Application, characteristics and technical data have to be taken from the hardware data sheet:

560CMD11 R0001 1KGT 150 764 V0011
560CMD11 R0011 1KGT 150 764 V0011

Operation

The Communication Unit 560CMD11 is one of the CMU boards (CMU = communication unit) of the remote terminal unit RTU560. The 560CMD11 controls process events and communications with control centers and local MMI systems via up to four serial Interfaces (CP1, CP2, CPA, CPB), two Ethernet 10BaseT/100BaseT LAN Interfaces (E1, E2) and an integrated GPRS modem.

Fig. 1: Block diagram 560CMD11

To force the IP-Address to a default value at startup, the “Def. IP-Addr” switch on the front side (see Fig. 8) has to be switched “ON”. The 560CMD11 starts with the factory settings for the Ethernet Interface (see Fig. 2) which are 192.168.0.1 for the IP-address with the network setting 255.255.255.0 for the subnet mask and 192.168.0.20 for the gateway.

Serial Interface

The serial interfaces (CP1, CP2, CPA and CPB) are available on the RJ45 connector on the front plate. It can interface RS485 (Tab. 1) or RS232C (Tab. 2) signals.

Table 1: Serial Interfaces RS485 Mode

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>Not used</td>
</tr>
<tr>
<td>2</td>
<td>TA</td>
<td>Data -</td>
</tr>
<tr>
<td>3</td>
<td>TB</td>
<td>Data +</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Signal Ground</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>Not used</td>
</tr>
</tbody>
</table>
Table 2: Serial Interface RS232C Mode

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Input / Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>Input</td>
</tr>
<tr>
<td>2</td>
<td>RxD</td>
<td>Input</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>Output</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>Output</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>Output</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>Input</td>
</tr>
<tr>
<td></td>
<td>Shield</td>
<td>Connected with housing</td>
</tr>
</tbody>
</table>

The interfaces are available on the RJ45 connectors and designed for RS485. The bus is terminated by a 1 kΩ resistor for the interfaces.

CP1 and CP2 Interface

At the CP1 and CP2 interfaces connected to an USART (universal synchronous/asynchronous receiver/transmitter) different UART based protocol types can be used.

CPA and CPB Interface

The settings have to be done by the RTUtil560 configuration tool.

At the CPA and CPB interfaces different UART character based protocol types can be used.

560CMD11 R0011

The communication interface CPB has two different functions:

- UART character based protocols
- GPRS-Modem-Interface

Both functions are mutually exclusive.

GPRS-Modem (only R0011)

The settings have to be done by the RTUtil560 configuration tool.

The 560CMD11 R0011 provides a radio interface via an integrated Quad-Band GSM/GPRS modem. For communication via the GSM/GPRS modem a pluggable SIM-Card is necessary.

The SIM-Card socket is placed below the CompactFlash socket.

The Quad-Band modem is designed for following frequencies and GSM nets:

- GSM 850MHz max. 2Watt transmitting power
- E-GSM 900MHz max. 2Watt transmitting power
- DCS 1800MHz max. 1Watt transmitting power
- PCS 1900MHz max. 1Watt transmitting power

At the housing (see Fig. 10) an antenna or antenna cable can be connected via a 50Ω (high frequency) SMA-RF-connector type.

Note:

Operating without a frequency tuned antenna can cause damage on the GPRS modem.

Following antennas are recommended:

- 560ANA01 bar (dipole) antenna ABB number: 1KGT023600R0001
- 560ANA02 Wall-mount antenna connected by a 5mtr long coaxial cable ABB number: 1KGT023700R0005
- 560ANA02 Wall-mount antenna connected by a 20mtr long coaxial cable ABB number: 1KGT023700R0020
Ethernet Interface E1 and E2

The Ethernet Interfaces are available on a RJ45 connector and supports different functions:

- Webserver-diagnostic with download of configuration files and firmware
- TCP/IP based protocols
- Integrated HMI

The signals are used according to Table 3.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Input/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TD +</td>
<td>Output</td>
</tr>
<tr>
<td>2</td>
<td>TD -</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>RD +</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>RD -</td>
<td>Input</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>Shield</td>
<td>Connected with housing</td>
</tr>
</tbody>
</table>

Table 3: Ethernet Interfaces E1, E2

IO-Bus

The connection to the local I/O boards is done by a 20 pole female connector. The connection to the serial peripheral bus (Wired OR-Bus, (WOR)) is done by a 20 pole male connector (see Fig. 6). The order of the 23AD62 module includes one ribbon cable. The ribbon cable should not exceed a length of 50cm (20inch).

Attention: It is not allowed to pull or to plug the 20 pole ribbon cable during the operation process.

Power Supply DC- In

The supply voltage for the 560CMD11 is 24VDC. The connector consists of a 3 pole pluggable screw-terminal 5,08mm (see Tab.4 and Fig. 8 or Fig. 11). The max. input power is 67 Watt.

In some cases an external potential isolation for the DC-Input is necessary. This can be done e.g. by a power supply unit 560PSU40/41.

Power Supply DC- Out

The 560CMD11 provides 24VDC output power for max. 0.5A. The connector consists of a 3 pole pluggable screw-terminal 5,08mm (see Tab. 4 and Fig. 8 or Fig. 11). The output power can only be used for the relay output board (23BO61/62).

It is not allowed to use the output power for the process supply!

560CMD11 Earthing

On the strength of safety and EMC protection it is important to make a connection as short as possible to a system earth (may be DIN-rail or mounting plate). An ordinary 1.5mm² multi-core wire (green/yellow) can be used and should not exceed a length of 100 cm (39 inch). The first pin of the 3 pole DC-In connector is the earth-pin (see Tab. 4 and Fig. 8 or Fig. 11).

<table>
<thead>
<tr>
<th>Pin</th>
<th>DC-Out</th>
<th>DC-IN</th>
<th>Power-Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>earth</td>
<td>earth</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>-Vout</td>
<td>- Vin</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>+Vout</td>
<td>+ Vin</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: 3 Pole Power Connector
The power supply terminal X38-2 (-) is internal connected with the housing ground by terminal X43 (see Fig. 3).

The protection earth must be connected to screw terminal 4-1 (see Tab. 4) for both 560CMD11 revisions. In rare cases (e.g. when grounding signal zero to Vin (+)) the jumper X43 has to be removed, but it is only possible in Version R0001. Opening of the housing is done in the same way as for changing the CF card.

![Diagram of power supply terminals](image)

**Fig. 3:** Placement of X43 at CMU PCB

### Additional information for R0011

It should be noted, that the module stipulates a minus earthing concept conditional on the GPRS technologies. In system with other earth concept it must be used a galvanic isolated power supply for the CMD11 to avoid the destroying (see Fig. 4). Depending of the system architecture may also be required an additional galvanic isolated RS232 interface (see Fig. 5), if the entire system is grounded positively.

### Signaling

The red LED of the 560CMD11 is controlled by the RTU560 firmware. For the definition and operation of the LED “ERR” please refer to the release specific function description. The connector embedded LEDs “Tx” and “Rx” are directly connected to the receiver/transmitter of the communication line. The LEDs “Act” and “Lnk” are directly connected to the Ethernet-controller.

Tab. 5 describes the system LEDs of the 560CMD11.

<table>
<thead>
<tr>
<th>LED</th>
<th>Colour</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERR</td>
<td>(1x) red</td>
<td>Warning / Error</td>
</tr>
<tr>
<td>Tx</td>
<td>(4x) green</td>
<td>Transmit data (CP1, 2, A, B)</td>
</tr>
<tr>
<td>Rx</td>
<td>(4x) green</td>
<td>Receive data (CP1, 2, A, B)</td>
</tr>
<tr>
<td>Act</td>
<td>(2x) green</td>
<td>Ethernet Activity E1, E2</td>
</tr>
<tr>
<td>Lnk</td>
<td>(2x) yellow</td>
<td>Ethernet Link E1, E2</td>
</tr>
<tr>
<td>IO-Bus</td>
<td>(1x) green</td>
<td>Serial Peripheral Bus</td>
</tr>
<tr>
<td>PF</td>
<td>(1x) red</td>
<td>One of the output voltage is fail</td>
</tr>
<tr>
<td>RUN</td>
<td>(1x) green</td>
<td>The CMU is reachable via Ethernet</td>
</tr>
<tr>
<td>RUN</td>
<td>(1x) yellow</td>
<td>The firmware is running but not reachable via Ethernet</td>
</tr>
<tr>
<td>RUN</td>
<td>OFF</td>
<td>No firmware is running</td>
</tr>
<tr>
<td>Def. IP-Addr</td>
<td>(1x) red</td>
<td>The default IP-address is active</td>
</tr>
<tr>
<td>GPRS</td>
<td>(1x) green</td>
<td>Transmit data (on air), Communication GPRS modem</td>
</tr>
</tbody>
</table>

**Table 5:** Meaning of LEDs
Fig. 4: Negative System Earthing

Fig. 5: Positive System Earthing
Firmware Version

The current firmware version will be delivered on a CompactFlash memory card. A new firmware file can be loaded via the Web diagnostic tool into the removable CompactFlash memory card.

For changing the CompactFlash memory card the right side of the housing has to be opened (see Fig. 8 and Fig. 11).

⚠️ For changing the CF - card follow the instructions below:

1. Disconnect the power-supply of the 560CMD11.
2. Take care of ESD protection before opening the 560CMD11 housing.
3. Open the 4 screws on the right side of the housing (see Fig. 8 and Fig. 11).
4. Pull or plug only the CF-card. Don't touch other components.
5. Close the housing before the power-supply is connected to the 560CMD11

SIM-Card (only R0011)

For communication via the GSM/GPRS modem a pluggable SIM-Card (ID-000) is necessary.

For changing the SIM-Card the right side of the housing has to be opened (see Fig. 11).

⚠️ For changing the SIM-Card follow the instructions below:

1. Disconnect the power-supply of the 560CMD11.
2. Take care of ESD protection before opening the 560CMD11 housing.
3. Open the 4 screws on the right side of the housing (see Fig. 11).
4. Pull or plug only the SIM-Card. Don't touch other components.
5. Close the housing before the power-supply is connected to the 560CMD11
Settings

Hardware settings and operation of the communication Interfaces of the 560CMD11 are carried out with the RTUtil560 configuration tool. For the configuration procedure of the communication Interfaces and the IO-Bus, please refer to the 560RTUtil user guide.

The following parameters have to be defined for all protocols:

- **Baudrate:** 50 to 19200 baud Modem control
- **Direct link** (TxD/RxD only)
- **WT link** full duplex (560FSM10/11 no handshake)
- **WT link** half duplex (560FSM10/11 with RTS/DCD)
- **Dial up** (external modem without handshake, without RTS/CTS)
- **Loop switch unit** (RP570/71 Host Interface only)
- **Link with collision avoidance** (TxD, RxD, DCD, without handshake (DNP 3.0 only)

The settings of the Ethernet Interface are:

- **Node name**
- **IP address**
- **Subnet mask**
- **Default mask**
- **Routing gateway**
- **The number of the host Interface.**

For the configuration procedure of the GPRS-Modem (only R0011), please refer to the function description part 6.

The settings of the GPRS-Modem are:

- **Local IP address**
- **Remote network IP address**
- **PIN number SIM-Card**
- **Username**
- **User password**
- **Provider Connection string (APN)**

**RF sensitivity (only R0011)**

- **Main parameters for the transmitter are:**
  - Max. output power: 30dBm ± 5dB
  - Min. output power: 0dBm ±5dB
- **min. signal level at input of GPRS-Chip:** -108dBm
- **cable RG58 with losses of 0,546dB/m indefinitely 10,92dB (20m)**
- **antenna with a gain of 2,2dBi**

Exemplary calculation:

- **min. signal (receive) with 20m cable:**
  -109dB + 10,92dB – 2,2dB =
  -99,28dBm

result: the RF signal at the point of antenna shall be min. -99,28dBm
Fig. 7: Top side of 560CMD11 R0001 housing

Fig. 8: Front and right side of 560CMD11 R0001 housing

Fig. 9: Bottom side of 560CMD11 R0001 housing
Fig. 10: Top side of 560CMD11 R0011 housing

Fig. 11: Front and right side of 560CMD11 R0011 housing

Fig. 12: Bottom side of 560CMD11 R0011 housing