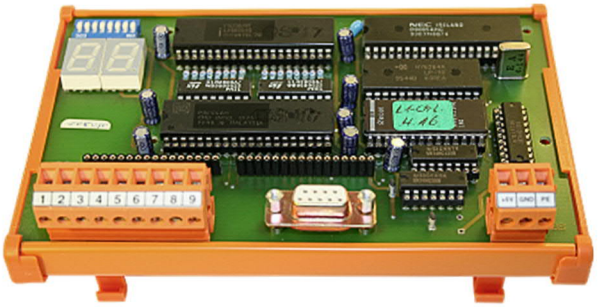
L1-Controller user manual

(english)



Art.Nr. 9510
Art.Nr. 9510-F
Art.Nr. 9511
Art.Nr. 9511-F

12.01.2021

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L1-Controller

L1-Controller

1 Description

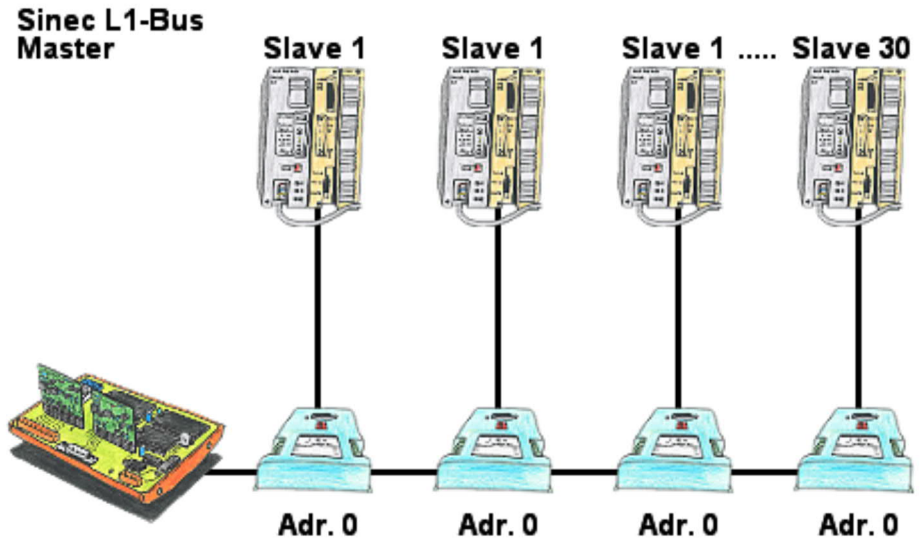
With the L1-BUS Controller, any computer can participate on the SINEC L1 bus from Siemens in master or slave. The only prerequisite is an asynchronous interface with RS-232 or RS-422 or TTY level.

Via a simple ASCII protocol the PC can exchange data with the L1-bus controller.

The entire L1-bus controller performs the functions autonomously even without computer performance.

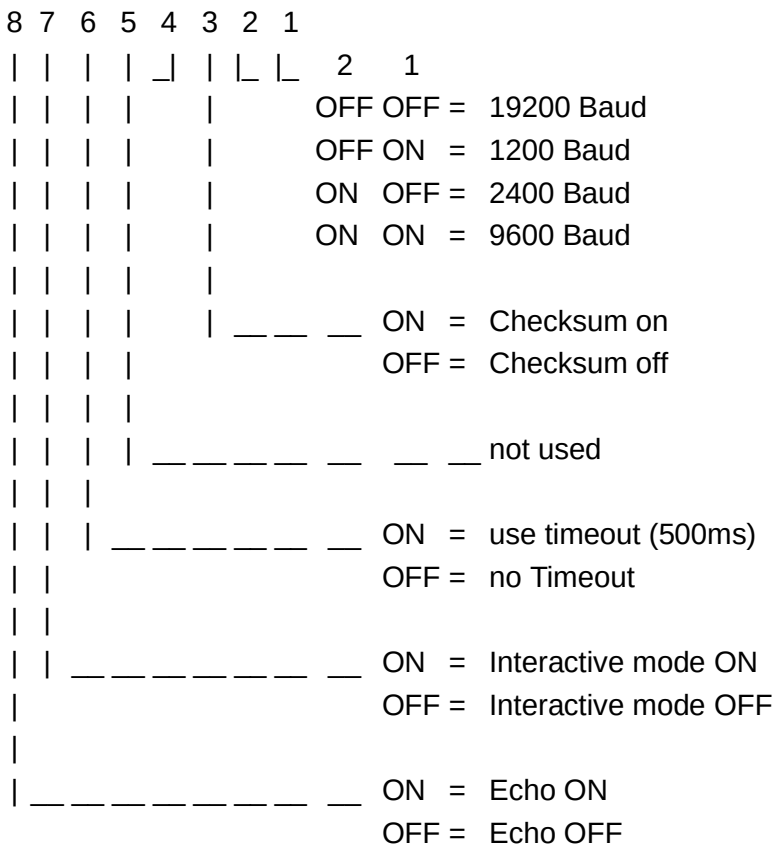
2 Connecting options

Sinec-L1-Bus and no master (CP530)



3 Control elements

3.1 DIP-switch



3.2 display information

display	description (state of L1Controllers)
EE	RAM error, defective RAM module
21	STX get on the communication line (connection setup)
4D	L1-bus controller is configured as master
53	L1-bus controller is configured as slave
58	L1-bus controller is neither master nor slave, broadcasting ban! Define the circulation list (SME / KS)
00	Data is burned into the flash ROM (from V4.8ff, Flash)
08, 10, 18, 20, 28, 30, 38	Hardware interrupts should not appear

4 Configuration

4.1 transmission protocol

- Communication request with STX (02h)
- send release with ENQ (05h)
- end detection of the transmission ETX (03h)
- acknowledgement positive ACK (06h)
- acknowledgement negative NAK (21h)
- no repetitions
- Data format 8-bit, no-parity, 1 stop bit
- Baud rate settable via DIP switch

- Checksum: 1 byte modulo 256 (over the entire frame)
- Structure of ZBE (status byte receive) and the ZBS (status byte transmit) as described in the manual of Siemens L1

Example
No checksum (DIP switch 3 OFF)
Configuration query (from L1-Bus Controller)

PC / terminal	data direction	L1-BUS-Controller
STX	=>	
	<=	ENQ
'K'	=>	
'M'	=>	
'U'	=>	
'?'	=>	
ETX	=>	
	<=	'K'
	<=	'M'
	<=	'U'
	<=	'!'
	<=	'0'
	<=	'1'
	<=	'0'
	<=	'1'
	<=	ETX

4.2 Configuration

4.2.1 Slave configuration

K = configuration
S = slave function
x = 1.ASCII for slave number (0 .. 3)
x = 2.ASCII for slave number (0 .. 9)
p = binary checksum
ETX

4.2.2 Master configuration

4.2.2.1 Configuration circulating list

K = configuration
M = master function
U = circulating list
x = 1.ASCII length for circulating list (0 .. 9)
x = 2.ASCII length for circulating list (0 .. 9)
y = 1.ASCII for slave number (0 .. 3)
y = 2.ASCII for slave number (0 .. 9)
.
.
z = 1.ASCII for slave number (0 .. 3)
z = 2.ASCII for slave number (0 .. 9)

p = binary checksum
ETX

4.2.2.2 Configuration alarm list

K = configuration
M = master function
A = alarm list
x = 1.ASCII length for alarm list (0 .. 9)
x = 2.ASCII length for alarm list (0 .. 9)
y = 1.ASCII for slave number (0 .. 3)
y = 2.ASCII for slave number (0 .. 9)
.
.
z = 1.ASCII for slave number (0 .. 3)
z = 2.ASCII for slave number (0 .. 9)
p = binary checksum
ETX

4.2.2.3 Configuration communication mode

- PC must query as needed

K = configuration
C = communikation mode
P = polling mode
p = binary checksum
ETX

- PC gets sent a STX from the controller when changing the received data of the slaves and the controller expects an ENQ from the PC .

4.2.2.4 Configuration interrupt mode

K = configuration
C = communikation mode
I = interrupt mode
p = binary checksum
ETX

4.2.2.5 Save configuration data in flash memory

F = flash
! = save
p = binary checksum
ETX
possible only with flash version!

4.2.2.6 Delete configuration data in flash memory

F = flash
C = delete
p = binary checksum
ETX
possible only with flash version!

4.3 Configuration queries

4.3.1 Configuration queries circulation list

K = configuration
M = master function
U = circulation list
? = query
p = checksum
ETX

4.3.2 Configuration query alarm list

K = configuration
M = master function
A = alarmliste
? = query
p = checksum
ETX

4.3.3 Configuration query communikation mode

K = configuration
C = communikation mode
? = query
p = checksum
ETX

4.3.4 Configuration query slave configuration

K = configuration
S = slave function
? = query
p = checksum
ETX

L1-Controller -> PC:
response as under slave configuration or master configuration

4.4 Querys

4.4.1 State status query

4.4.1.1 PC -> L1-Controller

Z = state status
? = query
x = 1.ASCII for slave number (0 .. 3)
x = 2.ASCII for slave number (0 .. 9)
p = binary checksum
ETX

4.4.1.2 L1-Controller -> PC

in slave number "00" ... "30"

Z = state status
! = anwser
x = 1.ASCII for slave number (0 .. 3)
x = 2.ASCII for slave number (0 .. 9)
s = ZBS binary
p = binary checksum
ETX

in slave number "31"
Z = state status
! = anwser
x = 1.ASCII for slave number (3)
x = 2.ASCII for slave number (1)
y = 1.State-byte binary
y = 2.State-byte binary
y = 3.State-byte binary
y = 4.State-byte binary
p = binary checksum
ETX

1. state-byte
Bit 31 = reserve
Bit 30 = change bit slave 30
...
Bit 24 = change bit slave 24

2. state-byte:
Bit 23 = change bit slave 23
...
Bit 16 = change bit slave 16

3. state-byte:
Bit 15 = change bit slave 15
...
Bit 8 = change bit slave 8

4. state-byte:
Bit 7 = change bit slave 7
...
Bit 1 = change bit slave
Bit 0 = change bit master

change bit:
= 1 change since last request
= 0 no change

4.4.2 Data request

4.4.2.1 PC -> L1-Controller

D = datas
? = request
x = 1.ASCII number for slave (0...3)
x = 2.ASCII number for slave (0...9)
p = Prüfsumme binär
ETX

4.4.2.2 L1-Controller -> PC

D = datas
! = anwser
x = 1.ASCII for slave number (0 .. 3)
x = 2.ASCII for slave number (0 .. 9)
y = 1.ASCII data length (0 .. 6)
y = 2.ASCII data length (0 .. 9)
s = ZBS binary
z = 1. date binary
.
.
z = n. date binary
p = binary checksum
ETX

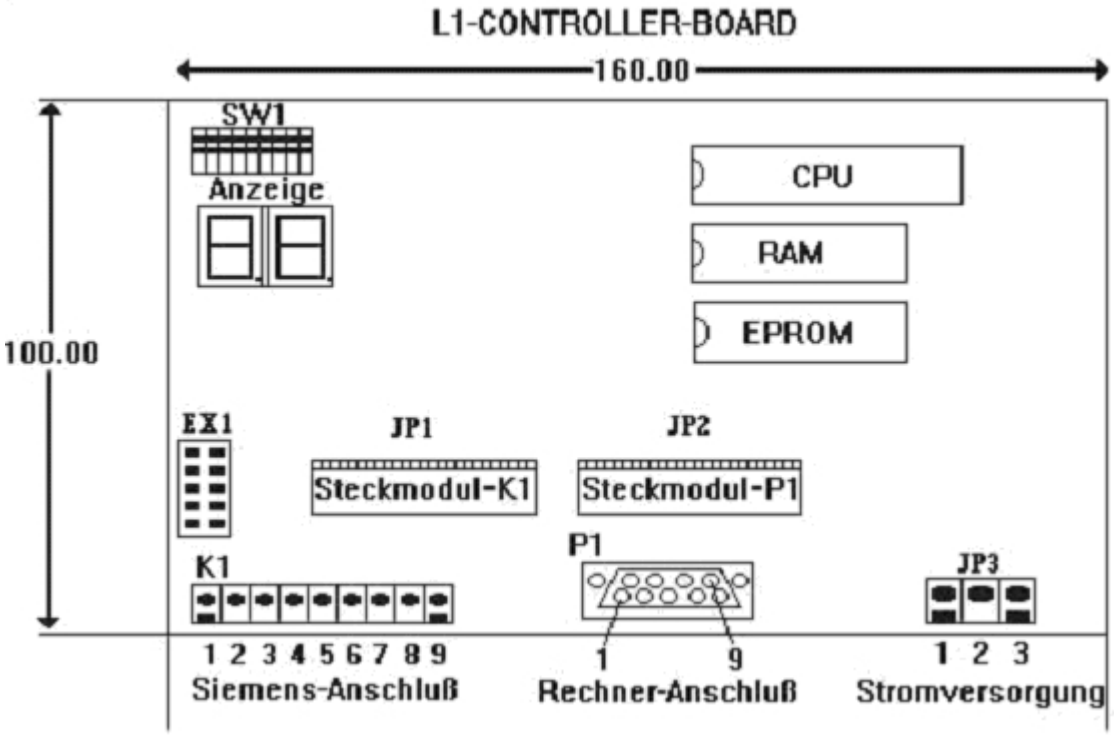
4.5 transmit data

4.5.1 PC -> L1-Controller

D = datas
! = send to L1-BUS Controller
x = 1.ASCII for slave number (0 .. 3)
x = 2.ASCII for slave number (0 .. 9)
y = 1.ASCII data length (0 .. 6)
y = 2.ASCII data length (0 .. 9)
e = ZBE binary
Strg A = 01h : AG RUN
'A' = 41h : AG STOP
z = 1. date binary
.
.
z = n. date binary
p = binary checksum
ETX

5 Technical data

Supply voltage:	5V DC +/- 20%
Power consumption:	-
Display:	2 x 7-segment display
Handling/Configuration:	DIP-Switch
Interfaces:	**others:** 1 x D-Sub-female 9pol for PC connection 3 x Weidmüller for 5V DC power supply 9 x Weidmüller for bus connection A and B
Operating temperature:	0 - 55°C
Case:	plastic case
Dimensions:	160 x 100 x 50 mm
Scope of delivery:	
	L1-Controller



Plug-in module	Cable	Socket Type
L1-BUS	LC-485-BT-777	9pole clamping socket
TTY	LC-TTY-PG	9pole clamping socket
TTY	customized	9pole D-SUB socket
RS232	UN-ES-232-PC	9pole D-SUB socket
RS422	customized	9pole D-SUB socket

5.1 Pin assignment power supply

Pin number	Short form	Designation	Direction
1	VCC	+5V supply voltage	input
2	GND	mass	input
3	PE	earth connecting	input

5.2 Pin assignment 9pole clamping socket

5.2.1 L1-BUS plug-in module (red)

Pin number	Designation	on the BT-777 clamp
1	TxD +	1A
2	TxD -	2A
3	RxD +	3A
4	RxD -	4A
5	GND / mass	0A and 0B
6	TxD +	3B
7	TxD -	4B
8	RxD +	1B
9	RxD -	2B

Attention:

If the pins are 6/7/8/9 are not used, a bridge from 9 to 5 is necessary!
If the pins are 1/2/3/4 are not used, a bridge from 4 to 9 is necessary!

5.2.2 TTY plug-in module

Pin number	Designation
1	TxD +
2	TxD -
3	RxD +
4	RxD -
5	I-TxD (20mA power source)
6	GND
7	I-RxD (20mA power source)
8	GND
9	+5V (protective resistance is over 100R)

Attention:

The inputs (RxD + and RxD-) and the outputs (TxD + and TxD-) are PASSIVE!

5.3 Pin assignment 9pole D-SUB socket

5.3.1 RS232 plug-in module

Pin number	Short form	Designation
1	shield	shield
2	RxD	receive data
3	TxD	transmit data
4	NC	not used
5	GND	mass

5.3.2 RS422 plug-in module

Pin number.	Short form	Designation
1	TxD +	transmit data +
2	TxD -	transmit data -
3	RxD +	receive data +
4	RxD -	receive data -

5.3.3 TTY plug-in module

Pin number	Designation
1	TxD +
2	TxD -
3	RxD +
4	RxD -
5	I-TxD (20mA power source)
6	GND
7	I-RxD (20mA power source)
8	GND
9	+5V (protective resistance is over 100R)

Attention:

The inputs (RxD + and RxD-) and the outputs (TxD + and TxD-) are PASSIVE!