User Manual

AS-Interface Programmer

> **Notice:**
>
> **RESTRICTIONS**
>
> THE **ZMD AS-**INTERFACE PROGRAMMER HARDWARE AND **ZMD AS-**INTERFACE PROGRAMMER SOFTWARE IS DESIGNED FOR IC EVALUATION, LABORATORY SETUP AND MODULE DEVELOPMENT ONLY.
>
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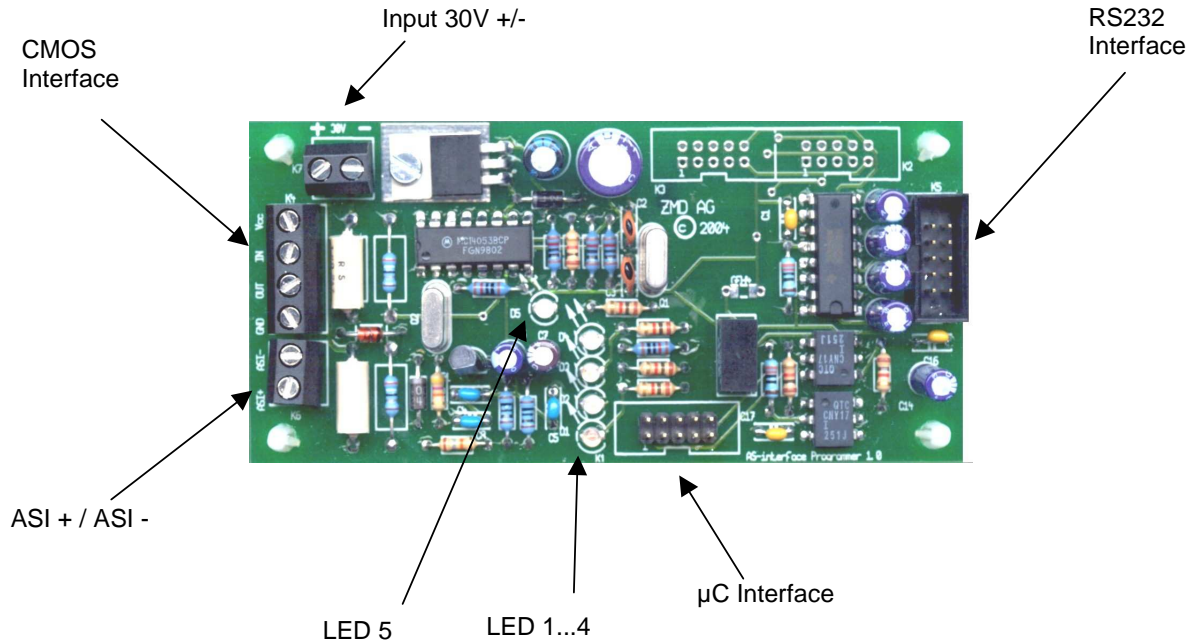
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1 Hardware

1.1 Board description

Input 30V +/-

RS232 Interface

CMOS Interface

ASI + / ASI -

LED 5   LED 1...4   µC Interface

ASI+ / ASI-:	Connection to the ASi network. The Programmer runs as AS-i Master. In AS-i mode (LED5 off) the ASi Programmer can be powered via the ASi network. Otherwise the power supply of the connected ASi network can be provided by the ASi Programmer. Therefore a DC power supply must be connected to the 30V input of the ASi Programmer. In this case the ASI Programmer handle the data decoupling via the onboard decoupling network. Attend there is only one power supply connected to the ASI Programmer, a ASI power supply at the ASI Network **or** a DC Power Supply at the ASI Programmer. (see chapter 1.2)
Input 30V +/-:	30V DC Input voltage to supply the AS-i network and the programmer via the on board decoupling network. An additional AS-interface power supply at the AS-i network is not required. A supply voltage of 24V DC will be also enough for simply test setups. To prevent the AS-I power generation circuit (decoupling circuit) against a current overload limit the input current at Input 30V connector to 150mA!
CMOS Interface:	CMOS output for manchester coded signals for control a ASi-IC in master mode. *See detailed description in chapter 1.2.3.*

|		
RS232 interface:	connection to PC (19200 Baud, 8 bit, no parity, 1 stop bit). Connect this port with the enclosed cable to a free serial COM port at your PC. After program start, the ASI Programmer search beginning from COM1 to COM16 for connected hardware. Via menu "Options" the COM port (1-8) can also selected manually.	
µC Interface:	for µC firmware-update (access by ZMD only)	
LED1...4:	status interface:	D1 Programmer power on D3 telegram timeout D4 data flow at ASI/CMOS
LED 5:	mode ASI/CMOS	off: ASi channel active on: CMOS channel active

1.2   Hardware setup

To supply the system 2 setups are possible. Do not mix both variants.
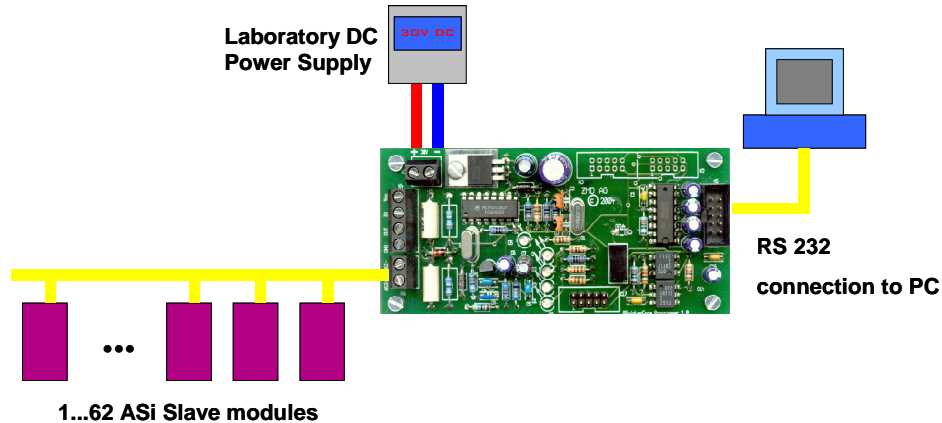
1.2.1   ASi Bus powered setup
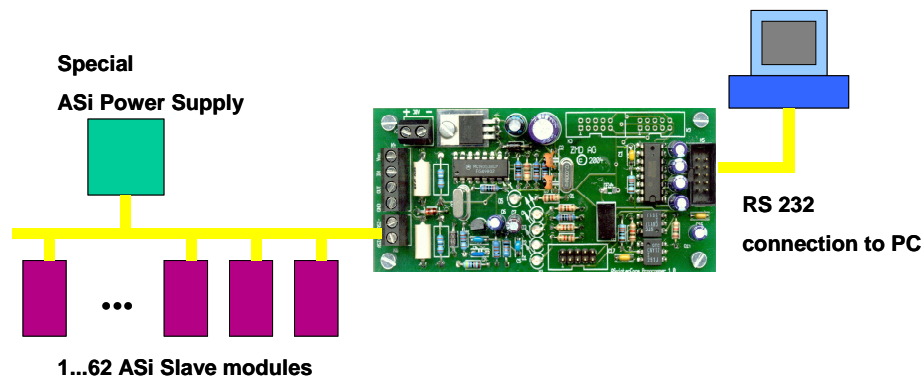
The power supply of the complete system, including ASI modules and ASI programmer will be provided by a special AS-interface power supply. No additional power supply at the 30V connector is allowed.

1.2.2   Internal ASI power generation

Laboratory DC Power Supply

RS 232 connection to PC

1...62 ASi Slave modules

The power supply of the complete system, including ASI modules and ASI programmer will be provided by a connected laboratory power supply. No additional ASI power supply may be connected to the ASI network. The data decoupling will be enforced by an data decoupling network, integrated on the ASI Programmer. The DC supply voltage may be 24 VDC and 33VDC. The supply voltage according to AS-Interface Complete Specification is 29,5…31,6V. To prevent the AS-I power generation circuit (decoupling circuit) against a current overload limit the input current at Input 30V connector to 150mA!

1.2.3   Master control via CMOS Interface

The following circuit diagram shows the connection of an external ASI master circuit.

Special ASi Power Supply

Laboratory DC Power Supply

1...62 ASi Slave modules

RS 232 connection to PC
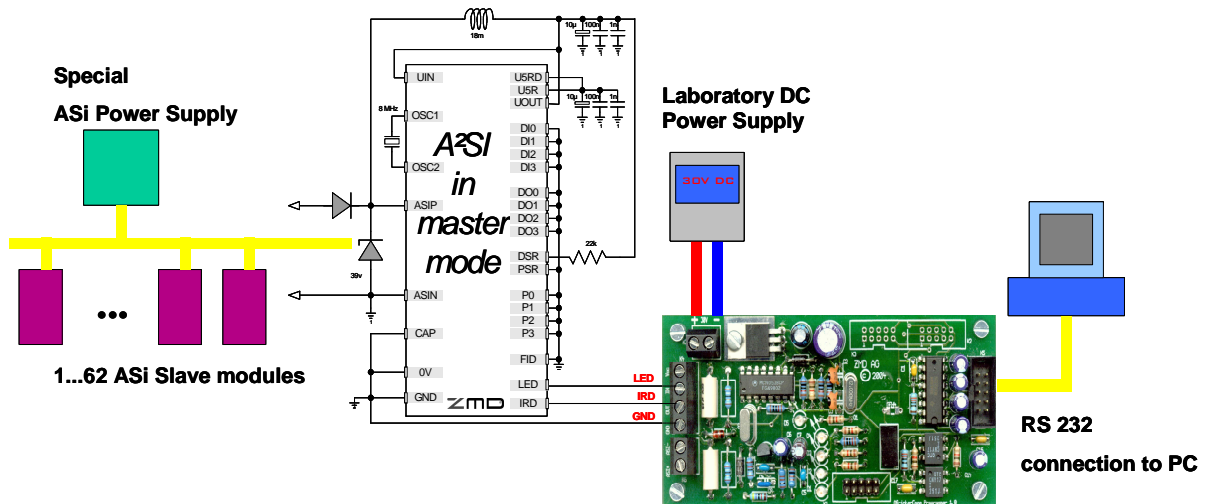
Maximum digital voltage level at CMOS input and output port is limited to 5V DC!!!
Do not pull up the LED/IRD pin to Uout. Pull up resistors are integrated in the ASI Programmer cirquit (R6, R7), no additional pull up resistors are required. The A²SI LED pin can be connected to the IN pin at the ASI Programmer and the A²SI IRD pin can be connected directly to the OUT pin of the ASI programmer. To activate the ASI Programmer CMOS interface type "CMOS" in the terminal. The LED D5 light red.
To switch back in normal ASI mode type "ASI" in terminal.

2　Software

2.1　Setup and Installation

System requirements:　486 compatible PC, 8MB RAM, 12MB free HDD, free COM port

If the PC do not support a free COM port, the ASI Programmer can be connected via a USB to serial adapter. To use such a adapter a special driver (delivered from USB to serial adapter manufacturer) has to be installed.

Run "Setup ZMD AS-Interface Programmer Vxxx.exe" from your CD-ROM. Follow the instructions of the setup program. Software updates are available via www.zmd.biz.

2.2　GUI (Graphical User Interface)

Start the graphical user interface by click at the **ZMD AS-Interface Programmer** Icon in program menu or at desktop. The software search for connected hardware automatically. After a software update a firmware check of the microcontroller firmware will be enforced. In certain cases a firmware update is necessary to use new software features.

2.2.1　Automatic software update

After program start the software check's the µC firmware. To support new features a firmware update is recommended if an old firmware was detected:
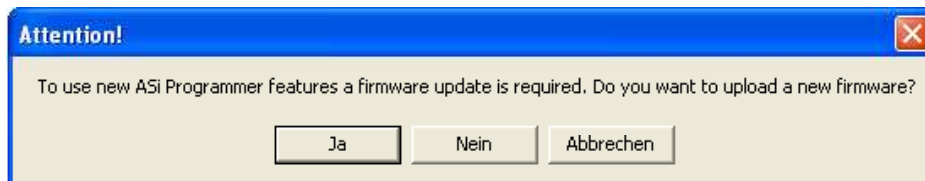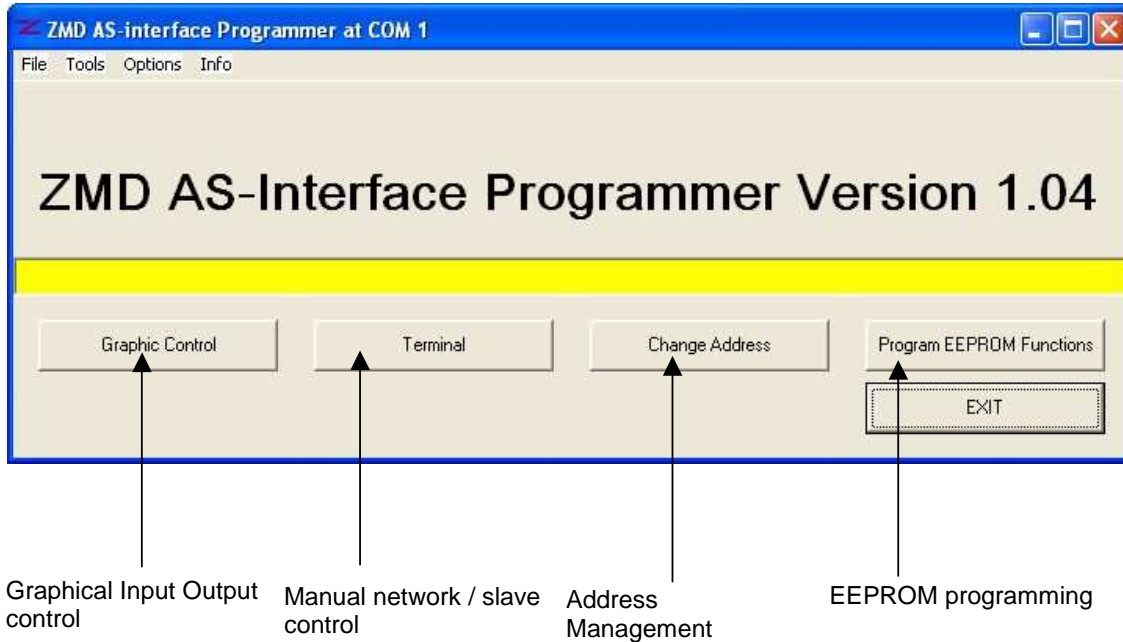

- Click on "Yes" to update a new firmware version to the µC. *The update process may not be interrupted. During the update process do not switch to other PC tasks, do not remove cables or power!*

- Click on "No" to disable the automatically firmware update in future.

- Click on "Cancel" to disable the firmware update for this session.

The update of a new firmware version is also possible via the menu "Options/Settings/Firmware Update". To upload a new file a actual *.hex file is required.

2.2.2   Main window

Graphical Input Output control

Manual network / slave control

Address Management

EEPROM programming

2.2.3   Graphical Input Output Control

This module allows to control an AS-Interface network (up to 62 slave modules) bit by bit. Graphical Input Output control runs in a loop mode for permanent data exchange with all slaves. The data transfer rate between programmer and slave modules does not reachs ASi real-time mode. The speed of data exchange depends on the PC performance. The minimum cycle time for data exchange with 1 slave is approximately 5,4ms.

Note: Resulting of the slower ASi Programmer cycle time a communication error with connected modules may provoked if the ASi module Watchdog activation flag is set.
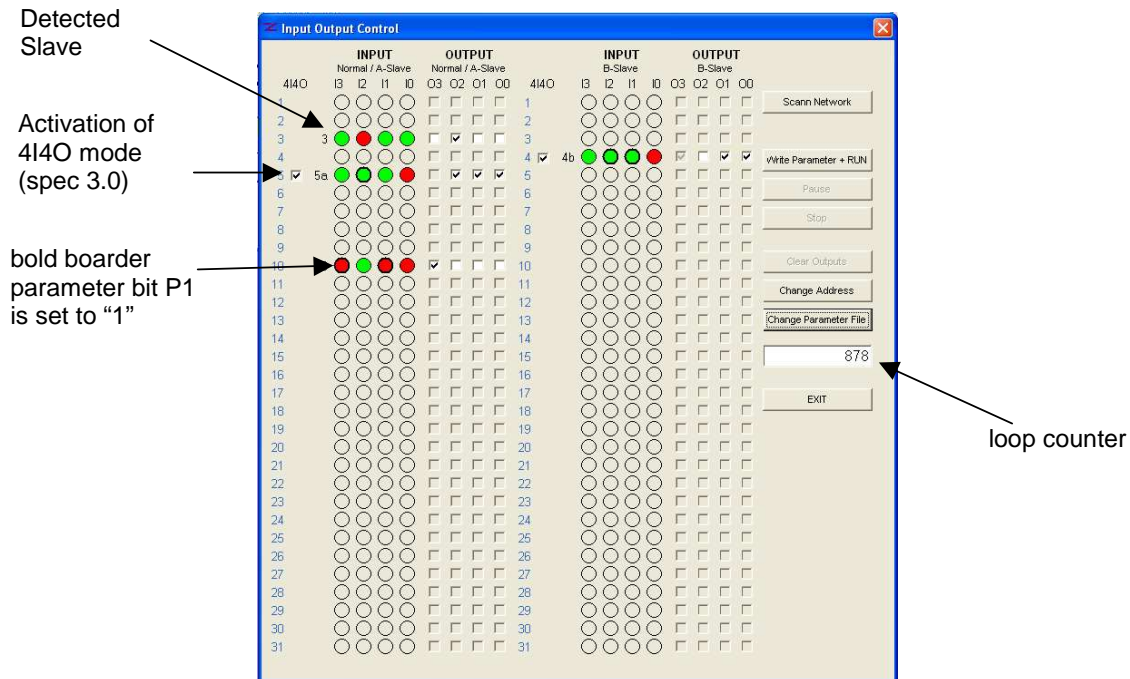
Handling:

1. Click on "Read Network Configuration" to detect the connected Slaves

2. Click on "Write Parameter" for parameterisation of all detected slave modules. To modify the parameter file click on "Change Parameter File" button. Otherwise default parameters (&B0000) may used.

3. In order to support the 4 In put / 4 Output mode (4I4O), described in the AS-I Complete Specification 3.0, this mode can be activated for all slaves in extended address mode separately. The special nibble selected transfer protocol (chapter 5.7.4.1 in Complete Specification). To activate this feature in slave modules, the corresponding EEPROM bit has to be programmed further.

4. A Click on „Run" will start the loop mode for continuous data exchange (non ASi real-time mode!). The loop counter shows the number of completed network data exchange cycles.

5. The slave input data are shown by ed circles (="0") and green circles (="1"). Output ports can be changed by setting a check mark in the corresponding field.

6. All outputs will be erased by a click on „Clear Outputs".

7. A Click on „Change Address" will open the slave addressing window.

Detected Slave

Activation of 4I4O mode (spec 3.0)

bold boarder parameter bit P1 is set to "1"

loop counter

2.2.4 Change parameter data

This module can change parameter data for each slave module bit by bit. After a network scan parameter data can be set to the slave modules. The bits can be changed by setting (="1") a check mark in the corresponding box. To send the parameter data to the slaves click on "Write Parameter" or transfer this configuration to the input output control window to set parameters by click at "Write Parameter" in the input output control window. Parameter data will be read back and will be shown by red (="0") and green (="1") circles. A bold boarder at an input bit shows the sent parameter data in the parameter window and in the corresponding input output control window.

With a click on "Load Parameter File" or "Save Parameter File" file the parameter settings can be saved or loaded.

File utility

Transfer
parameter
settings to input
output control

Parameter
data input
from slave

Parameter Data output to
the slave

2.2.5 Change address

Current slave
configuration

Read configuration

Slave to address

New slave address,
normal addressing
mode (A/B Slave)

New slave address,
extended addressing
mode (A/B slave)

Write address

1. Select a slave to change address

2. Select a new slave address (the select menus show only free network addresses, witch
   makes double addressing impossible)

3. Click on „Set Address" to change the address.

Note:

Switching between normal addressing mode and extended addressing mode is impossible in this
menu. To activate the extended address mode the corresponding EEPROM setting (ID-Code =
&H0A) has to be set with EEPROM configuration tool.
Changing between A and B slave (through changing of the Bit3 of Extended ID Code 2) will be
handled automatically.

2.2.6   EEPROM Configuration

- To program EEPROM functions only 1 slave with address „0" should be connected to the network

Bit configuration EEPROM show and modify
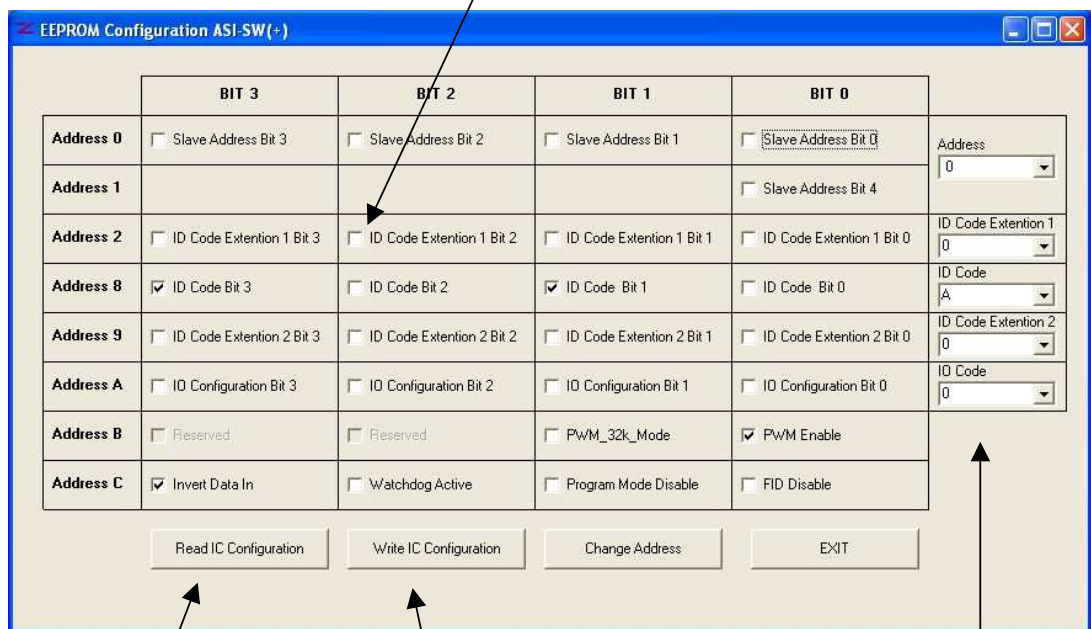
Read EEPROM   Write EEPROM

Bit configuration hexadecimal

1. Click on „Read IC Configuration" to read current EEPROM setting.

2. To change EEPROM setting click on the control boxes or select a hexadecimal bit configuration from the select bar.

3. To write EEPROM configuration click on „Write IC Configuration"

4. After the writing process the programmer software reads the current EEPROM configuration back from the IC.

2.2.7 Terminal

The terminal tool allows the communication with an AS-interface network or a single slave module command by command.

Terminal window

```
ZMD AS-interface programmer terminal V1.02

ZMD AS-interface programmer terminal V1.02 © ZMD/AG 2004

found ZMD AS-interface programmer at COM Port

Comand:    w
Answer:    Adr: 0a  Status : 2  ID: 0A  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 2   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 3   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 4   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 5   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 6   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 7   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 8   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 9   Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 10  Status : 2  ID: 00  I0: 0A  ID1: 08  ID2: 00
Answer:    Adr: 11  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 12  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 13  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 14  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 15  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 16  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 17  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 19  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00
Answer:    Adr: 20  Status : 2  ID: 00  I0: 00  ID1: 00  ID2: 00

Comand:    s0
Answer:    Adr: 0 Status: 2
```
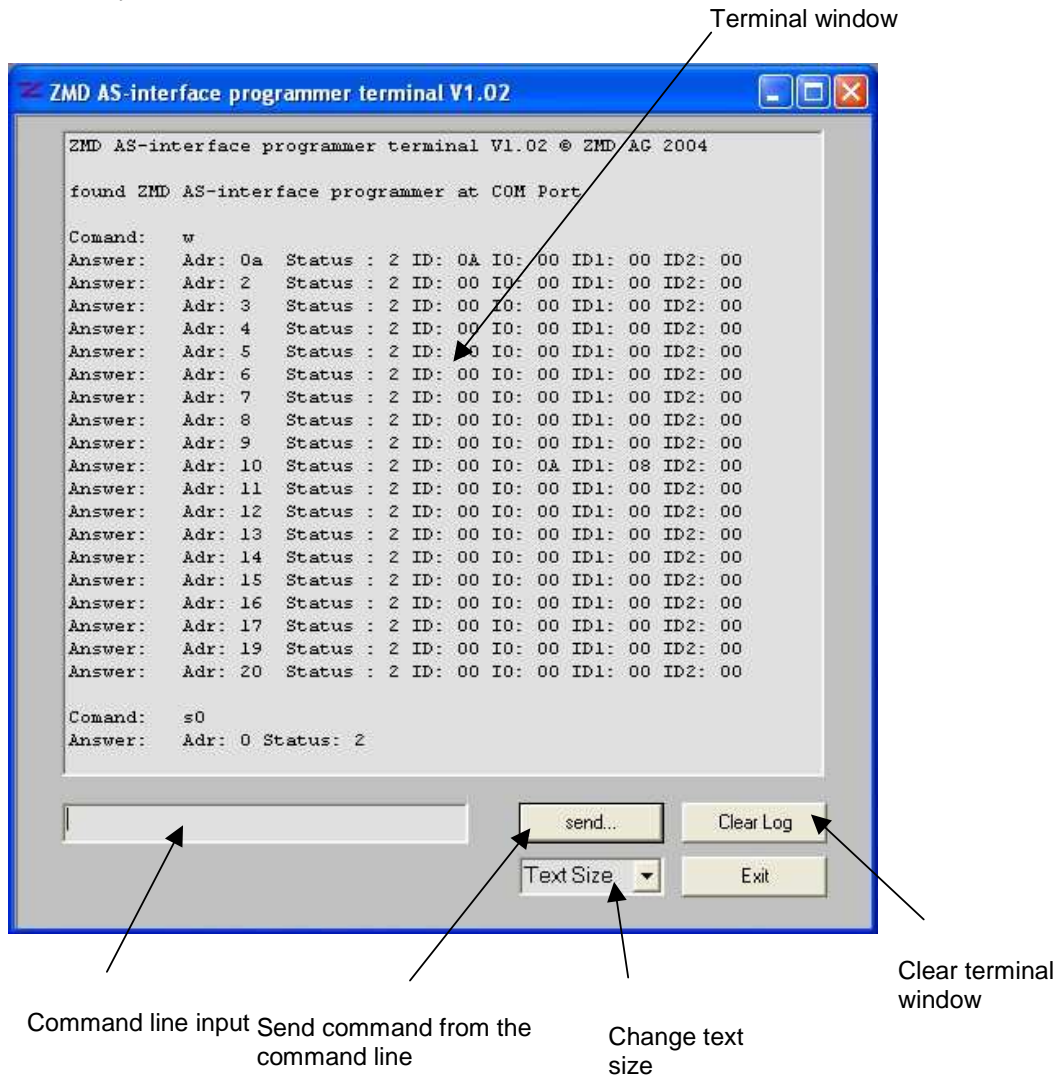
send...   Clear Log

Text Size ▼   Exit

Clear terminal window

Command line input Send command from the command line

Change text size

1. Type a valid command in the command line. For example "d12 2" – data exchange to slave with address 12 , send data 2 (decimal).
2. Click on "send…" or press return.
3. The terminal window shows the sent command and the corresponding answer.

   In case of an error, a timeout or an error description will be send.

"Clear Log" will clear the terminal window. The "↑"- key brings the last send command back to the command line input textbox.

For detailed commands and other control functions, refer to the following command table:

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2.3 Telegram structure

2.3.1 Telegram structure of Standard AS-i telegrams in Terminal Mode

Description	Command	Master request 1	Extended Adr.	Separator	Master request 2	End	Remarks
Data Exchange	**D**	0…31	(a,b)	"," ";" "." "-"	0-15	CR	In case of ext. Adr = a or b, no separator is required
Write Parameter	**P**	0…31	(a,b)	"," ";" "." "-"	0-15	CR	
Address Assignment	**A**	0…31	--		--	CR	only to Adr. 0
Write Extend. ID-Code 1	**E**	0…15	--		--	CR	only to Adr. 0
Delete Address	**C**	0…31	(a,b)		--	CR	
Reset Slave	**R**	0…31	(a,b)		--	CR	
Read IO Configuration	**O**	0…31	(a,b)		--	CR	
Read ID-Code	**I**	0…31	(a,b)		--	CR	
Read ID-Code 1	**J**	0…31	(a,b)		--	CR	
Read ID-Code 2	**K**	0…31	(a,b)		--	CR	
Read Status	**S**	0…31	(a,b)		--	CR	
Broadcast	**BC**	--	--		--	CR	to all slaves
Enter Program Mode	**EPM**	--	--		--	CR	only to Adr. 0

General remarks:

Every command-structure must be closed with **CR** (return HEX Code 0A) or **ETX** (End of Text, HEX Code 03,Terminal Mode "CTRL+C")
For commands and extended addressing bytes lower case letters or capitals can be used.

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2.3.2 Telegram structure of special functions in Terminal Mode

Description	Command	Remarks
Scan AS-I Bus	**W**	Scans the AS-I bus and reads the configuration data of the connected modules
Lock IRD Channel	**IRD**	Sends a magic Sequence to lock the IRD channel
Lock AS-I channel	**ASI**	Locks the Programmer board to the AS-I channel (default) - LED5 off – setting keeps alive after power down -
Lock CMOS channel	**CMOS**	Locks the Programmer board to the CMOS channel - LED5 on – setting keeps alive after power down -
Repeat a command line	**Lxxx**	Repeats the following command line xxx times
Terminate loop command	**@**	Terminates the loop command (Lxxx)
Echo mode on	**EON**	The Programmer repeats received commands character by character, e.g. for standard terminals
Echo mode off	**EOF**	The Programmer will not repeat received commands (default), a STX (&H02) always initiates a new command line
Read version number	**V**	Reads the Firmware version of the AS-I Programmer
Read Waitstate configuration	**WS**	Reads the Waitstate configuration – delay time between receiving a command and executing the command
Write Waitstate configuration	**WSxxx**	Writes the Waitstate configuration – XXX in milliseconds (0 = default value)
Read IC type	**T**	Reads the current ASI IC type at address 0

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3   Schematics

3.1   ASi and MCU
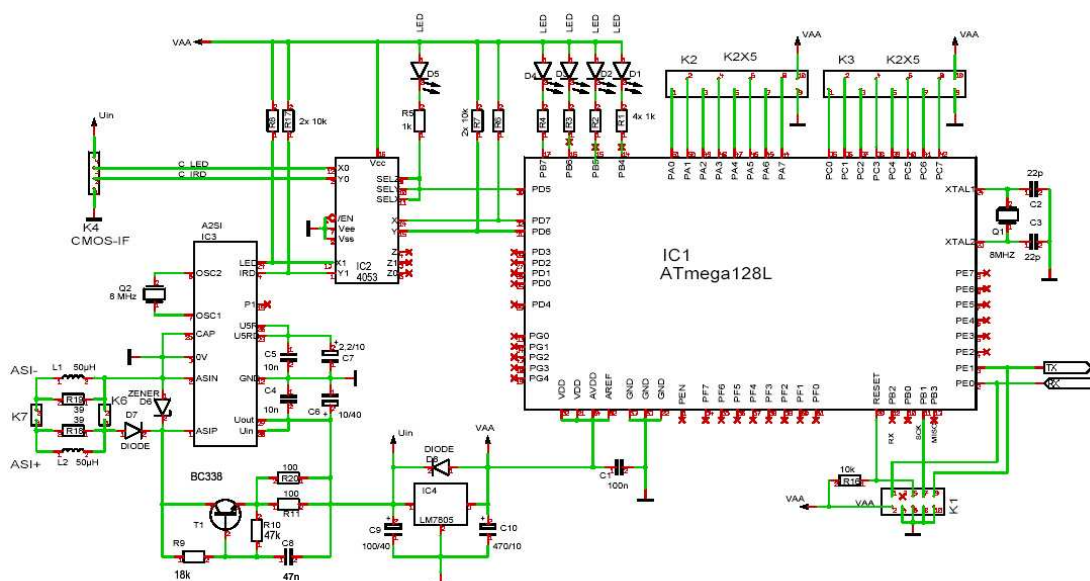
Title	Transceiver - MCU		Sheet No. 1	**ZMD AG**
Project No.	A4990400	Revision No.		Grenzstrasse 28
Date	16.02.04	Date	25.05.04	D-01109 Dresden
Author Gerd Hofmann phone ext - 393 email: ghofmann@zmd.de				phone +49/351/8822/0
File ASI_Programmer_Rev2		08.06.04		www.zmd.de

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3.2   PC Communication Interface
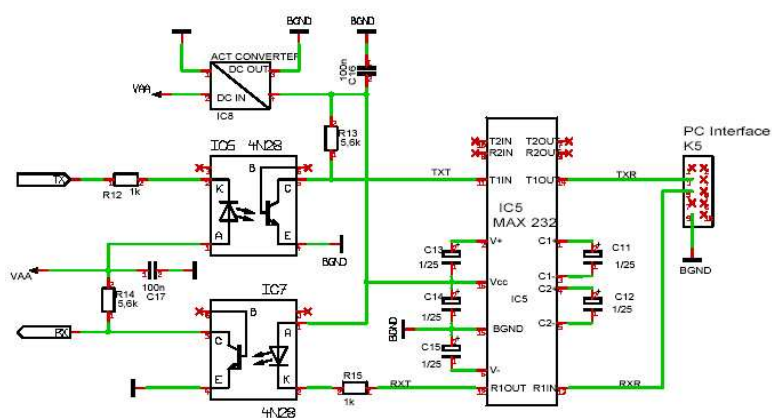
Title	Galvanic Isolated Interface		Sheet No.2
Project No.		Revision No.	
Date	18.02.04	Date	08.06.04
Author	Gerd Hofmann phone ext - 393 email: ghofmann@zmd.de		
File	ASI_Programmer_Rev2		08.06.04

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4   Notes