

EXDUL-517E

EDP No.: A-374440

EXDUL-517S

EDP No.: A-374420

10 optocoupler isolated digital inputs

8 optocoupler isolated digital outputs

1 16-bit counter

LCD Display (EXDUL-517E only)

Common plus connection at outputs

wasco[®]

user's guide

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Important Information:

This manual was made up for modules EXDUL-517E and EXDUL-517S. EXDUL-517E additionally provides an LCD display, all other functions are identical. For EXDUL-517S all commands and functions concerning the LCD display are not applicable.

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1. Introduction

EXDUL-517E and EXDUL-517S are network-compatible digital I/O modules with Ethernet interface. Each module features 10 digital inputs and 8 digital outputs galvanically isolated by high-quality optocouplers and provides additionally protection diodes. All input optocouplers have integrated schmitt trigger function. Special high power output optocouplers manage a switching current of up to 150 mA. One of the 10 input optocouplers is programmable and usable as a digital counter if required. EXDUL-517E additionally provides an LCD display performing I/O status information or user specific data. The module can be connected easily and conveniently to a network or PC in a plug and play manner via an Ethernet interface. The connections for the necessary external power supply as well as the connections for the input and output optocouplers are led to a 24pin screw terminal block. The compact chassis enables the module to be used as a portable device with a notebook. For mechanical engineering control applications it can also easily be wall mounted or clipped onto DIN mounting rail.

2. Connection Terminals

2.1 Terminal Layout of CN1

OUT01-	2 	 1	OUT00-
OUT03-	4 	 3	OUT02-
OUT05-	6 	 5	OUT04-
OUT07-	8 	 7	OUT06-
OUT00...07+	10 	 9	NC
IN01+	12 	 11	IN00+ / counter
IN03+	14 	 13	IN02+
IN05+	16 	 15	IN04+
IN07+	18 	 17	IN06+
IN09+	20 	 19	IN08+
NC	22 	 21	IN00...09-
GND	24 	 23	Vcc

Vcc:

Connector for external supply voltage

GND:

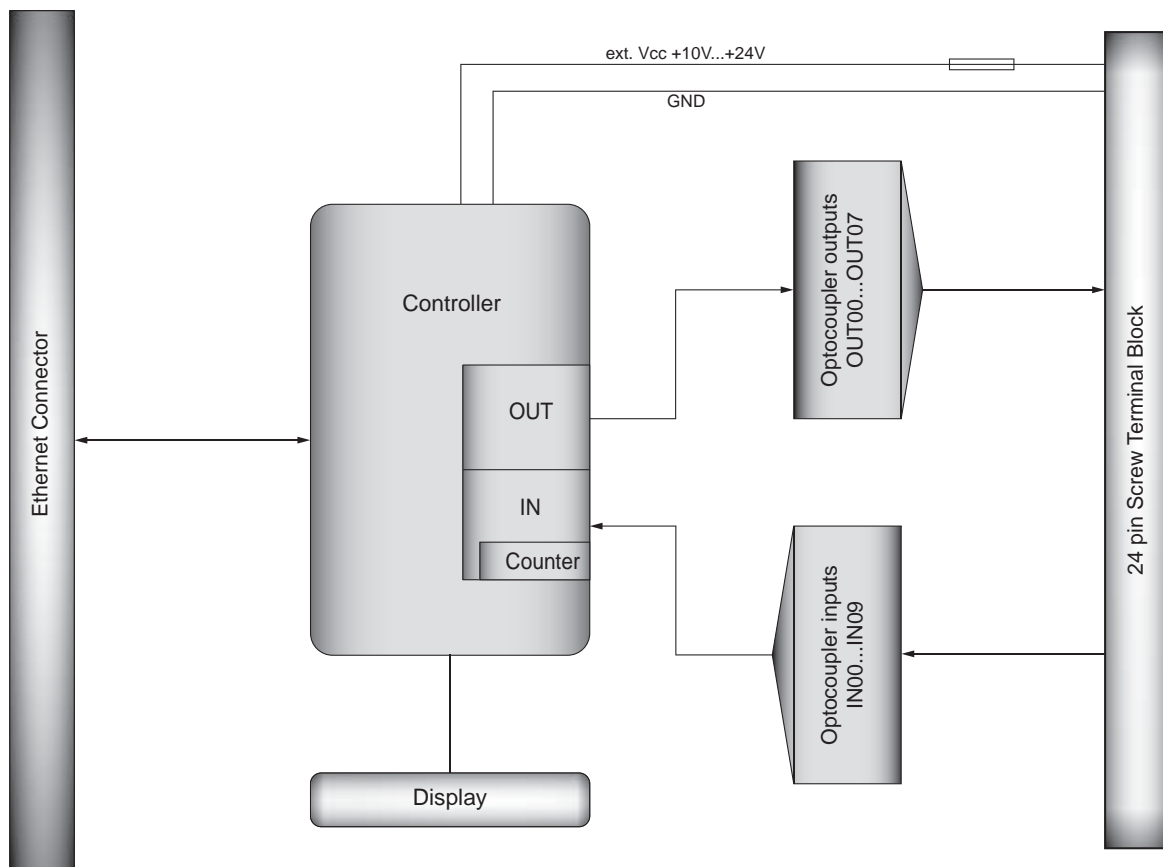
Ground connection when using external supply voltage

NC:

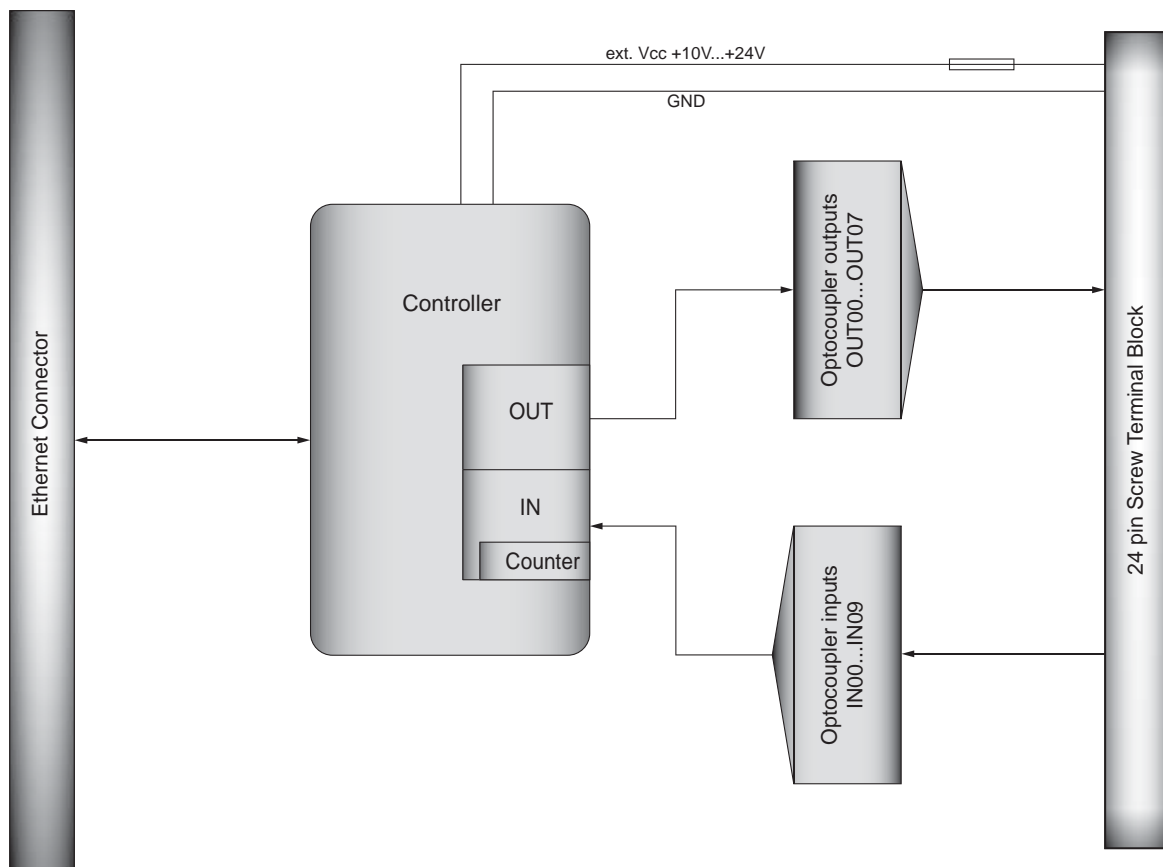
not connected

3. System Components

3.1 Block Diagram EXDUL-517E



3.2 Blockschaftbild EXDUL-517S



3.3 Optocoupler Inputs

10 channels, galvanically isolated

Common ground connection (cathodes of the optocouplers connected)

1 of the channels programmable to be a digital counter

Optocouplers with integrated schmitt trigger function

Overvoltage protection diodes

Input voltage range: low = 0....3 Volt high = 10.....30 Volt

Input frequency: max. 10 kHz

3.4 Optocoupler Outputs

8 channels, galvanically isolated

Common plus connection (collectors of the optocouplers connected)

High capacity optocouplers

Reverse polarity protection

Output current: max. 150mA

Switching voltage: max. 50 V

3.5 Counter

1 programmable 16-bit counter

(1 of the input optocouplers is assigned)

Counting frequency: max. 5 kHz

3.6 LCD Display (EXDUL-517E only)

Matrix display with 2 lines and 16 columns performing 16 signs each line

Info display during booting-up

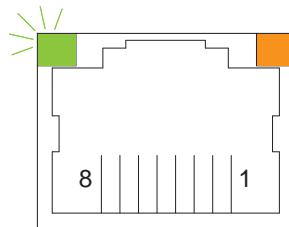
I/O status display or UserLCD display during operation

4. Initial Setup

Connection to a network or to a computer is made easily and conveniently via an Ethernet interface, you can configure via any web browser. An external power supply unit is required for the necessary current supply.

4.1 Connection to an Ethernet Port

The module EXDUL-517E / EXDUL-517S provides a 10Base-T Ethernet interface with RJ-45 connection (8P8C modular connector) and you can connect directly either to a PC, Ethernet hub or Ethernet switch using a network cable. If your switch, hub or PC provides an Ethernet interface with Auto MDI(X) capability, you can connect by a standard straight through network cable such as Cat5 or higher. Older computers whose Ethernet interfaces do not automatically crossover transmitting and receiving lines may require a crossover cable or a crossover adapter. After the operating voltage has been properly applied the module will boot. Once a stable connection has been established, the green LED on the left side of the RJ-45 jack is lit continuously.



4.2 Connecting Supply voltage

The EXDUL-517E / EXDUL-517S requires a supply voltage from +10 V ... +24 V DC across terminal 23 (Vcc) and terminal 24 (GND).

4.3 Integrated ModPage of EXDUL-517E / EXDUL-517S

Any web or internet browser such as Mozilla Firefox, Internet Explorer, Safari etc. can access to the ModPage of EXDUL-517 over TCP/IP connection. The ModPage enables to read connection information and modify configuration data under password protection. Modifications made will be stored in the built-in EEPROM of EXDUL-517 and will be loaded during boot-up process. The EXDUL-517 ModPage allows to write, read-out and show user specific memory area UserA, UserB, UserLCD1 and UserLCD2 as well as start and stop the counter or test digital inputs and outputs.

4.4 Password Protection - Access Code

As noted earlier using the EXDUL ModPage enables to configure the network, to set up the LCD display, to write into user specific memory areas as well as to set up inputs and outputs or counter. To prevent unauthorised access these setting sections are password protected.

Following default access code is preset:

User name: admin
Password: 11111111

Please regard upper and lower case!

If the access does not succeed with this access code, your system administrator changed settings of the access code.

4.5 Basic Settings of Network Configuration

In out of the box setting the EXDUL-517 is issuing DHCP (Dynamic Host Configuration Protocol), to obtain a dynamic IP Address. During commissioning the EXDUL-517 sends a request to the network (LAN). A network with enabled DHCP server will automatically assign an IP Address to the module. This setting allows an easy and convenient connection of the module and a proper adjustment of the configuration data to your own requirements.

4.6 Composition and Structure of IP Address

IP4 addresses consist of 32 Bits = 4 Bytes (octets). Each Byte can range from 0 through 255. IP Addresses are written in dotted decimal format (e.g. 192.168.1.83).

Each IP Address contains a network portion and a device portion (host number). A subnet mask divides network portion and host portion. All devices located on the same network can communicate with each other.

Example:

If subnet mask 255.255.0.0 is allocated to the IP Address 192.168.1.83, so the device is located on network 192.168.-.- and is named -.-.1.83.

4.7 Changing of Network Configuration

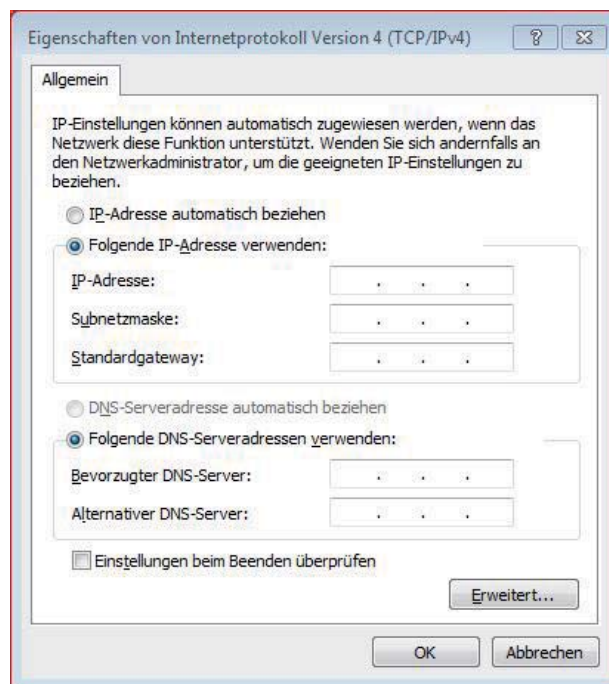
To change the configuration set-up by default plug the enclosed standard network cable of the EXDUL 517 into a local network and connect supply voltage (+10 V ...+24 V) across terminal 23 (Vcc) and terminal 24 (GND) of the module. The EXDUL will boot immediately. Once a stable connection has been established, the green LED on the left side of the RJ-45 jack is lit green continuously. Access to the EXDUL-517 ModPage is possible using any web or internet browser. Host Name then is **http://EXDUL-517**. If you click the button **TCP/IP Config** following configuration screen will open:

The screenshot shows the EXDUL-517 ModPage interface. The title bar reads 'EXDUL-517 ModPage v1.03'. A left-hand navigation menu includes: Home, I/O Status, LCD Anzeige, Register Info, Passwort Info, TCP/IP Config (highlighted), LCD Config, User Register, IO Config, Zähler, and Passwort ändern. The main content area is titled 'TCP/IP Konfiguration' and contains the following text: 'Diese Seite dient zur Einstellung und Änderung der Netzwerkparameter.' Below this is a red warning box: 'Achtung: Beachten Sie dringend die Hinweise im Handbuch, durch unkorrekte Einstellungen geht die Netzwerkkonnektivität verloren.' The configuration form includes fields for: MAC Address (D4:B4:3E:00:00:00), Host Name (EXDUL-517), IP Address (169.254.1.2), Gateway (169.254.1.1), Subnet Mask (255.255.255.0), Primary DNS (217.237.151.115), and Secondary DNS (192.168.100.1). There is a checked checkbox for 'Enable DHCP' and a 'Daten speichern' button at the bottom of the form. The footer of the page reads 'EXDUL ModPage Copyright © 2013'.

You can use the enclosed standard network cable to connect EXDUL-517 directly to a PC with an Auto MDI-X-capable Ethernet interface. Older computers may need a crossover cable or crossover adapter. If you connect directly, in normal case no DHCP service is at your disposal, for neither the PC nor the EXDUL provides one. In this case the last set static IP Address can be used for addressing the EXDUL-517. Factory-new devices of EXDUL-517 are shipped with an IP Address of 169.254.1.1.

Important Information:

The PC used and the cable-connected EXDUL must be located on the same network to be able to communicate. Therefore the computer's DHCP has to be deactivated and the first two number blocks (192.168) of EXDUL IP Address 192.168.1.83 (Subnet mask 255.255.0.0) are to be transferred to the computer's IP Address. The next two number blocks can be assigned with values between 0 and 255 matching your current personal requirements.



The net portion of the IP Address depends on the subnet mask. All octets of the IP Address of Exdul-517, which in the subnet mask are assigned with 255, are to be transferred to the IP Address of the computer (see chapter 4.6 Composition and Structure of IP Address)

4.8 Configuration to Static IP Address (DHCP deactivated)

To configure EXDUL-517 to the static IP Address DHCP has to be deactivated in EXDUL-517 configuration screen. To change the configuration connect the EXDUL-517 to a LAN or PC as discussed in chapter 4.7 (Change network configuration).

Once a stable Ethernet connection has been established you can access the ModPage of the EXDUL-517 via any Internet browser. When you enter the Host Name **http://EXDUL-517**, the browser should open the ModPage. Click on the button **TCP/IP Config** to open following configuration screen:

EXDUL-517 ModPage v1.03

TCP/IP Konfiguration

Diese Seite dient zur Einstellung und Änderung der Netzwerkparameter.

Achtung: Beachten Sie dringend die Hinweise im Handbuch, durch unkorrekte Einstellungen geht die Netzwerkkonnektivität verloren.

MAC Address: D4:B4:3E:00:00:00

Host Name: EXDUL-517

Enable DHCP

IP Address: 169.254.1.2

Gateway: 169.254.1.1

Subnet Mask: 255.255.255.0

Primary DNS: 217.237.151.115

Secondary DNS: 192.168.100.1

Daten speichern

EXDUL ModPage Copyright © 2013

Once having disabled DHCP you can enter IP Address, subnet mask and desired Host Name. A click on the button **Konfiguration speichern** takes over all currently registered data in the internal memory of the EXDUL-517. From that point the module only can be addressed by the IP Address registered here, or by the indicated Host Name respectively. PC used or LAN are to be located on the same network, too.

Important information: Each device or module on one network must have its unique IP Address or Host Name, double assignments are not permitted! Any Host Name can be chosen, but it has to be composed of ASCII characters 0 to 9 as well as A to Z (leave out upper and lower case) and - (hyphen).

Some IP Addresses are reserved or have special functions as for example 127.0.0.1 (local host)

192.168.1.0 (0 defines the network address) with 255.255.255.0 (subnet mask).

Please consult your network administrator which IP Address you may use.

If you use an impermissible IP Address, the access to the module might be disrupted. The setting of the most important impermissible addresses will be blocked by the module.

4.9 Configuration with Dynamic IP Address (DHCP enabled)

If you want to embed EXDUL-517 into an existing network with already effective DHCP server and to access via a dynamic IP Address DHCP (Dynamic Host Configuration Protocol) has to be activated in the configuration screen of the ModPage. In basic setting by default DHCP is activated already and no re-setting is necessary.

If the IP Address is set statically activate DHCP as follows:

Connect EXDUL-517 to a computer using a network cable (older computers may need a crossover cable). Please make sure that the computer is set on: **Folgende IP-Adresse verwenden:** (DHCP-deaktiviert)

The network part of the IP Address (see chapter 4.6 Composition and structure of IP Address) has to be overtaken from the IP Address of the EXDUL-517, for the computer and the EXDUL are to be located on the same network.

Connect supply voltage (+10 V ...+24 V) across terminal 23 (Vcc) and terminal 24 (GND) of the module. The EXDUL will boot immediately. Once a stable connection has been established, the LED on the left side of the RJ-45 jack is lit green continuously.

Access to the EXDUL-517 ModPage is possible using any web browser pointing to the EXDUL-517's Host Name or IP Address. The browser now should open the EXDUL ModPage. If you click the button **TCP/IP Config** the configuration screen will open and you can activate DHCP by setting the checkmark **Enable DHCP**

Important Information:

We strongly recommend to consult your network administrator before activating DHCP. If you want to embed several of the same modules of the series EXDUL-5xx on one network, the presetted Host Names are to be changed. Each Host Name within a network must be assigned to only one device or module. Any Host Name can be chosen, but it has to be composed of ASCII characters 0 to 9 as well as A to Z (leave out upper and lower case) and - (hyphen).

4.10 LCD Display during the Boot Process (EXDUL-517E only)

During booting the module the display shows information data. Line 1 indicates the module name. If the IP Address is set dynamically in TCP/IP configuration (DHCP enabled = basic setting by default) line 2 temporarily indicates the last set static IP Address, subsequently the dynamic address assigned by the DHCP server.

If the IP Address is set statically in TCP/IP configuration line 2 indicates the effectively set address.

After having finished the boot process in both cases the display shows either I/O status information or UserLCD information depending upon configuration.

4.11 LCD Display during Operation (EXDUL-517E only)

Once the boot process complete, the display switches from information display to I/O status display or UserLCD display. If the I/O status is displayed line 1 indicates the current states of the inputs, line 2 those of the outputs. If UserLCD mode is activated in EXDUL-517 ModPage the display shows UserLCD data with values from memory areas UserLCD1m and UserLCD2m instead of I/O status display.

The LCD display performs UserLCD1m and UserLCD2m data values unless you write new user data in UserLCD line1 and line2 of the LCD display. To avoid „screen-burn“ while in ongoing operation the display alternates from I/O status display to UserLCD display for 5 seconds every minute.

5. Access to EXDUL-517

As noted earlier the access to the configuration set-up and to the inputs and outputs of the EXDUL-517 is possible via EXDUL-517 ModPage or TCP/IP socket. For this you need to know IP Address, Host Name or MAC Address.

5.1 Access via EXDUL ModPage

The ModPage of the EXDUL-517 allows to read inputs, to set outputs, to read out UserA, UserB and UserLCD area as well as to read out information about details of the connection or the module or to change configuration data. You can access to ModPage via any internet browser with any computer connected to the module. The used computer has to be set to „**IP-Adresse automatisch beziehen (DHCP-aktiviert)**“ if the module still is in delivery status (DHCP activated) and if it is integrated on a network with effective DHCP service. Entering the Host Name (at delivery status **http://EXDUL-517**, alternatively the name you choosed, or you might determine it via Exdul Ethernet Discoverer) you can open the ModPage. If you don't succeed in opening please check the network connections or the entered Host Name. More details see chapter FAQ - trouble shooting.

EXDUL

EXDUL-517 ModPage v1.03

EXDUL-517

Die EXDUL-517E und EXDUL-517S sind netzwerkfähige, digitale I/O-Module mit Ethernet-Interface.

Jedes Modul verfügt über 10 digitale Eingänge und acht digitale Ausgänge mit galvanischer Trennung über hochwertige Optokoppler und zusätzlichen Schutzdioden. Alle Eingangsoptokoppler verfügen über eine integrierte Schmitt-Trigger-Funktion, die speziellen leistungsfähigen Ausgangsoptokoppler bewältigen einen Schaltstrom von bis zu 150 mA. Ein Optokoppler-Eingang kann bei Bedarf auch als Zähler-Eingang programmiert und genutzt werden.

Das EXDUL-517E bietet zusätzlich eine LCD-Anzeige zur Darstellung von I/O-Statusinformationen oder anwenderspezifischen Daten. Die Anschlüsse für die notwendige externe Spannungsversorgung sind wie die Anschlüsse der Eingangs- und Ausgangsoptokoppler der 24poligen Schraubklemmleiste zugeführt.

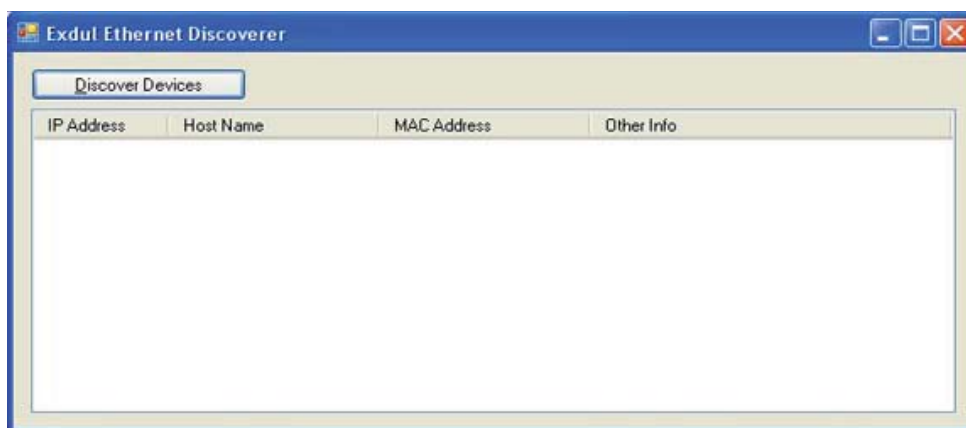
EXDUL ModPage Copyright © 2013

5.2 Access via TCP/IP Sockets

A reliable connection between computer and EXDUL-517 will be achieved using TCP protocol. The protocol will take independent actions in case of data loss. The module is addressed by a 4 Byte IP Address (IPV4) or the allocated Host Name respectively and a port number x. The computer transmits a 52-byte string for every command via this connection. The module processes the command and always will send a response. In combination with a high level language the TCP/IP connection allows to read the inputs, to set the outputs, to start, to stop and to read-out the counter, to write user specific memory areas and to change configuration setup as well.

5.3 How to Identify Host Name, IP Address and MAC Address

If you don't know neither the Host Name nor the IP Address or MAC Address of the EXDUL-517, the search tool Exdul Ethernet Discoverer enables you to detect these addresses. If your Firewall prevents communication between the search program and EXDUL-5xx it is necessary to grant access to the program.



The search tool **Exdul Ethernet Discoverer** is provided on the companion EXDUL software CD or available for download at www.wasco.de.

6. Programming

You can program EXDUL in Windows via so-called TCP/IP sockets, for which many commonly used programming languages provide standard libraries. Using .Net Frameworks of Microsoft enables a quick and easy implementation. You can find several programming examples on the enclosed companion CD and on our website.

6.1 Register HW Identification and Serial Number

Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HW identification	E	X	D	U	L	-	5	1	7	v	1	.	0	2		
	45 _{hex}	58 _{hex}	44 _{hex}	55 _{hex}	4C _{hex}	2D _{hex}	35 _{hex}	31 _{hex}	37 _{hex}	76 _{hex}	31 _{hex}	3E _{hex}	30 _{hex}	32 _{hex}	20 _{hex}	20 _{hex}
S/N	1	0	4	4	0	2	6									
	01 _{hex}	00 _{hex}	04 _{hex}	04 _{hex}	00 _{hex}	02 _{hex}	06 _{hex}	FF _{hex}	FF _{hex}	FF _{hex}	FF _{hex}	FF _{hex}	FF _{hex}	FF _{hex}	FF _{hex}	FF _{hex}

In the register HW identification the module name as well as the firmware version are stored and can be read by the user to verify the product identity. Hardware identifier ends with a blank. The table above shows every Hex value and the corresponding ASCII character in the row HW identification, in this example for EXDUL-517 with firmware version 1.02.

The register serial number only can be read by the user. The serial number in the table above serves as a format example. Row S/N shows every Hex value and the corresponding ASCII character, here for serial number 1044026.

6.2 Memory Areas UserA, UserB, UserLCD1m* and UserLCD2m*

Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
UserA																
	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}
UserB																
	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}
UserLCD1m*																
	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}
UserLCD2m*																
	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}	20 _{hex}

In each register UserA, UserB, UserLCD1m* and UserLCD2m* 16 digits (16 Byte) can be used for own purposes. The data remain stored when turning off. Factory settings (delivery status) can be restored by a default reset. In delivery status in all of the four user memory areas the Hex value is 20, corresponding to a blank in ASCII characters. The Hex value is shown in the top table and each corresponding ASCII character in the row above.

After having started the module in activated UserLCD mode the data from the memory register UserLCD1m* and UserLCD2m* are displayed as long as the user doesn't write new information in UserLCD line1 and UserLCD line2 in LCD display.

6.3 Display Register UserLCD line1*, UserLCD line2* and LCD Contrast*

In UserLCD activated mode the register UserLCD line1 and UserLCD line2 are used to write any 16 characters into each of the two rows of the LCD display. When you take over the data, the display shows this instead of the data from UserLCD1m and UserLCD2m. The data in the register UserLCD line1 and UserLCD line2 remain **not** stored when turning off. In register LCD contrast you can adjust the display contrast. The setting will be stored when turning off.

*: Nur für EXDUL-517E zutreffend, bei EXDUL-517S ohne Funktion!

6.4 Command and Data Format

The data exchange is achieved via transmitting and receiving discrete strings. Each transmitting or receiving string consists of 52 elements in ANSI format (1 Byte each character), beginning with a „!“ (Byte 0) and ending with a „\$“ (Byte 51). For each transmitting string the header (Byte 0 ... 20) will show the number of digits to be transferred (Byte 1 and 2), the Job-ID User (Byte 3 and 4) and password / access code (Byte 11..18). Bytes 21 through 24 contain the command code, while Bytes 32 through 47 are reserved for data transfer.

6.5 Structure of the Header

Byte 0	Start code „!“
Byte 1	Length of string (High-Byte)
Byte 2	Length of string (Low-Byte)
Byte 3	Job-ID User (High-Byte)
Byte 4	Job-ID User (Low-Byte)
Byte 5..10	Reserved
Byte 11..18	Password / access code
Byte 19..20	Reserved

*: EXDUL-517E only

Length of string: the number of elements (Bytes) which can be sent within a transmitting or receiving string; 52 Bytes are determined for the EXDUL-517.

Job-ID User: In larger networks not all of the strings may arrive in the same correct order as they were sent. In each string there are two Bytes intended for Job-ID User to allocate the strings.

6.6 Command Index

Hexcode	Description
0C 00 00 00	write UserA
0C 00 00 01	read UserA
0C 00 00 02	write UserB
0C 00 00 03	read UserB
0C 00 03 07	write UserLCD1m
0C 00 03 09	read UserLCD1m
0C 00 03 08	write UserLCD2m
0C 00 03 0A	read UserLCD2m
0C 00 03 00	write UserLCD line1
0C 00 03 02	read UserLCD line1
0C 00 03 01	write UserLCD line2
0C 00 03 03	read UserLCD line2
0C 00 03 04	enable UserLCD Mode
0C 00 03 05	read status UserLCD Mode
0C 00 03 0B	write LCD contrast
0C 00 03 0C	read LCD contrast
0C 00 04 01	read HW identifier
0C 00 05 01	read serial number
0C 00 0C 01	change password
0C 00 0E 00	write IP Address + subnet mask
0C 00 0E 01	read IP Address + subnet mask
0C 00 0E 04	write Host Name
0C 00 0E 05	read Host Name

*:EXDUL-517E only

0C 00 0E 06	write Gateway + DNS
0C 00 0E 07	read Gateway + DNS
0C 00 0E 08	read MAC Address
0C 00 0E 09	DHCP enable / disable
0C 00 0E 0A	DHCP state
08 00 01 01	read optocoupler input port
08 00 00 00	write optocoupler output port
08 00 00 01	read optocoupler output port (status request)
09 00 00 00	start counter0
09 00 00 01	stop counter0
09 00 00 02	read status of counter0
09 00 00 03	read counter0
0C 00 0C 0E	reset (User)
0C 00 0C 0F	reset factory setting (set delivery status)

6.7 Command Composition

6.7.1 Write in User Area A and B

Example: write the string EXDUL-517 from register UserA and UserB

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	00 (UserA) 02 (UserB)	00 (UserA) 02 (UserB)	Command code 4th Byte
25...31			Reserved
32	45	45	Data 1st digit E _{ascii}
33	58	58	Data 2nd digit X _{ascii}
34	44	44	Data 3rd digit D _{ascii}
35	55	55	Data 4th digit U _{ascii}
36	4C	4C	Data 5th digit L _{ascii}
37	2D	2D	Data 6th digit r _{ascii}
38	35	35	Data 7th digit 5 _{ascii}
39	31	31	Data 8th digit 1 _{ascii}
40	37	37	Data 9th digit 7 _{ascii}
41	20	20	Data 10th digit [blank] _{ascii}
42	20	20	Data 11th digit [blank] _{ascii}
43	20	20	Data 12th digit [blank] _{ascii}
44	20	20	Data 13th digit [blank] _{ascii}
45	20	20	Data 14th digit [blank] _{ascii}
46	20	20	Data 15th digit [blank] _{ascii}
47	20	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.2 Read out User area A und B

Example: read the string EXDUL-517 in register UserA and UserB

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	01 (UserA) 03 (UserB)	01 (UserA) 03 (UserB)	Command code 4th Byte
25...31			Reserved
32	xx	45	Data 1st digit E _{ascii}
33	xx	58	Data 2nd digit X _{ascii}
34	xx	44	Data 3rd digit D _{ascii}
35	xx	55	Data 4th digit U _{ascii}
36	xx	4C	Data 5th digit L _{ascii}
37	xx	2D	Data 6th digit - _{ascii}
38	xx	35	Data 7th digit 5 _{ascii}
39	xx	31	Data 8th digit 1 _{ascii}
40	xx	37	Data 9th digit 7 _{ascii}
41	xx	20	Data 10th digit [blank] _{ascii}
42	xx	20	Data 11th digit [blank] _{ascii}
43	xx	20	Data 12th digit [blank] _{ascii}
44	xx	20	Data 13th digit [blank] _{ascii}
45	xx	20	Data 14th digit [blank] _{ascii}
46	xx	20	Data 15th digit [blank] _{ascii}
47	xx	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.3 Write in UserLCD1m* and UserLCD2m*

Example: Write the character string EXDUL-517 in register UserLCD1m* and UserLCD2m*

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	07 (UserLCD1m) 08 (UserLCD2m)	07 (UserLCD1m) 08 (UserLCD2m)	Command code 4th Byte
25...31			Reserved
32	45	45	Data 1st digit E _{ascii}
33	58	58	Data 2nd digit X _{ascii}
34	44	44	Data 3rd digit D _{ascii}
35	55	55	Data 4th digit U _{ascii}
36	4C	4C	Data 5th digit L _{ascii}
37	2D	2D	Data 6th digit * _{ascii}
38	35	35	Data 7th digit 5 _{ascii}
39	31	31	Data 8th digit 1 _{ascii}
40	37	37	Data 9th digit 7 _{ascii}
41	20	20	Data 10th digit [blank] _{ascii}
42	20	20	Data 11th digit [blank] _{ascii}
43	20	20	Data 12th digit [blank] _{ascii}
44	20	20	Data 13th digit [blank] _{ascii}
45	20	20	Data 14th digit [blank] _{ascii}
46	20	20	Data 15th digit [blank] _{ascii}
47	20	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.4 Read out UserLCD1m* and UserLCD2m*

Example: read the string EXDUL-517 from the register UserLCD1m* and UserLCD2m*

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	09 (UserLCD1m) 0A (UserLCD2m)	09 (UserLCD1m) 0A (UserLCD2m)	Command code 4th Byte
25...31			Reserved
32	xx	45	Data 1st digit E _{ascii}
33	xx	58	Data 2nd digit X _{ascii}
34	xx	44	Data 3rd digit D _{ascii}
35	xx	55	Data 4th digit U _{ascii}
36	xx	4C	Data 5th digit L _{ascii}
37	xx	2D	Data 6th digit r _{ascii}
38	xx	35	Data 7th digit 5 _{ascii}
39	xx	31	Data 8th digit 1 _{ascii}
40	xx	37	Data 9th digit 7 _{ascii}
41	xx	20	Data 10th digit [blank] _{ascii}
42	xx	20	Data 11th digit [blank] _{ascii}
43	xx	20	Data 12th digit [blank] _{ascii}
44	xx	20	Data 13th digit [blank] _{ascii}
45	xx	20	Data 14th digit [blank] _{ascii}
46	xx	20	Data 15th digit [blank] _{ascii}
47	xx	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.5 Write in UserLCD1* and UserLCD2*

Example: Write the string EXDUL-517 in UserLCD1* resp. UserLCD2*

Byte	Transmit	Reply	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	00 (UserLCD1) 01 (UserLCD2)	00 (UserLCD1) 01 (UserLCD2)	Command code 4th Byte
25...31			Reserved
32	45	45	Data 1st digit E _{ascii}
33	58	58	Data 2nd digit X _{ascii}
34	44	44	Data 3rd digit D _{ascii}
35	55	55	Data 4th digit U _{ascii}
36	4C	4C	Data 5th digit L _{ascii}
37	2D	2D	Data 6th digit ^ _{ascii}
38	35	35	Data 7th digit 5 _{ascii}
39	31	31	Data 8th digit 1 _{ascii}
40	37	37	Data 9th digit 7 _{ascii}
41	20	20	Data 10th digit [blank] _{ascii}
42	20	20	Data 11th digit [blank] _{ascii}
43	20	20	Data 12th digit [blank] _{ascii}
44	20	20	Data 13th digit [blank] _{ascii}
45	20	20	Data 14th digit [blank] _{ascii}
46	20	20	Data 15th digit [blank] _{ascii}
47	20	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	end identifier \$ _{ascii}

*: EXDUL-517E only

6.7.6 Read from UserLCD1* and UserLCD2*

Example: read the string EXDUL-517 from UserLCD1* resp. UserLCD2*

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	02 (UserLCD1) 03 (UserLCD2)	02 (UserLCD1) 03 (UserLCD2)	Command code 4th Byte
25...31			Reserved
32	xx	45	Data 1st digit E _{ascii}
33	xx	58	Data 2nd digit X _{ascii}
34	xx	44	Data 3rd digit D _{ascii}
35	xx	55	Data 4th digit U _{ascii}
36	xx	4C	Data 5th digit L _{ascii}
37	xx	2D	Data 6th digit ^r _{ascii}
38	xx	35	Data 7th digit 5 _{ascii}
39	xx	31	Data 8th digit 1 _{ascii}
40	xx	37	Data 9th digit 7 _{ascii}
41	xx	20	Data 10th digit [blank] _{ascii}
42	xx	20	Data 11th digit [blank] _{ascii}
43	xx	20	Data 12th digit [blank] _{ascii}
44	xx	20	Data 13th digit [blank] _{ascii}
45	xx	20	Data 14th digit [blank] _{ascii}
46	xx	20	Data 15th digit [blank] _{ascii}
47	xx	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.7 Write UserLCD-Mode

Example: Enable UserLCD mode

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	04	04	Command code 4th Byte
25...31			Reserved
32	01	01	01 = enable / 00 = disable
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.8 Read UserLCD-Mode

Example: UserLCD mode is set enable

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	05	05	Command code 4th Byte
25...31			Reserved
32	xx	01	01 = enable / 00 = disable
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.9 Read Hardware Identification

Example: Read of hardware identification EXDUL-517V1.02

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	04	04	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32	xx	45	Data 1st digit E _{ascii}
33	xx	58	Data 2nd digit X _{ascii}
34	xx	44	Data 3rd digit D _{ascii}
35	xx	55	Data 4th digit U _{ascii}
36	xx	4C	Data 5th digit L _{ascii}
37	xx	2D	Data 6th digit _{ascii}
38	xx	35	Data 7th digit 5 _{ascii}
39	xx	31	Data 8th digit 1 _{ascii}
40	xx	37	Data 9th digit 7 _{ascii}
41	xx	76	Data 10th digit V _{ascii}
42	xx	31	Data 11th digit 1 _{ascii}
43	xx	2E	Data 12th digit _{ascii}
44	xx	30	Data 13th digit 0 _{ascii}
45	xx	32	Data 14th digit 2 _{ascii}
46	xx	20	Data 15th digit [blank] _{ascii}
47	xx	20	Data 16th digit [blank] _{ascii}
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.10 Read the Serial Number

Example: read the serial number 1044026

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	05	05	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32	xx	01	Data 1st digit 1 _{dez}
33	xx	00	Data 2nd digit 0 _{dez}
34	xx	04	Data 3rd digit 4 _{dez}
35	xx	04	Data 4th digit 4 _{dez}
36	xx	00	Data 5th digit 0 _{dez}
37	xx	02	Data 6th digit 2 _{dez}
38	xx	06	Data 7th digit 6 _{dez}
39...47	xx	20	Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.11 Read Optocoupler Input Port

Example: read the inputs at the optocoupler input port. Precondition for this example are the voltage input levels (0 = Low = 0...3 V; 1 = High = 10...30 V) to be set on each input according following table:

Input channel	IN09	IN08	IN07	IN06	IN05	IN04	IN03	IN02	IN01	IN00
Screw terminal	20	19	18	17	16	15	14	13	12	11
Input level	1	0	1	1	1	1	0	0	1	1
Display*	E	A	E	E	E	E	A	A	E	E

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	08	08	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	01	01	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32	xx	02	Read value (Highbyte - 00...03)
33	xx	F3	Read value (Lowbyte - 00...FF)
34...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.12 Write Optocoupler Output Port

Example: interconnection of optocouplers to channel OUT02, OUT03, OUT04 and OUT06, (optocouplers connected through = 1; optocouplers not connected through = 0)

Output channel	OUT07	OUT06	OUT05	OUT04	OUT03	OUT02	OUT01	OUT00
Screw terminal	8	7	6	5	4	3	2	1
Switching status	0	1	0	1	1	1	0	0
Display*	A	E	A	E	E	E	A	A

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	08	08	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	00	00	Command code 4th Byte
25...31			Reserved
32	5C	5C	Transfer value (00...FF)
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.13 Readback Optocoupler Output Port (Status Request)

Example: interconnection of optocouplers to channel OUT02, OUT03, OUT04 und OUT06, (optocouplers connected through = 1; optocouplers not connected through = 0)

Output channel	OUT07	OUT06	OUT05	OUT04	OUT03	OUT02	OUT01	OUT00
Screw terminal	8	7	6	5	4	3	2	1
Switching status	0	1	0	1	1	1	0	0
Display*	A	E	A	E	E	E	A	A

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	08	08	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32	xx	5C	Transfer value (00...FF)
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.14 Start Counter

Every start command resets the counter to 0 and it then will begin to count upwards, with a counting range of 0...65,535.

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	09	09	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	00	00	Command code 4th Byte
25...31			Reserved
32...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.15 Readback Start of Counter (Status Request)

Example: counter started

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	09	09	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	02	02	Command code 4th Byte
25...31			Reserved
32	xx	01	01 = counter started (00 = counter stopped)
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.16 Stop Counter

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	09	09	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.17 Read Counter Status

Example 1: Read counter status 2047 (without overflow)

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{asci}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	09	09	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	00	00	Command code 3rd Byte
24	03	03	Command code 4th Byte
25...31			Reserved
32	xx	00	Flag for overflow (set when counting range is overrun)
33	xx	07	Read value (Highbyte - 00...FF)
34	xx	FF	Read value (Lowbyte - 00...FF)
35...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{asci}

Counter status = read value High-Byte x 256 + read value Low-Byte

Example 2: Read counter status 2047 counting range overrun (with overflow)

Byte	Transmit	Response	Description
32	xx	01	Flag for overflow (set when counting range is overrun)
33	xx	07	Read value (Highbyte - 00...FF)
34	xx	FF	Read value (Lowbyte - 00...FF)

Counter status = read value High-Byte x 256 + read value Low-Byte

6.7.18 Write LCD Contrast Value*

Calling this command you can adjust display contrast. Values are accepted from 0 up to 4095, the display contrast will reduce the more the value increases. Comfortable display contrast will be achieved with values ranging from 800 up to 1800.

Example: Display contrast value 800

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	0B	0B	Command code 4th Byte
25...31			Reserved
32	03	03	Read value (Highbyte - 00...FF)
33	50	50	Read value (Lowbyte - 00...FF)
34...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

Contrast value = transfer value High-Byte x 256 + transfer value Low-Byte (03 50 = 800)

Example: Display contrast value 1800

Byte	Transmit	Response	Description
32	07	07	Transfer value (High-Byte - 00...0F)
33	08	08	Transfer value (Low-Byte - 00...FF)

Contrast value = transfer value High-Byte x 256 + transfer value Low-Byte (07 08 = 1800)

*: EXDUL-517E only

6.7.19 Read LCD Contrast Value*

Example: Display contrast value 800

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	03	03	Command code 3rd Byte
24	0C	0C	Command code 4th Byte
25...31			Reserved
32	xx	03	Read value (Highbyte - 00...0F)
33	xx	50	Read value (Lowbyte - 00...FF)
34...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

Contrast value = transfer value High-Byte x 256 + transfer value Low-Byte (03 50 = 800)

Example: Display contrast value 1000 (factory setting at delivery)

Byte	Transmit	Response	Description
32	xx	03	Transfer value (High-Byte - 00...0F)
33	xx	E8	Transfer value (Low-Byte - 00...FF)

Contrast value = transfer value High-Byte x 256 + transfer value Low-Byte (03 E8 = 1000)

*: EXDUL-517E only!

6.7.20 Write Host Name

Example: write Host Name EXDUL-517

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	04	04	Command code 4th Byte
25...31			Reserved
32	45	45	Data 1st digit E _{ascii}
33	58	58	Data 2nd digit X _{ascii}
34	44	44	Data 3rd digit D _{ascii}
35	55	55	Data 4th digit U _{ascii}
36	4C	4C	Data 5th digit L _{ascii}
37	2D	2D	Data 6th digit - _{ascii}
38	35	35	Data 7th digit 5 _{ascii}
39	31	31	Data 8th digit 1 _{ascii}
40	37	37	Data 9th digit 7 _{ascii}
41	20	20	Data 10th digit [blank] _{ascii}
42	20	20	Data 11th digit [blank] _{ascii}
43	20	20	Data 12th digit [blank] _{ascii}
44	20	20	Data 13th digit [blank] _{ascii}
45	20	20	Data 14th digit [blank] _{ascii}
46	20	20	Data 15th digit [blank] _{ascii}
47			Reserved
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

This command requires a reboot / reset of the module.

*: EXDUL-517E only

6.7.21 Read Host Name

Example: read Host Name EXDUL-517

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	05	05	Command code 4th Byte
25...31			Reserved
32	xx	45	Data 1st digit E _{ascii}
33	xx	58	Data 2nd digit X _{ascii}
34	xx	44	Data 3rd digit D _{ascii}
35	xx	55	Data 4th digit U _{ascii}
36	xx	4C	Data 5th digit L _{ascii}
37	xx	2D	Data 6th digit ^r _{ascii}
38	xx	35	Data 7th digit 5 _{ascii}
39	xx	31	Data 8th digit 1 _{ascii}
40	xx	37	Data 9th digit 7 _{ascii}
41	xx	20	Data 10th digit [blank] _{ascii}
42	xx	20	Data 11th digit [blank] _{ascii}
43	xx	20	Data 12th digit [blank] _{ascii}
44	xx	20	Data 13th digit [blank] _{ascii}
45	xx	20	Data 14th digit [blank] _{ascii}
46	xx	20	Data 15th digit [blank] _{ascii}
47			Reserved
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.22 Write IP Address and Subnet Mask

Example: Write IP Address 192.168.0.83

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	00	00	Command code 4th Byte
25...31			Reserved
32	C0	C0	1st Byte IP Address decimal value 192
33	A8	A8	2nd Byte IP Address decimal value 168
34	00	00	3rd Byte IP Address decimal value 0
35	53	53	4th Byte IP Address decimal value 83
36	FF	FF	1st Byte Subnetmask decimal value 255
37	FF	FF	2nd Byte Subnetmask decimal value 255
38	FF	FF	3rd Byte Subnetmask decimal value 255
39	00	00	4th Byte Subnetmask decimal value 0
40...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

This command requires a reboot / reset of the module.

6.7.23 Write IP Address and Subnet Mask

Example: read IP Address 192.168.0.83

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32	xx	C0	1st Byte IP Address decimal value 192
33	xx	A8	2nd Byte IP Address decimal value 168
34	xx	00	3rd Byte IP Address decimal value 0
35	xx	53	4th Byte IP Address decimal value 83
36	xx	FF	1st Byte Subnetmask decimal value 255
37	xx	FF	2nd Byte Subnetmask decimal value 255
38	xx	FF	3rd Byte Subnetmask decimal value 255
39	xx	00	4th Byte Subnetmask decimal value 0
40...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.24 Write Gateway and DNS

Example:

Write Gateway 192.168.0.1, Primary DNS 192.168.0.1, Secondary DNS 217.237.151.115

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	00	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	06	06	Command code 4th Byte
25...31			Reserved
32	C0	C0	Gateway 1th Byte decimal value 192
33	A8	A8	Gateway 2nd Byte decimal value 168
34	00	00	Gateway 3rd Byte decimal value 0
35	01	01	Gateway 4th Byte decimal value 1
36	C0	C0	Primary DNS 1st Byte decimal value 192
37	A8	A8	Primary DNS 2nd Byte decimal value 168
38	00	00	Primary DNS 3rd Byte decimal value 0
39	01	01	Primary DNS 4th Byte decimal value 1
40	D9	D9	Secondary DNS 1st Byte decimal value 217
41	ED	ED	Secondary DNS 2nd Byte decimal value 237
42	97	97	Secondary DNS 3rd Byte decimal value 151
43	73	73	Secondary DNS 4th Byte decimal value 115
44...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

This command requires a reboot / reset of the module.

*: EXDUL-517E only

6.7.25 Read Gateway und DNS

Example:

Read Gateway 192.168.0.1, Primary DNS 192.168.0.1, Secondary DNS 217.237.151.115

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	00	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	07	07	Command code 4th Byte
25...31			Reserved
32	xx	C0	Gateway 1st Byte decimal value 192
33	xx	A8	Gateway 2nd Byte decimal value 168
34	xx	00	Gateway 3rd Byte decimal value 0
35	xx	01	Gateway 4th Byte decimal value 1
36	xx	C0	Primary DNS 1st Byte decimal value 192
37	xx	A8	Primary DNS 2nd Byte decimal value 168
38	xx	00	Primary DNS 3rd Byte decimal value 0
39	xx	01	Primary DNS 4th Byte decimal value 1
40	xx	D9	Secondary DNS 1st Byte decimal value 217
41	xx	ED	Secondary DNS 2nd Byte decimal value 237
42	xx	97	Secondary DNS 3rd Byte decimal value 151
43	xx	73	Secondary DNS 4th Byte decimal value 115
44...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

*: EXDUL-517E only

6.7.26 Read MAC Address

Example: Read MAC Address 00:04:A3:C0:BE:AF

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	08	08	Command code 4th Byte
25...31			Reserved
32	xx	00	MAC Address 1st Byte 00 _{hex}
33	xx	04	MAC Address 2nd Byte 04 _{hex}
34	xx	A3	MAC Address 3rd Byte A3 _{hex}
35	xx	C0	MAC Address 4th Byte C0 _{hex}
36	xx	BE	MAC Address 5th Byte BE _{hex}
37	xx	AF	MAC Address 6th Byte AF _{hex}
38...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.27 DHCP Enable/Disable

Example: DHCP status

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{asci}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	09	09	Command code 4th Byte
25...31			Reserved
32	01 (enable) 00 (disable)	01 (enable) 00 (disable)	01 = activate DHCP 00 = deactivate DHCP
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{asci}

This command requires a reboot / reset of the module.

6.7.28 DHCP Status

Example: DHCP effective

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0E	0E	Command code 3rd Byte
24	0A	0A	Command code 4th Byte
25...31			Reserved
32	xx	01	01 = DHCP activated 00 = DHCP deactivated
33...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.29 How to Change Access Code (Password)

To prevent unauthorized access to the module it is highly recommended to change the factory presetted password. The new access code should consist of an 8 digit combination of letters and numbers using upper and lower case. Capital letters (A-Z), lower case letters (a-z) and numbers (0-9) are permitted. Presetted login name (admin) is not changeable.

Example: New password Exdul517

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0C	0C	Command code 3rd Byte
24	01	01	Command code 4th Byte
25...31			Reserved
32	45	45	1st digit E _{ascii}
33	78	78	2nd digit X _{ascii}
34	64	64	3rd digit D _{ascii}
35	75	75	4th digit U _{ascii}
36	6C	6C	5th digit L _{ascii}
37	35	35	6th digit 5 _{ascii}
38	31	31	7th digit 1 _{ascii}
39	37	37	8th digit 7 _{ascii}
40...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

6.7.30 Reset

Description: User settings keep reserved

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0C	0C	Command code 3rd Byte
24	0E	0E	Command code 4th Byte
25...31			Reserved
32...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

Attention: the module does not send a response!

6.7.31 Factory Resetting

Description: restores the basic status

Byte	Transmit	Response	Description
0	21	21	Start identifier ! _{ascii}
1	0	0	Length of the string (High-Byte)
2	52	52	Length of the string (Low-Byte)
3	xx	xx	Job-ID (High-Byte)
4	xx	xx	Job-ID (Low-Byte)
5...10			Reserved
11...18	xx	xx	Password / access code
19...20	xx	xx	Reserved
21	0C	0C	Command code 1st Byte
22	00	00	Command code 2nd Byte
23	0C	0C	Command code 3rd Byte
24	0F	0F	Command code 4th Byte
25...31			Reserved
32...47			Reserved, without relevance for this command
48...50			Reserved for error code/error detection
51	24	24	End identifier \$ _{ascii}

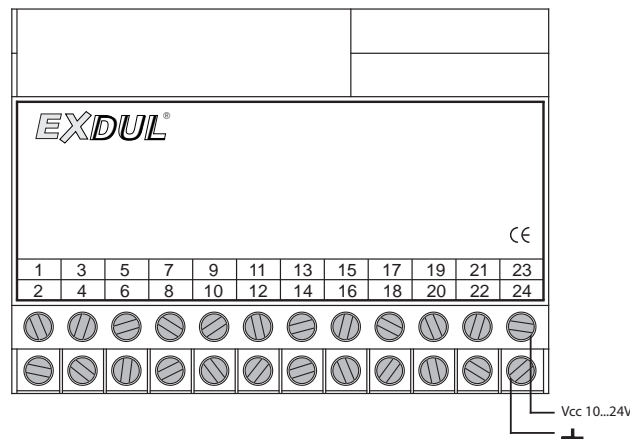
Attention: the module does not send a response!

7. FAQ - Troubleshooting

Please find below a short summary of the most and common causes of failures, which might occur during commissioning or access to the EXDUL-517 or to the EXDUL ModPage. Please firstly check following points before contacting your distributor:

Is the power supply voltage of the EXDUL-517 connected properly?

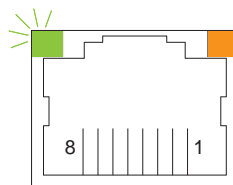
For operating a supply voltage from +10 V ... +24 V DC across terminal 23 (Vcc) and terminal 24 (GND) is required. Check the screw terminal connection links on the module as well as the power supply unit and connections to the power supply.



Is the link LED lit green continuously on the RJ-45 jack?

After operating voltage is applied, the EXDUL-517 will boot. Once a stable Ethernet connection has been established, the LED on 8P8C module jack (RJ-45 jack) is lit green continuously.

If not, check the cabling link between the EXDUL-517 and your computer (a crossover cable might be necessary). If you work on a network, please check network connections between EXDUL-517 and wall-mounted network socket, effective Ethernet switch or Ethernet hub.



Is there a stable connection between computer and network ?

Check network cable between EXDUL-517 and network socket (wall-mounted RJ-45 jack), effective Ethernet switch or Ethernet hub. The Ethernet cable has to be suitable for the Ethernet connection, it may not be damaged and has to be properly connected on both sides. Current computers mostly provide two LED's on the network jack of the network adapter. If connection to the network is established, the green LED is lit continuously. If the network jack of the computer provides only one LED it will flash or flicker at port activity (proper network connection).

Is the network cable in use suitable for the connection?

If you connect EXDUL-517 to a switch, hub or PC with an Auto MDI-(X) capable Ethernet interface, a standard network cable (Cat5 or higher) can be used. Older computer whose Ethernet interface do not automatically cross transmitting and receiving lines, may need a crossover cable or crossover adapter.

Is the wall-mounted network jack effective?

If you connect the EXDUL-517 to a permanent installed network via a wall socket please check together with your network administrator, whether the wall socket is active and connected with an effective Ethernet switch or Ethernet hub.

Is the computer's Ethernet interface activated?

The Ethernet adapter has to be activated in the BIOS of your computer. Please check the Windows Device Manager whether the adapter is listed under network adapters. The entry must not be tagged with an exclamation mark!

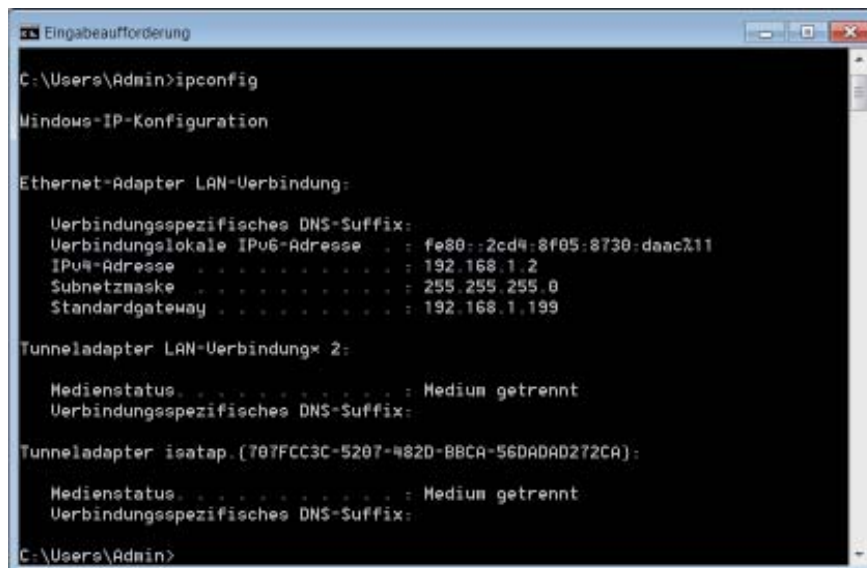
Is the computer's network configuration set correctly?

Each effective device on a TCP-IP based network needs a unique IP Address, which is composed of a network ID and a device ID. The subnet mask separates the IP Address in a network portion (network prefix, network ID) and a device portion (device ID). In the basic setting the EXDUL-517 is adjusted to DHCP client. To access the EXDUL-517 the used PC has to be set to **IP-Adresse automatisch beziehen (DHCP-aktiviert)** and the network has to provide a DHCP server (integrated in most of the routers). The DHCP server automatically allocates a subnet mask and an IP Address to the EXDUL-517 and to the computer. If the basic setting was changed to static IP Address, the computer in use has to be set to static address (**Folgende IP-Adresse verwenden**), too.

Example: EXDUL-517 is registered with the static IP Address of 192.168.1.199 (network ID: 192.168.1., device ID 199). To access the EXDUL-517 the used PC has to be set to subnet mask 255.255.255.0 and to static IP Address ranging from 192.168.1.1 up to 192.168.1.244

How to check the network configuration of the PC

You can detect the TCP/IP settings of your computer via the window Internet Protocol Version 4 (TCP/IPv4) or status of the LAN connection respectively (see „How to check or to change IP Address of the PC“). Alternatively enter the simple command IPCONFIG to the command-line. Thereto change to MS-DOS Prompt (see „How to change to MS-DOS Prompt“), enter **ipconfig** and press enter to confirm. The response should look similar to the picture as shown below:



```
Eingabeaufforderung
C:\Users\Admin>ipconfig

Windows-IP-Konfiguration

Ethernet-Adapter LAN-Verbindung:

    Verbindungsspezifisches DNS-Suffix:
    Verbindungslokale IPv6-Adresse . . : fe80::2cd4:8f05:8730:daac%11
    IPv4-Adresse . . . . . : 192.168.1.2
    Subnetzmaske . . . . . : 255.255.255.0
    Standardgateway . . . . . : 192.168.1.199

Tunneladapter LAN-Verbindung* 2:

    Medienstatus . . . . . : Medium getrennt
    Verbindungsspezifisches DNS-Suffix:

Tunneladapter isatap.{707FCC3C-5207-482D-BBCA-56DADAD272CA}:

    Medienstatus . . . . . : Medium getrennt
    Verbindungsspezifisches DNS-Suffix:

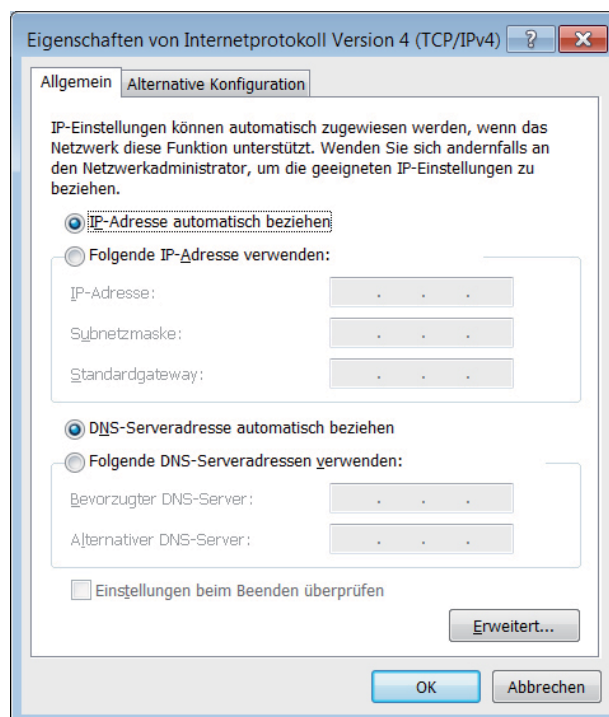
C:\Users\Admin>
```

How to check or to change IP Address of the PC

Windows7:

Start -> control panel -> Network and sharing center (display network status and tasks) -> change adapter settings -> select required LAN connection in the window network connections (double-click or right mouse button) -> properties -> Internet Protocol Version 4 (TCP/IPV4) -> properties

Please note: you have to own administrator privileges for changing TCP/IP settings!



WindowsXP:

Start -> control panel -> network connections (network and Internet connections) -> select required LAN connection (double-click or right mouse button) -> properties -> Internet Protocol (TCP/IP) -> properties

Please note: you have to own administrator privileges for changing TCP/IP settings!

How to change to MS-DOS prompt

Windows7:

Start -> enter **cmd** in input field (program and file searching) -> press enter to confirm

or

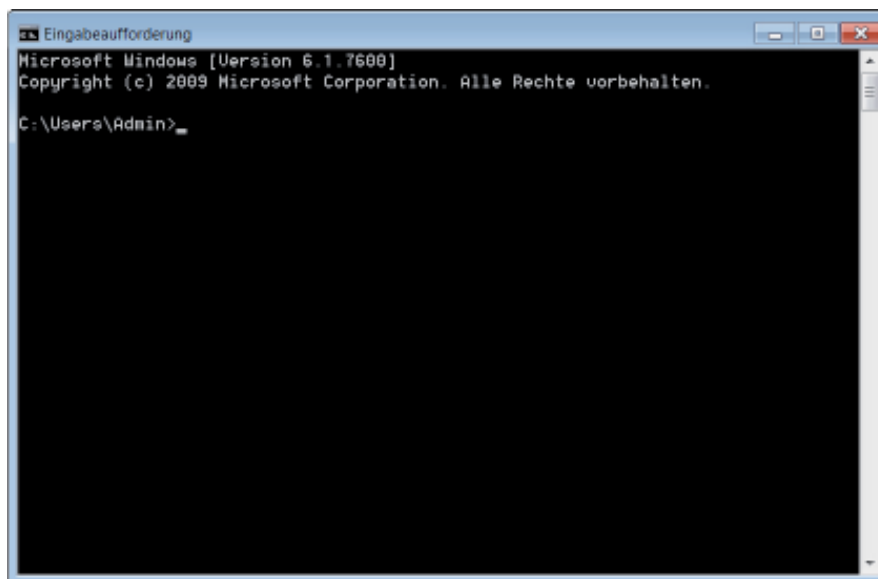
Start -> All Programs -> Accessories -> prompt

WindowsXP:

Start -> Run -> enter **cmd** in input field -> OK

or

Start -> All Programs -> Accessories -> prompt



Is it possible to locate modules EXDUL-5xx on an existing network and to detect the network data?

All EXDUL-5xx modules send detection signals in certain periodic intervals. The program **Exdul Ethernet Discoverer** evaluates the identification data and compiles a list with Host Name, IP Address and MAC Address. It is suitable for any single EXDUL-5xx directly connected to a PC as well as for a network with several modules connected via Hub or Switch. In case the firewall prevents the communication between searching program and EXDUL-5xx an approval to your firewall is necessary.

8. Specifications

Digital inputs by optocoupler

Channels	10 inputs galvanically isolated common ground connection (cathodes connected) 1 of the channels programmable as counting input optocoupler with integrated Schmitt-Trigger function
galvanic isolation	diodes
over voltage protection	
input voltage range	high = 10 30 V low = 0 3 V
input frequency	max. 10 kHz

Digital outputs by optocoupler

Channels	8 outputs galvanically isolated common plus connection (collectors connected)
galvanic isolation	high-capacity optocoupler
reverse polarity protection	diodes
output current	max. 150mA
switching voltage	max. 50 V

Counter

Channel	1 programmable counter 16 Bit (1 of the 10 input optocoupler is assigned)
counting frequency	max. 5 kHz

LCD display (EXDUL-517E only)

Display	Matrix display with 2 lines and 16 columns displaying 16 characters on each line
display modes	Info display during booting process I/O status display or UserLCD display during operation

Operating voltage

External voltage source:	+10 V...+24 V
--------------------------	---------------

Ethernet Port

10Base-T Ethernet Interface

Module circuit points

1 * 24pin screw terminal block
1 * RJ-45 jack

Network cable

RJ-45 network cable Cat5 or higher

Dimensions

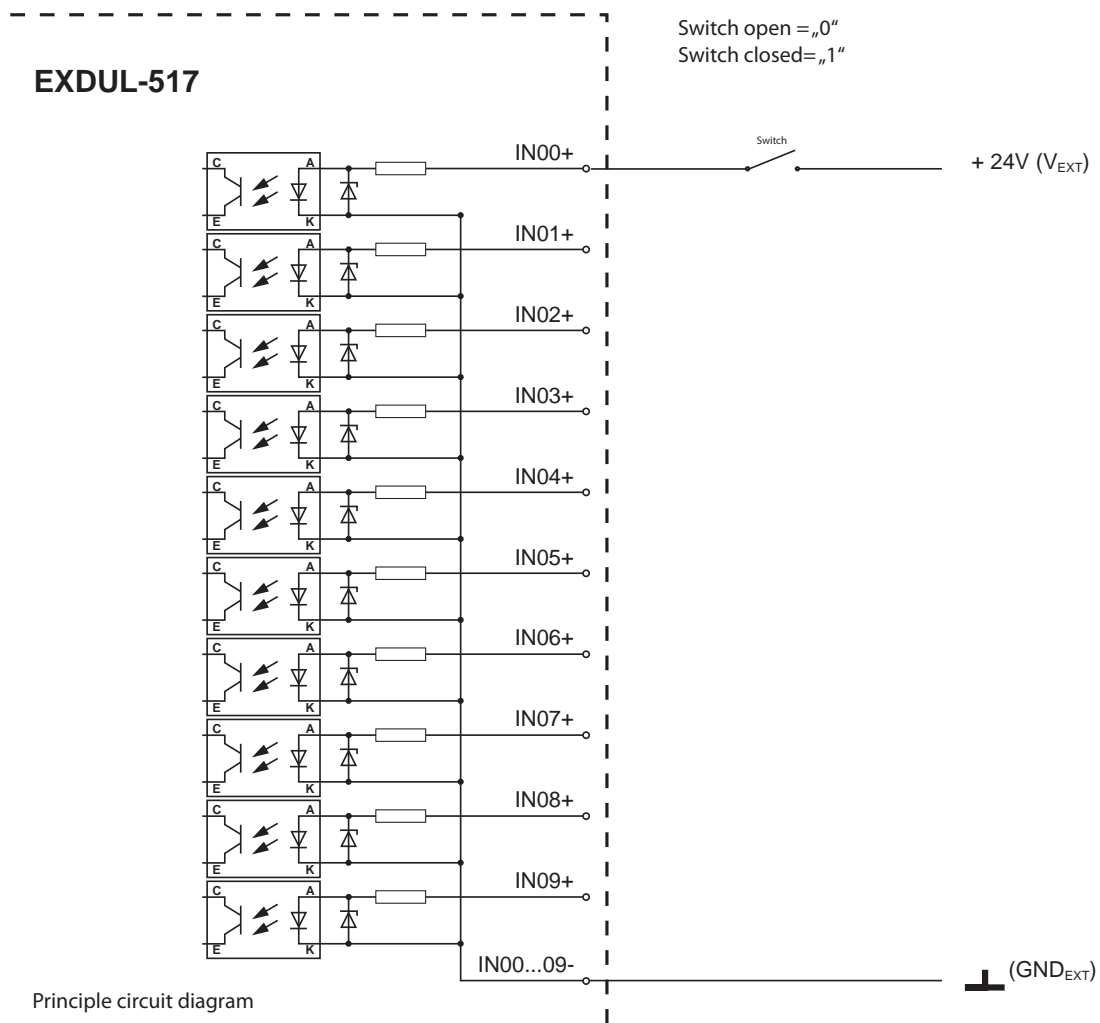
105 mm x 89 mm x 59 mm (l x b x h)

Casing

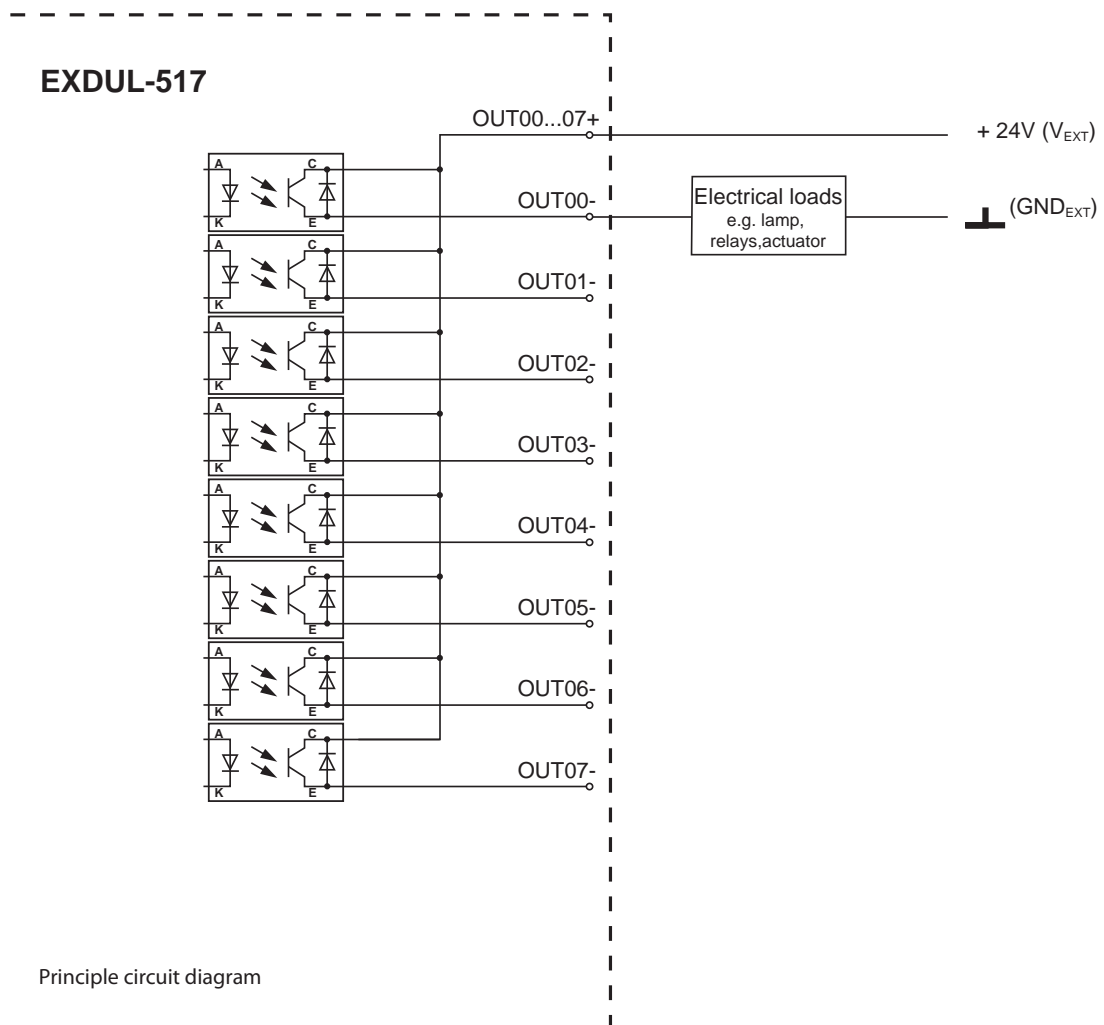
Plastic casing with integrated snap-on technology or DIN EN rail mounting
Suitable for control and engineering technology mounted to control and distribution boxes, surface mounting or mobile use on a desk.

9. Examples for Circuitry

9.1 Input Wiring



9.2 Output Wiring



10. ASCII Table

Hex	Dec	Binary	Character	Hex	Dec	Binary	Character
00	0	00000000		28	40	00101000	(
01	1	00000001		29	41	00101001)
02	2	00000010		2A	42	00101010	*
03	3	00000011		2B	43	00101011	+
04	4	00000100		2C	44	00101100	,
05	5	00000101		2D	45	00101101	-
06	6	00000110		2E	46	00101110	.
07	7	00000111		2F	47	00101111	/
08	8	00001000		30	48	00110000	0
09	9	00001001		31	49	00110001	1
0A	10	00001010		32	50	00110010	2
0B	11	00001011		33	51	00110011	3
0C	12	00001100		34	52	00110100	4
0D	13	00001101		35	53	00110101	5
0E	14	00001110		36	54	00110110	6
0F	15	00001111		37	55	00110111	7
10	16	00010000		38	56	00111000	8
11	17	00010001		39	57	00111001	9
12	18	00010010		3A	58	00111010	:
13	19	00010011		3B	59	00111011	;
14	20	00010100		3C	60	00111100	<
15	21	00010101		3D	61	00111101	=
16	22	00010110		3E	62	00111110	>
17	23	00010111		3F	63	00111111	?
18	24	00011000		40	64	01000000	@
19	25	00011001		41	65	01000001	A
1A	26	00011010		42	66	01000010	B
1B	27	00011011		43	67	01000011	C
1C	28	00011100		44	68	01000100	D
1D	29	00011101		45	69	01000101	E
1E	30	00011110		46	70	01000110	F
1F	31	00011111		47	71	01000111	G
20	32	00100000	[blank]	48	72	01001000	H
21	33	00100001	!	49	73	01001001	I
22	34	00100010	"	4A	74	01001010	J
23	35	00100011	#	4B	75	01001011	K
24	36	00100100	\$	4C	76	01001100	L
25	37	00100101	%	4D	77	01001101	M
26	38	00100110	&	4E	78	01001110	N
27	39	00100111	'	4F	79	01001111	O

Hex	Dec	Binary	Character
50	80	01010000	P
51	81	01010001	Q
52	82	01010010	R
53	83	01010011	S
54	84	01010100	T
55	85	01010101	U
56	86	01010110	V
57	87	01010111	W
58	88	01011000	X
59	89	01011001	Y
5A	90	01011010	Z
5B	91	01011011	[
5C	92	01011100	
5D	93	01011101]
5E	94	01011110	^
5F	95	01011111	_
60	96	01100000	`
61	97	01100001	a
62	98	01100010	b
63	99	01100011	c
64	100	01100100	d
65	101	01100101	e
66	102	01100110	f
67	103	01100111	g
68	104	01101000	h
69	105	01101001	i
6A	106	01101010	j
6B	107	01101011	k
6C	108	01101100	l
6D	109	01101101	m
6E	110	01101110	n
6F	111	01101111	o
70	112	01110000	p
71	113	01110001	q
72	114	01110010	r
73	115	01110011	s
74	116	01110100	t
75	117	01110101	u
76	118	01110110	v
77	119	01110111	w
78	120	01111000	x
79	121	01111001	y
7A	122	01111010	z
7B	123	01111011	{

Hex	Dec	Binary	Character
7C	124	01111100	
7D	125	01111101	}
7E	126	01111110	
7F	127	01111111	
80	128	10000000	
81	129	10000001	
82	130	10000010	
83	131	10000011	
84	132	10000100	
85	133	10000101	
86	134	10000110	
87	135	10000111	
88	136	10001000	
89	137	10001001	
8A	138	10001010	
8B	139	10001011	
8C	140	10001100	
8D	141	10001101	
8E	142	10001110	
8F	143	10001111	
90	144	10010000	
91	145	10010001	
92	146	10010010	
93	147	10010011	
94	148	10010100	
95	149	10010101	
96	150	10010110	
97	151	10010111	
98	152	10011000	
99	153	10011001	
9A	154	10011010	
9B	155	10011011	
9C	156	10011100	
9D	157	10011101	
9E	158	10011110	
9F	159	10011111	
A0	160	10100000	
A1	161	10100001	
A2	162	10100010	
A3	163	10100011	
A4	164	10100100	
A5	165	10100101	
A6	166	10100110	
A7	167	10100111	

Hex	Dec	Binary	Character
A8	168	10101000	
A9	169	10101001	
AA	170	10101010	
AB	171	10101011	
AC	172	10101100	
AD	173	10101101	
AE	174	10101110	
AF	175	10101111	
B0	176	10110000	
B1	177	10110001	
B2	178	10110010	
B3	179	10110011	
B4	180	10110100	
B5	181	10110101	
B6	182	10110110	
B7	183	10110111	
B8	184	10111000	
B9	185	10111001	
BA	186	10111010	
BB	187	10111011	
BC	188	10111100	
BD	189	10111101	
BE	190	10111110	
BF	191	10111111	
C0	192	11000000	
C1	193	11000001	
C2	194	11000010	
C3	195	11000011	
C4	196	11000100	
C5	197	11000101	
C6	198	11000110	
C7	199	11000111	
C8	200	11001000	
C9	201	11001001	
CA	202	11001010	
CB	203	11001011	
CC	204	11001100	
CD	205	11001101	
CE	206	11001110	
CF	207	11001111	
D0	208	11010000	
D1	209	11010001	
D2	210	11010010	
D3	211	11010011	

Hex	Dec	Binary	Character
D4	212	11010100	
D5	213	11010101	
D6	214	11010110	
D7	215	11010111	
D8	216	11011000	
D9	217	11011001	
DA	218	11011010	
DB	219	11011011	
DC	220	11011100	
DD	221	11011101	
DE	222	11011110	
DF	223	11011111	
E0	224	11100000	
E1	225	11100001	
E2	226	11100010	
E3	227	11100011	
E4	228	11100100	
E5	229	11100101	
E6	230	11100110	
E7	231	11100111	
E8	232	11101000	
E9	233	11101001	
EA	234	11101010	
EB	235	11101011	
EC	236	11101100	
ED	237	11101101	
EE	238	11101110	
EF	239	11101111	
F0	240	11110000	
F1	241	11110001	
F2	242	11110010	
F3	243	11110011	
F4	244	11110100	
F5	245	11110101	
F6	246	11110110	
F7	247	11110111	
F8	248	11111000	
F9	249	11111001	
FA	250	11111010	
FB	251	11111011	
FC	252	11111100	
FD	253	11111101	
FE	254	11111110	
FF	255	11111111	

11. Product Liability Act

Information on Product Liability

The Product Liability Act (Act on Liability for Defective Products - Prod-HaftG) in Germany regulates the manufacturer's liability for damages caused by defective products.

The obligation to pay compensation can be given, if the product's presentation could cause a misconception of safety to a non-commercial end-user and also if the end-user is expected not to observe the necessary safety instructions handling this product.

It must therefore always be verifiable, that the end-user was made familiar with the safety rules.

In the interest of safety, please always advise your non-commercial customer of the following safety instructions:

Safety instructions

The valid VDE-instructions must be observed, when handling products that come in contact with electrical voltage.

Especially the following instructions must be observed:
VDE100; VDE0550/0551; VDE0700; VDE0711; VDE0860.

The instructions are available from:

vde-Verlag GmbH
Bismarckstr. 33
10625 Berlin

- * unplug the power cord before you open the unit or make sure, there is no current to/in the unit.
- * You only may start up any components, boards or equipment, if they are installed inside a secure touch-protected casing before. During installation there must be no current to the equipment.
- * Make sure that the device is disconnected from the power supply before using any tools on any components, boards or equipment. Any electric charges saved in components in the device are to be discharged prior.
- * Voltaged cables or wires, which are connected with the unit, the components or the boards, must be tested for insulation defects or breaks. In case of any defect the device must be immediately taken out of operation until the defective cables are replaced.
- * When using components or boards you must strictly comply with the characteristic data for electrical values shown in the corresponding description.
- * As a non-commercial end-user, if it is not clear whether the electrical characteristic data given in the provided description are valid for a component you must consult a specialist.

Nevertheless, the compliance with building and safety instructions of every kind (VDE, TÜV, industrial injuries corporation, etc.) is duty of the user/customer.

12. CE Declaration of Conformity

This is to certify, that the products

EXDUL-517E EDV-Number A-374440
EXDUL-517S EDV-Number A-374420

comply with the requirements of the relating EC directives. This declaration will lose its validity, if the instructions given in this manual for the intended use of the products are not fully complied with.

EN 5502 Klasse B
IEC 801-2
IEC 801-3
IEC 801-4
EN 50082-1
EN 60555-2
EN 60555-3

The following manufacturer is responsible for this declaration:

Messcomp Datentechnik GmbH
Neudecker Str. 11
83512 Wasserburg

given by

Dipl.Ing.(FH) Hans Schnellhammer

Wasserburg, 14.12.2013



Reference system for intended use

The multi functional modules EXDUL-517E and EXDUL-517S are not stand-alone devices. The CE-conformity only can be assessed when using additional computer components simultaneously. Thus the CE conformity only can be confirmed when using the following reference system for the intended use of the multi functional modules:

Control Cabinet:	Vero IMRAK 3400	804-530061C 802-563424J 802-561589J
19" Casing:	Vero PC-Casing	145-010108L
19" Casing:	Addition Electronic	519-112111C
Motherboard:	GA-586HX	PIV 1.55
Floppy-Controller:	on Motherboard	
Floppy:	TEAC	FD-235HF
Grafic Card:	Advantech	PCA-6443
Interface:	EXDUL-517E EXDUL-517S	A-374440 A-374420