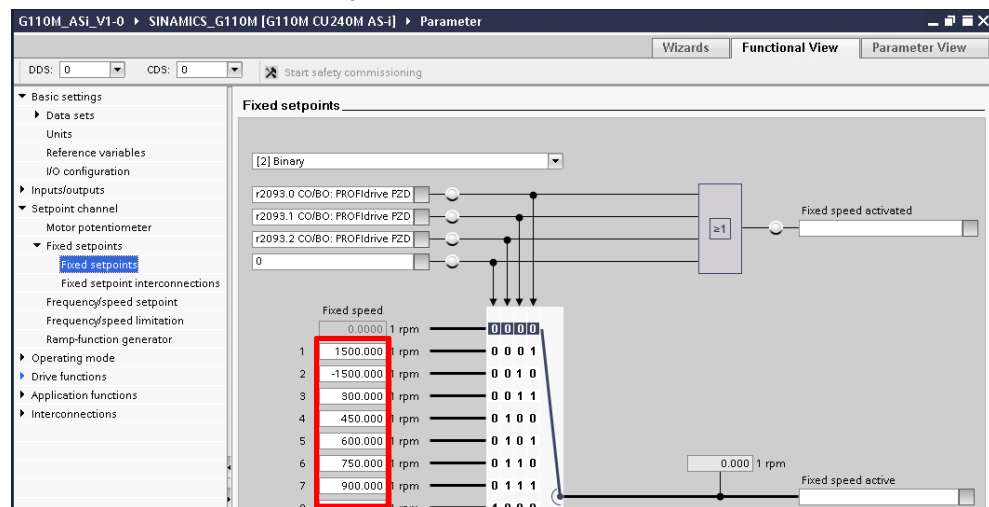


The last step summarizes the parameters and the written values. Please finish the quick commissioning.

Fixed speed setpoints

If the SINAMICS G110M is controlled with fix setpoint, the speed setpoints need to be parameterized in the functional view under “Setpoint channel > Fixed setpoints > Fixed setpoints”.

Figure 4-4: Fixed speed setpoints



Communication

The configuration of the communication is defined by the macro or default selection for the I/O configuration. The single slave is has the ID1 profile in parameter P2014[1] the value 15 (F_{Hex}) for slave 2. The dual slave sets the ID1 profile for slave 1 P2014[0] and 2 P2014[1] of the value 7.

One still has to define the AS-i addresses of the SINAMICS G110M slaves. The AS-i address of the single slave is defined in parameter P2012[1] for slave 2. Slave 1 is not used with the SINAMICS G110M as single slave. When the SINAMICS G110M is used as dual slave, both addresses have to be configured in parameter p2012[0]/[1]. The address in parameter P2012[0]/[1] is inserted as decimal value. Therefore, the A/B addresses have to be converted a shown in Table 4-1.

Table 4-1: Address conversion of A/B slaves

Slave-Adresse	Dezimalwert	Slave-Adresse	Dezimalwert
1A	1	1B	33
2A	2	2B	34
...
31A	31	31B	63

4.2 Drive functions

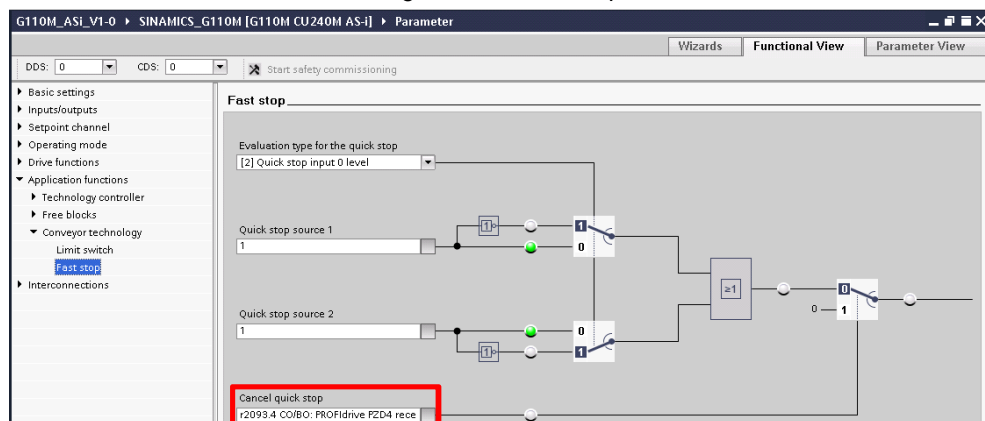
In the following the commissioning of typical drive functions is described.

4.2.1 Quick stop

Typically this function is used for simple positioning in conveying applications. The advantage is the high repeatability which is independent from any CPU or field bus cycle times. The local digital inputs on the G110M can be connected to a signal of the digital inputs which interrupts the ON command. The status of the digital input is parameter r722, while the access is bitwise for the respective digital input.

Via parameter p886 you can choose whether the Quick stop shall release edge or level triggered. The travel command is continued using the control bit Cancel quick stop. This is also realized if the digital input, which initiated the function, is still energized.

Figure 4-5: Quick Stop



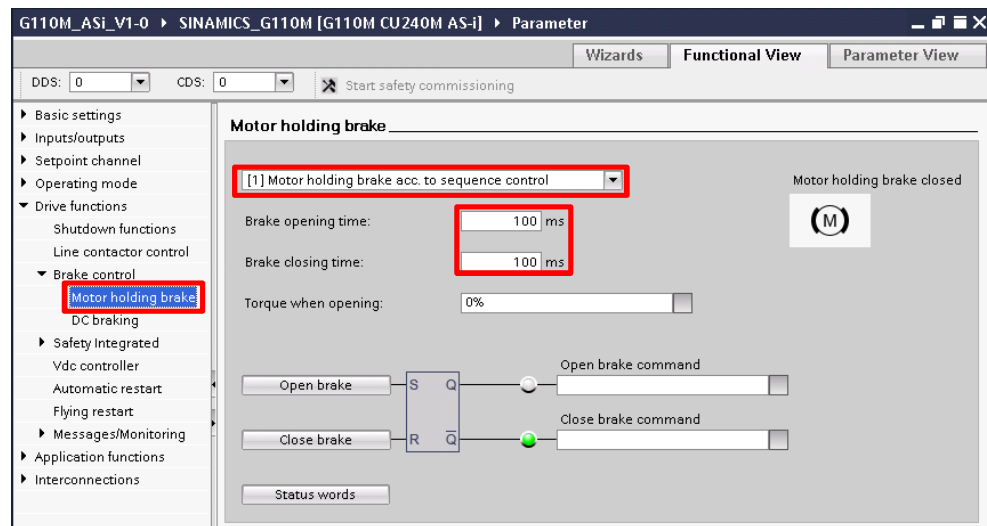
4.2.2 Dynamic braking

The SINAMICS G110M can be ordered with an internal braking resistor for dynamic braking operations. Alternatively an external braking resistor can be connected. The resistor needs to be parameterized in order to be activated. Open the expert list of the drive and insert the peak power of the braking resistor in parameter p219. If the internal braking resistor is used, the peak power is equivalent to the drive's nominal power rating.

4.2.3 Motor holding brake

If the motor is equipped with a motor holding brake, the drive can handle the command to open the brake. The brake can be opened with the drive on command and closed with the off command when "[1] Motor holding brake acc. to sequence control" is selected in parameter p1215. You can further specify the opening and closing times of the holding brake.

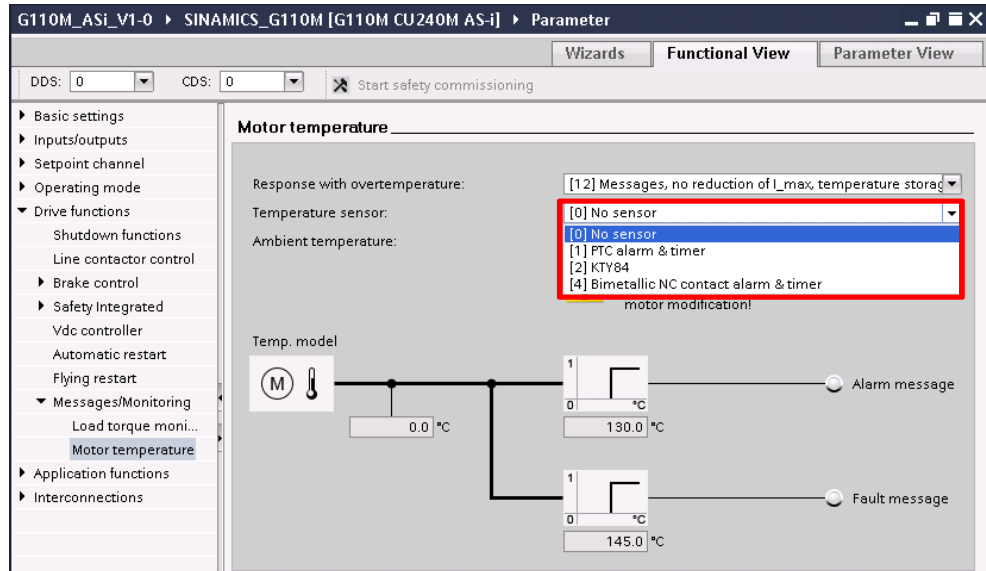
Figure 4-6: Motor holding brake



4.2.4 Motor temperature

When a motor temperature sensor is used to protect the motor and wired to the SINAMICS G110M, the drive can monitor the sensor signal. In the drive's functional parameter view under "Drive functions > Messages/Monitoring > Motor temperature" you can choose the respective temperature sensor in parameter p601.

Figure 4-7: Motor temperature



5 Drive control

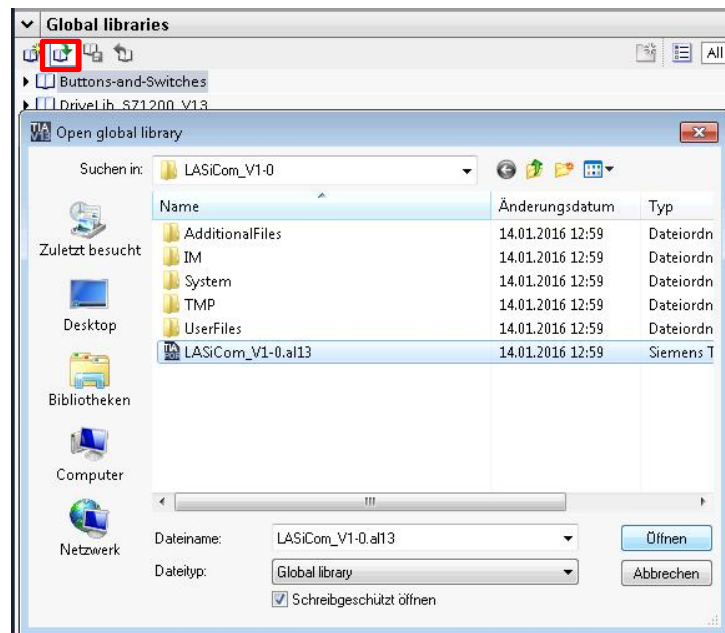
Table 5-1 lists all the control function blocks for the SIMATIC program to control the SINAMICS G110M with various AS-i masters. The communication processor CP343 uses the blocks FC143, FC243 and FB243. The blocks FC145, FC245 for classic address sorting and FC146, FC246 for linear sorting are developed for the gateways. For the acyclic operations the function blocks FB248 and FB249 are used.

Table 5-1: Overview of the control function blocks

Name	Beschreibung
ASI-CTRL	Command interface for AS-i master
LASiCom_Single343 (FC143)	Single slave with CP34x (only A addresses)
LASiCom_Dual343 (FC243)	Dual slave with CP34x (only A addresses)
LASiCom_Analog343 (FB243)	Helper block for FC243 (B addresses and analog values)
LASiCom_SingleClassic (FC145)	Control of single slave in classic sorting
LASiCom_SingleLinear (FC146)	Control of single slave in linear sorting
LASiCom_DualClassic (FC245)	Control of dual slave in classic sorting
LASiCom_DualLinear (FC246)	Control of dual slave in linear sorting
LASiCom_RWParameter (FB247)	Read or write parameter
LASiCom_WriteDataset (FB248)	Load drive dataset into G110M
LASiCom_DriveDataset_DB (DB249)	Drive dataset to be written with FB248
LASiCom_TypeParameter	Data structure of a parameter for the dataset array

Download the function block library from the internet and unpack the library. Open the library "LASiCom" under the global libraries. Under master copies the function blocks can be found and inserted into the plc program.

Figure 5-1: Open the LASiCom library



5.1 Control via process image

The simplest way to control the SINAMICS G110M is to write directly to the slave address of the AS-i master's I/O address space. Figure 5-2 shows a watch table with which a SINAMICS G110M single slave can be controlled. The start address of the AS-i master is 66 and the slave address in this case is 1A.

Figure 5-2: Control of a single slave via process image

	Name	Adresse	Anzeigeformat	Beobachtungsw...	Steuerwert
1	"singleSlaveDO0"	%Q66.0	BOOL	<input checked="" type="checkbox"/> TRUE	TRUE
2	"singleSlaveDO1"	%Q66.1	BOOL	<input type="checkbox"/> FALSE	
3	"singleSlaveDO2"	%Q66.2	BOOL	<input type="checkbox"/> FALSE	
4	"singleSlaveDO3"	%Q66.3	BOOL	<input type="checkbox"/> FALSE	
5	"singleSlaveDI0"	%I66.0	BOOL	<input checked="" type="checkbox"/> TRUE	
6	"singleSlaveDI1"	%I66.1	BOOL	<input checked="" type="checkbox"/> TRUE	
7	"singleSlaveDI2"	%I66.2	BOOL	<input type="checkbox"/> FALSE	FALSE
8	"singleSlaveDI3"	%I66.3	BOOL	<input type="checkbox"/> FALSE	FALSE

Figure 5-3 shows a watch table to control a SINAMICS G110M dual slave via the process image. The master start address of the AS-i I/O address space is 100 and the addresses of slave 1 and slave 2 are 1A and 2A.

Figure 5-3: Control of a dual slave via process image

	Name	Adresse	Anzeigeformat	Beobachtungsw...	Steuerwert
1	"Dual_slave1_DI2"	%I100.0	BOOL	<input type="checkbox"/> FALSE	
2	"Dual_slave1_DI3"	%I100.1	BOOL	<input type="checkbox"/> FALSE	
3	"Dual_slave2_ready"	%I101.4	BOOL	<input checked="" type="checkbox"/> TRUE	
4	"Dual_slave2_operation"	%I101.5	BOOL	<input checked="" type="checkbox"/> TRUE	
5	"Dual_slave2_DI0"	%I101.6	BOOL	<input type="checkbox"/> FALSE	
6	"Dual_slave2_DI1"	%I101.7	BOOL	<input type="checkbox"/> FALSE	
7	"Dual_slave1_Quick_Stop"	%Q100.2	BOOL	<input checked="" type="checkbox"/> TRUE	TRUE
8	"Dual_slave2_DO0"	%Q101.4	BOOL	<input checked="" type="checkbox"/> TRUE	TRUE
9	"Dual_slave2_DO1"	%Q101.5	BOOL	<input type="checkbox"/> FALSE	FALSE
10	"Dual_slave2_DO2"	%Q101.6	BOOL	<input type="checkbox"/> FALSE	

5.2 Control function blocks

5.2.1 Communication processor CP34x-2(P)

The blocks *LASiCom_Single343* and *LASiCom_Dual343* are called for every SINAMICS G110M single or dual slave respectively.

Single Slave with „LASiCom_Single343“ (FC143)

Figure 5-4: LASiCom_Single343

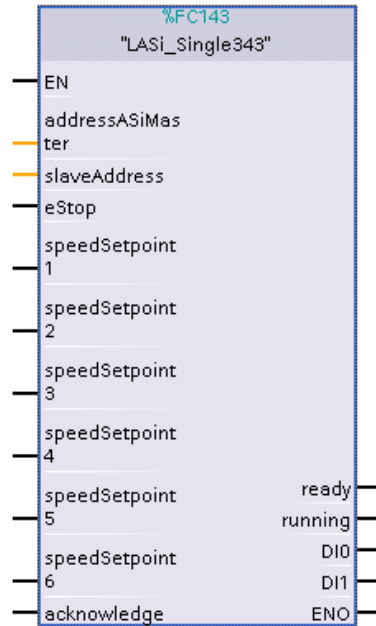


Table 5-2: Interface description of LASiCom_Single343

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Start address of the AS-i masters in the hexadecimal format (256dec = 100hex)
IN	slaveAddress	INT	AS-i address, slave 2 (p2012[1])
IN	eStop	BOOL	For a low signal, immediately initiates a pulse inhibit
IN	speedSetpoint1	BOOL	Start with fixed speed 1 (p1001)
IN	speedSetpoint2	BOOL	Start with fixed speed 2 (p1002)
IN	speedSetpoint3	BOOL	Start with fixed speed 3 (p1003)
IN	speedSetpoint4	BOOL	Start with fixed speed 4 (p1004)
IN	speedSetpoint5	BOOL	Start with fixed speed 5 (p1005)
IN	speedSetpoint6	BOOL	Start with fixed speed 6 (p1006)
IN	acknowledge	BOOL	Fault acknowledgment
OUT	ready	BOOL	G110M is ready to be switched-on
OUT	Running	BOOL	G110M is operational
OUT	DI0	BOOL	Status of the local digital input 0
OUT	DI1	BOOL	Status of the local digital input 1

Dual Slave with „LASiCom_Dual343“ (FC243)

Figure 5-5: LASiCom_Dual343

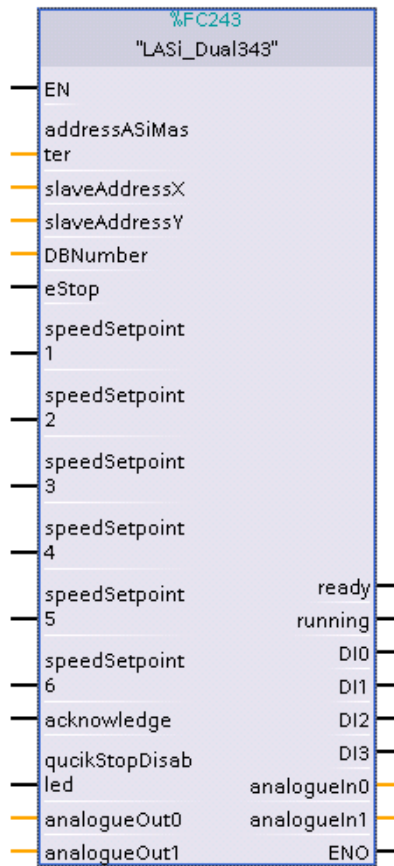


Table 5-3: Interface description of LASiCom_Dual343

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Starting address of the AS-i master in hexadecimal format (256dez = 100hex)
IN	slaveAddressX	INT	AS-i address of Slave-1 (p2012[0]) Off set needs to be added for slaves in B address area; B address area only active when „DB_No > 0“
IN	slaveAddressY	INT	AS-i address of Slave-2 (p2012[1]) Off set needs to be added for slaves in B address area; B address area only active when „DB_No > 0“
IN	DBNumber	INT	Number of the instance DB when auxiliary function block (FB243) is used. When “0” function is deactivated.
IN	eStop	BOOL	For a low signal, immediately initiates a pulse inhibit
IN	speedSetpoint1	BOOL	Start with fixed speed 1 (p1001)
IN	speedSetpoint2	BOOL	Start with fixed speed 2 (p1002)
IN	speedSetpoint3	BOOL	Start with fixed speed 3 (p1003)
IN	speedSetpoint4	BOOL	Start with fixed speed 4 (p1004)
IN	speedSetpoint5	BOOL	Start with fixed speed 5 (p1005)
IN	speedSetpoint6	BOOL	Start with fixed speed 6 (p1006)
IN	acknowledge	BOOL	Fault acknowledge
IN	quickStopDisabled	BOOL	Quick stop disable
IN	analogOut0	INT	Analogue output 0 to G110M (0 – 200%)

Type	Name	Data type	Description
			Analogue channels only active when „DB_No > 0“
IN	analogOut1	INT	Analogue output 1 to G110M (0 – 200%) Analogue channels only active when „DB_No > 0“
OUT	ready	BOOL	Drive is ready
OUT	running	BOOL	Drive is running
OUT	DI0	BOOL	Status of local digital input 0
OUT	DI1	BOOL	Status of local digital input 1
OUT	DI2	BOOL	Status of local digital input 2
OUT	DI3	BOOL	Status of local digital input 3
OUT	analogIn0	INT	Analogue input 0 from G110M Analogue channels only active when „DB_No > 0“
OUT	analogIn1	INT	Analogue input 1 from G110M Analogue channels only active when „DB_No > 0“

NOTE

The AS-i master CP 342-2 AS-i (MLFB: 6GK7 342-2AH0x-0XA0) neither supports addressing in B address area nor data transmission via the analogue channel. The auxiliary function blocks cannot be used in this case.

The auxiliary function block *LASiCom_Analog343* needs to be used when you have a slave in the B address area or when you want to use the analogue channel. This auxiliary function block requires only one call per AS-i master. The call enables all dual-slaves managed by this master to use the additional functions.

Helper function block for analog values and B address range (FB243)

In order to relieve data traffic on the back plane bus between CPU and CP 34x-2(P) the individual functions of the auxiliary function block can be activated separately.

Figure 5-6: LASiCom_Analog343

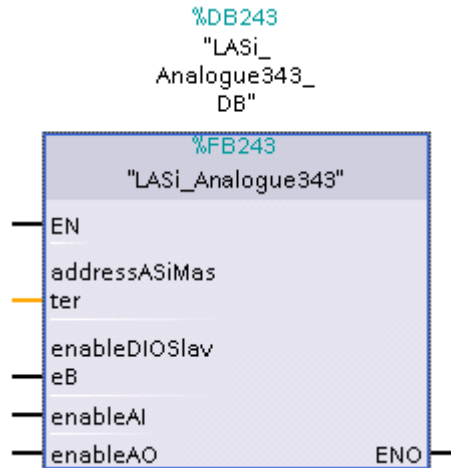


Table 5-4: Interface description of LASiCom_Analog343

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Starting address of the AS-i master in hexadecimal format (256dez > 100hex)
IN	enableDIOslaveB	BOOL	Activates B address area for AS-i master
IN	enableAI	BOOL	Activates the analogue inputs of the AS-i slaves
IN	enableAO	BOOL	Activates the analogue outputs of the AS-i slaves

5.2.2 Gateways and ET200SP CM AS-i Master ST

The cyclic communication of the digital signals are written and read with the blocks LASiCom_SingleClassic or LASiCom_SingleLinear for classic and linear sorting of single slave and with the blocks LASiCom_DualClassic or LASiCom_DualLinear for classic and linear sorting of dual slaves.

Single Slave with „LASiCom_SingleLinear/Classic“ (FC145/146)

Figure 5-7: LASiCom_SingleClassic/Linear FC145/FC146

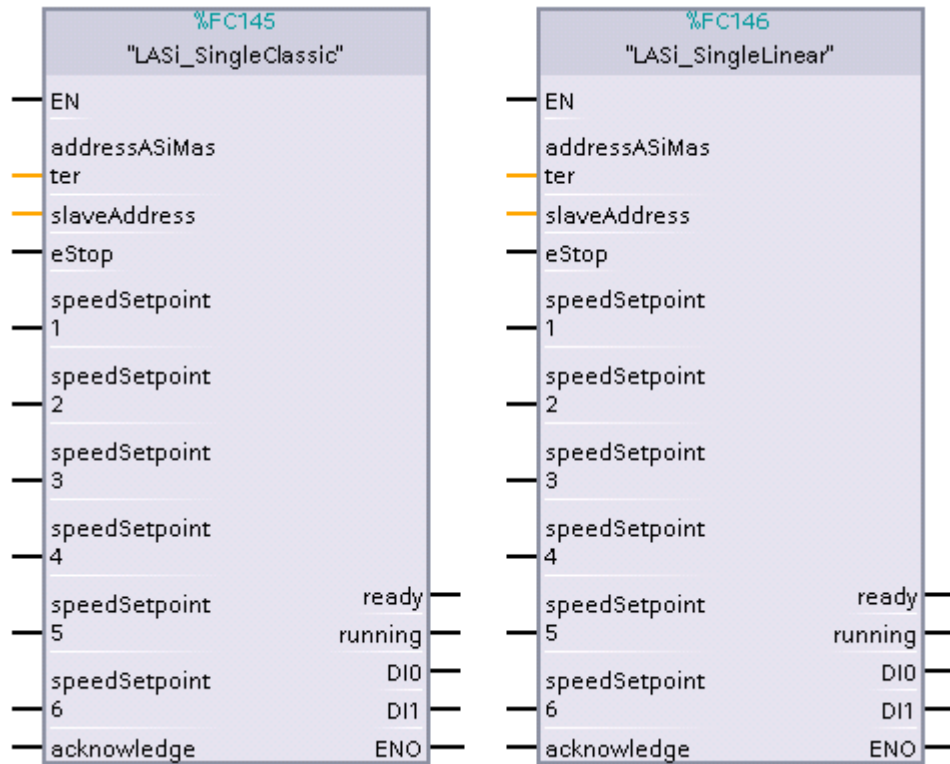


Table 5-5: Interface Description of LASiCom_SingleClassic/Linear (FC145/146)

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Start address of the AS-i masters in the hexadecimal format (256dec = 100hex)
IN	slaveAddress	INT	AS-i address, slave 2 (p2012[1])
IN	eStop	BOOL	For a low signal, immediately initiates a pulse inhibit
IN	speedSetpoint1	BOOL	Start with fixed speed 1 (p1001)
IN	speedSetpoint2	BOOL	Start with fixed speed 2 (p1002)
IN	speedSetpoint3	BOOL	Start with fixed speed 3 (p1003)
IN	speedSetpoint4	BOOL	Start with fixed speed 4 (p1004)
IN	speedSetpoint5	BOOL	Start with fixed speed 5 (p1005)
IN	speedSetpoint6	BOOL	Start with fixed speed 6 (p1006)
IN	acknowledge	BOOL	Fault acknowledgment
OUT	ready	BOOL	G110M is ready to be switched-on
OUT	running	BOOL	G110M is running
OUT	DI0	BOOL	Status of the local digital input 0
OUT	DI1	BOOL	Status of the local digital input 1

Dual Slave with „LASiCom_DualLinear/Classic“ (FC245/246)

Figure 5-8: LASiCom_DualClassic/Linear FC245/FC246

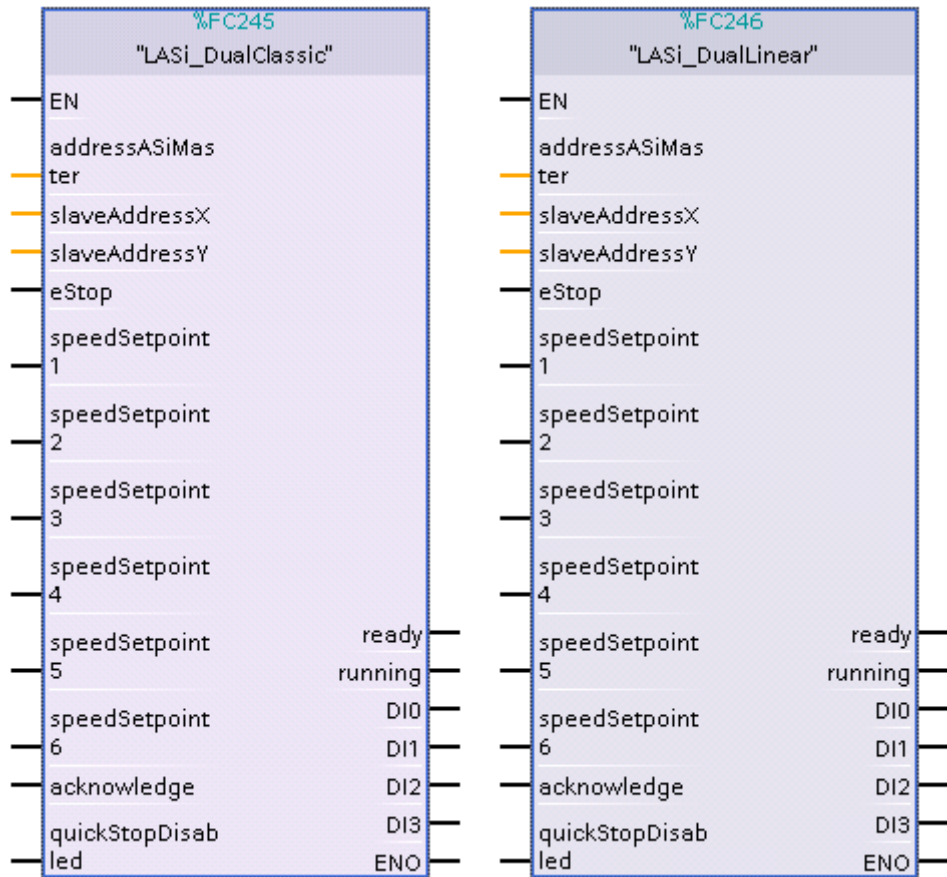


Table 5-6: Interface Description of LASiCom_DualLinear/Classic (FC245/246)

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Starting address of the AS-i master in hexadecimal format (256dez = 100hex)
IN	slaveAddressX	INT	AS-i address of Slave-1 (p2012[0]) Off set needs to be added for slaves in B address area; B address area only active when „DB_No > 0“
IN	slaveAddressY	INT	AS-i address of Slave-2 (p2012[1]) Off set needs to be added for slaves in B address area; B address area only active when „DB_No > 0“
IN	eStop	BOOL	For a low signal, immediately initiates a pulse inhibit
IN	speedSetpoint1	BOOL	Start with fixed speed 1 (p1001)
IN	speedSetpoint2	BOOL	Start with fixed speed 2 (p1002)
IN	speedSetpoint3	BOOL	Start with fixed speed 3 (p1003)
IN	speedSetpoint4	BOOL	Start with fixed speed 4 (p1004)
IN	speedSetpoint5	BOOL	Start with fixed speed 5 (p1005)
IN	speedSetpoint6	BOOL	Start with fixed speed 6 (p1006)
IN	acknowledge	BOOL	Fault acknowledge
IN	quickStopDisabled	BOOL	Quick stop disable
OUT	ready	BOOL	Drive is ready
OUT	running	BOOL	Drive is running
OUT	DI0	BOOL	Status of local digital input 0

Type	Name	Data type	Description
OUT	DI1	BOOL	Status of local digital input 1
OUT	DI2	BOOL	Status of local digital input 2
OUT	DI3	BOOL	Status of local digital input 3

Cyclic analog values

The cyclic analog values of the gateways are written and read directly via the I/O address which was configured in slave 1 of the A/B dual slave. If macro “[34] AS-i dual slave with speed setpoint” was selected, the analog values are pre connected as follows:

Table 5-7: Connections with parameter p15 = [34]

PZD	Parameter	Connected with	E/A-address
2	r2050[1]	Main setpoint p1070[0]	AW X
3	r2050[2]	-	AW X+2
2	p2051[1]	Actual speed r63[0]	EW Y
3	P2051[2]	Actual current r27	EW Y+2

5.3 Acyclic commands

NOTE The acyclic operations are realized with FB ASI_CTRL. This function block is, however, not supported by the IE/AS-i-Link PN IO gateway. Here the system function blocks must be used for acyclic communication.

5.3.1 Read and write parameters (FB247)

With the block *LASiCom_RWParameter* parameter values can be read and written. The parameters of the SINAMICS G110M are of either 16 bit or 32 bit length. The parameter length can be taken from the parameter help in STARTER or from the list manual.

NOTE Binary combinations of parameter can be assigned with the fixed values FALSE and TRUE. For FALSE the value *DW#16#0* is to be entered, for TRUE the value *DW#16#10000* is to be entered.

Figure 5-9: LASiCom_RWParameter

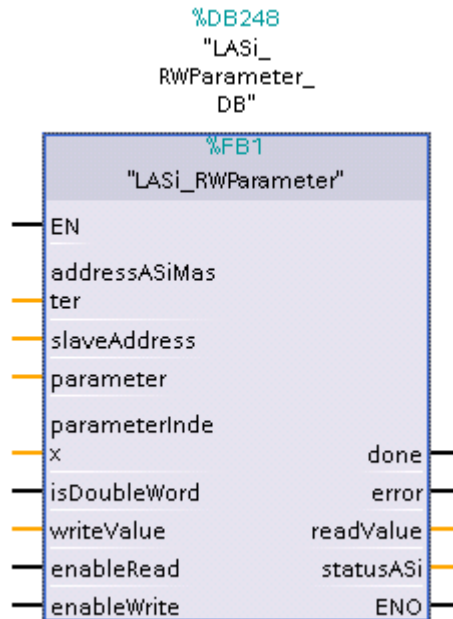


Table 5-8: Interface Description of LASiCom_RWParameter

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Starting address of the AS-i master in hexadecimal format(256dez > 100hex)
IN	slaveAddress	INT	AS-i address of Slave 1 (p2012[0]) Off set needs to be added for slaves in B address area
IN	parameter	INT	Number of parameter to be written or read
IN	parameterIndex	INT	Number of the indices of selected parameter
IN	isDoubleWord	BOOL	0: Selected parameter is 16 Bit wide 1: Selected parameter is 32 Bit wide
IN	writeValue	DWORD	Value to be written to selected parameter
IN	enableRead	BOOL	Initiates reading of selected parameter
IN	enableWrite	BOOL	Initiates writing of selected parameter
OUT	done	BOOL	Task being processed
OUT	error	BOOL	Task completed successfully
OUT	readValue	BOOL	Task aborted with errors
OUT	statusASi	DWORD	Value read from selected parameter
OUT	enableRead	DWORD	Status of FB19

Example:

Change the first fixed frequency in parameter p1001[0] to 1200.5 rpm.

Par_No: 1001 Par_Type: TRUE
 Par_Index: 0 Value_WR: 1200.5 (REAL)

5.3.2 Writing a drive parameter dataset (FB248)

NOTE The drive is reset to factory setting before the parameter values are being written to the drive. The parameter setting being done in advance to the operation will be lost.

The block *LASiCom_WriteDataset* transmits an entire drive dataset to the SINAMICS G110M. It can therefore be applied to series commissioning as an alternative to memory cards.

Figure 5-10: LASiCom_WriteDataset

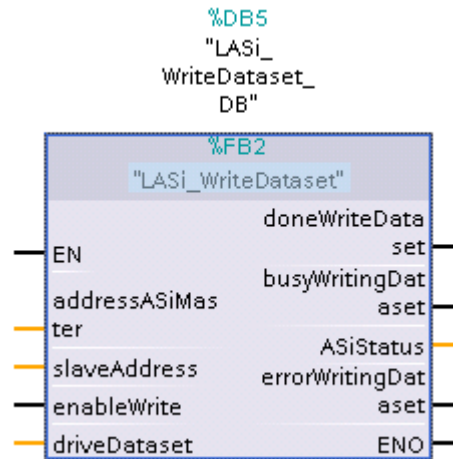


Table 5-9: Interface Description of LASiCom_WriteDataset

Type	Name	Data type	Description
IN	addressASiMaster	WORD	Starting address of the AS-i master in hexadecimal format(256dez > 100hex)
IN	slaveAddress	INT	AS-i address of Slave 1 (p2012[0]) Off set needs to be added for slaves in B address area
IN	enableWrite	BOOL	Starts to write to the selected data set.
OUT	doneWriteDataset	BOOL	Operation completed
OUT	busyWritingDataset	BOOL	Block is busy performing operation
OUT	ASiStatus	DWORD	Status of FB19
OUT	errorWritingDataset	BOOL	Task aborted with errors
IN_OUT	driveDataset	ARRAY [0..34] of UDT249	Parameter dataset of the SINAMICS G110M

The dataset is stored in an array of *LASiCom_typeParameter* which is defined as follows:

Table 5-10: LASiCom_typeParameter

Name	Type	Description
number	INT	Parameter number
index	INT	Parameter index
value	REAL	Parameter value as REAL (integer values should be given as a real value with .0 for example 1 = 1.0)
isWord	BOOL	Determines the parameter length (true = 16 bits; false = 32 bits)
isDWord	BOOL	Determines whether the parameter is a integer value or a real value (true = integer value, false = real value)

The block *LASiCom_WriteDataset* awaits an array with 35 parameters which is defined in a data block as shown in Figure 5-11.

Figure 5-11: Data block of the drive dataset

	Name	Data type	Offset	Start value	Retain	Accessible f...	Visible in ...	Setpoint
1	Static							
2	DriveDataset1	Array[0..36] ...	0.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	DriveDataset1[0]	*LASiCom_typePara...	0.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	number	Int	0.0	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	index	Int	2.0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	value	Real	4.0	31.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	isWord	Bool	8.0	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	isDword	Bool	8.1	true	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	DriveDataset1[1]	*LASiCom_typePara...	10.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10	DriveDataset1[2]	*LASiCom_typePara...	20.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Table 5-11 lists all the parameters of the SINAMICS G110M which are written by the PLC with *LASiCom_WriteDataset*.

Table 5-11: Parameter list of the SINAMICS G110M written by *LASiCom_WriteDataset*

Parameter	Description	Data type	Default value
p15	Macro drive unit	UInt32	31
p300	Motor type selection	Int16	1
p301	Motor code number selection	UInt16	0
p304	Rated motor voltage	Float32	0.0
p305	Rated motor current	Float32	0.0
p307	Rated motor power	Float32	0.0
p308	Rated motor power factor	Float32	0.0
p310	Rated motor frequency	Float32	0.0
p311	Rated motor speed	Float32	0.0
p1215	Motor holding brake configuration	Int16	1
p1216	Motor holding brake opening time	Float32	100
p1217	Motor holding brake closing time	Float32	100
p1080	Minimum speed	Float32	0
p601	Motor temperature sensor type	Int16	0
p610	Motor overtemperature response	Int16	12
p1001	CO: Fixed speed setpoint 1	Float32	0
p1002	CO: Fixed speed setpoint 2	Float32	0
p1003	CO: Fixed speed setpoint 3	Float32	0
p1004	CO: Fixed speed setpoint 4	Float32	0
p1005	CO: Fixed speed setpoint 5	Float32	0
p1006	CO: Fixed speed setpoint 6	Float32	0
p1082	Maximum speed	Float32	0
p1120	Ramp-function generator ramp-up time	Float32	0
p1121	Ramp-function generator ramp-down time	Float32	0
p1233	DC braking time	Float32	0
p1232	DC braking braking current	Float32	0
p219	Braking resistor braking power	Float32	0
p1310	Starting current (voltage boost) permanent	Float32	60
p1311	Starting current (voltage boost) when accelerating	Float32	0
p1312	Starting current (voltage boost) when starting	Float32	60
p346	Motor excitation build-up time	Float32	0.04
p347	Motor de-excitation time	Float32	0.04
p881	BI: Quick stop signal source 1	UBin32	1
p882	BI: Quick stop signal source 2	UBin32	1
p886	Quick stop signal source evaluation type	Int16	0
p290	Power unit overload response	Int16	0
p1800	Pulse frequency setpoint	Float32	4

6 Related literature

Table 6-1

	Topic	Title / Link
\1\	Siemens Industry Online Support	http://support.automation.siemens.com
\2\	Download page of this entry	http://support.automation.siemens.com/WW/view/en/109481531
\3\		

7 Contact

Siemens AG
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 91056 Erlangen
 Germany
 mailto: tech.team.motioncontrol@siemens.com

8 History

Table 8-1

Version	Date	Modifications
V1.0	12/2015	First version
V1.1	05/2016	Revision of FB247/FB248