

RTU620 Remote Terminal Unit DataSheet

Communication Unit 620CPU01

Application

The 620CPU01 communication unit is the CMU module of the RTU620 product line.

The 620CPU01 controls process events and communicates with control centers according the running software. For this reason there are three serial interfaces (CP1, CP2, CP3) and the Ethernet 10BaseT/100BaseT LAN interface (E1). For service purposes there is an USB interface available .

The connection to the local I/O-boards is done by the 20 pole male connector (X2, X3).



The essential tasks are:

- Managing and controlling of the RTU620 I/O modules via the serial I/O bus
- Reading Process events from the input modules.
- Send commands to the output modules.
- Communicating with control systems and local HMI systems via the serial interfaces (RS232) and the Ethernet 10/100BaseT interface.
- Communication with Sub-RTU's, IED's or multimeter devices via the interfaces (RS485) and the Ethernet interface.
- Managing the time base for the RTU620 product line station and synchronizing the I/O modules.
- Handling the dialog between RTU620 product line and Web-Browser via the LAN interfaces.

The communication unit will be mounted on a DIN-rail, together with the power supply module and the I/O modules. The communication unit is able to handle Ethernet- and UART character based communication protocols.

The unit is available in One version:

R0001: without battery buffered real time clock (RTC)

Characteristic

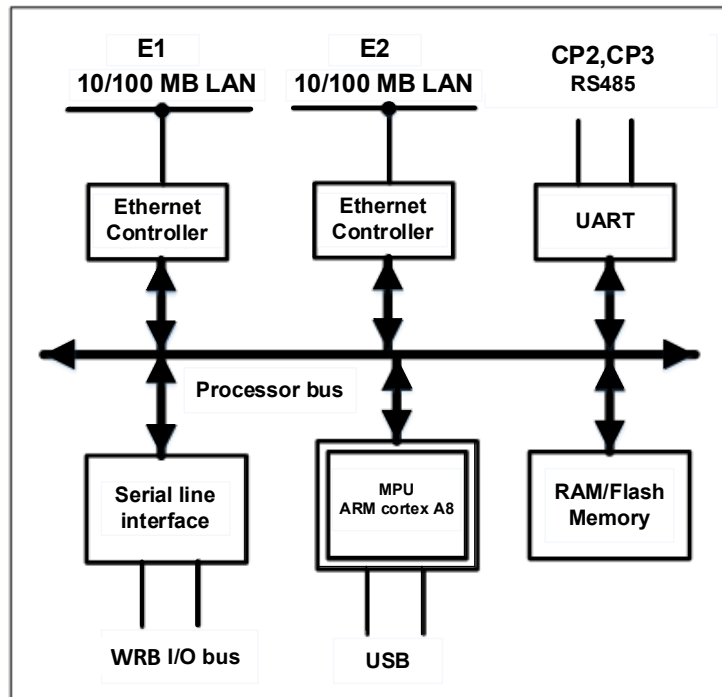


Figure 1: Block diagram 620CPU01

On the applied ARM9 controller AT91SAM9260 a realtime operating system is implemented. The 620CPU01 is responsible for the interface management, the event handling, the time base and the internal data base. The controller acts as master for the serial I/O bus (WRB).

System relevant configuration files are stored in the non-volatile flash memory card (removable SD-card™) in order to guarantee a valid system configuration after Power on Reset (PoR).

An optional battery buffered RTC is used to keep an exact time during power off state.

The communication unit provides the following interfaces:

- Communication Port 1 (CP1): a serial interface according RS232C with RJ45 connector.
- Communication Port 2 and 3 (CP2 & CP3): serial interfaces according RS485 with RJ45 connector.
- Ethernet interface (E1): 10/100BaseT with RJ45 connector.
- Interface X1 for power supply to the power supply unit 620PSU01.
- Interface X2 for communication unit with the RTU620 I/O modules.
- USB 2.0 device interface for diagnosis and maintenance purposes.
- WRB I/O bus interface for local communication with the I/O-modules

Communication interfaces

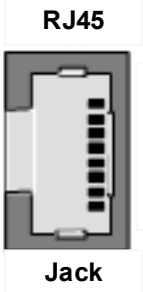
Ethernet Interface E1

The Ethernet interface E1 supports different functions:

- Webserver-diagnostic with download of configuration files and firmware
- Protocol IEC 60870-5-104, DNP3, ...

The signals are used according to:

Ethernet Interfaces

Pin	Signal	Input/Output	
1	TD+	Output	
2	TD-	Output	
3	RD+	Input	
4		Not used	
5	RD-	Input	
6		Not used	
7		Not used	
8		Not used	
	Shield	Connected With housing	

Each network segment can have a maximum cabling distance of 100 metres with Cat-5-cable.

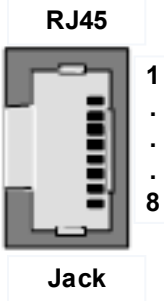
ADVICE

In case of longer cable length adequate provisions for potential equalization must be ensured to prevent damage on the modules and installations.

Communication interfaces

Serial Interface CP1

The serial interface CP1 is available on the RJ45 connectors. It can interface RS232C signals. The interface CP1 are connected to an UART (universal asynchronous receiver/transmitter). On the interfaces different UART based protocol types can be used.

Serial interface RS232C			
Pin	Signal	Input/Output	
1	DCD	Input	
2	RxD	Input	
3	TxD	Output	
4	DTR	Output	
5	GND	-	
6	DSR	Input	
7	RTS	Output	
8	CTS	Input	
	Shield	Connected With housing	

The RS232C standard defines a maximum cable length of 15 m

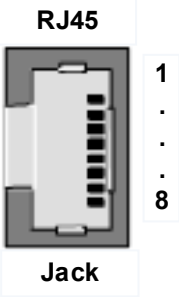
Serial Interface CP2 and CP3

The serial interfaces CP2 and CP3 are available on the RJ45 connectors. It can interface RS485 signals. On both interfaces different UART based protocol types can be used.

In RS485 mode both sides of the serial bus must be terminated by a 1 kΩ resistor. The termination on the CMU side is already done onboard.

Communication interfaces

The signals are used according to:

Serial interface RS485			
Pin	Signal		
1	-	Not used	
2	TA	Data-	
3	TB	Data+	
4	-	Not used	
5	GND	Signal Ground	
6	-		
7	-	Not used	
8	-		
	Shield	Connected With housing	

The RS485 cable length should be less than 150 m

ADVICE

In case of longer cable length adequate provisions for potential equalization must be ensured to prevent damage on the modules and installations.

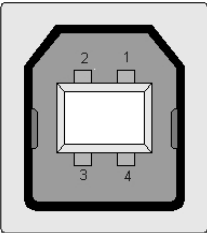
Connections

USB Interface

Device USB 2.0 interface for service purposes.

Connections

The interface is an USB device port compliant with the USB V2.0 full-speed device specification (12 Mbit/s). On top of USB the Remote Network Driver Interface Specification (RNDIS) protocol is used to provide a virtual Ethernet link to a Windows operating system. After installing and configuring the needed RNDIS driver on the Windows system the connection could be used for web server diagnostics and the download of configuration data and firmware.

USB Interface			
Pin	Signal	Description	
1	VBUS	Supply 5V DC	
2	D-	Data-	
3	D+	Data+	
4	GND	Ground	
	Shield	Connected with housing	

ADVICE

If the system earth is connected to a positive supply voltage the USB interface must be galvanic isolated from earth to prevent damage of connected devices.

Power Supply and I/O bus connections

The power supply (e. g. 620PSU01) is direct connected to the right side of the module via connector X1 .

RTU620 I/O modules are directly connected to the left side via connector X2. An additional I/O adapter module can be connected by a 20 pole ribbon cable to the WRB I/O bus via connector X3 (see Fig. 3).

ADVICE

To prevent damage on the connected modules de-energize the system before plugging or unplugging the I/O bus connectors.

Connections

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Firmware-Version

The actual firmware is available on SD-card. A download of firmware is also possible by using the web based diagnostic tool. In this case the firmware is loaded via Ethernet or USB and stored on SD-card. Exchanging the SD-card is possible.

Settings

The settings of the hardware and for operation of the communication interface is done with the RTUtil500 configuration tool.

Following parameters can be defined for serial interfaces:

Parameter name	Default	Parameter location
Interface Type	RS232C	CMU - serial interfaces
value range: RS232C, RS485 or fix if selection is not supported		
COM Speed	9600 bits/sec	CMU - serial interfaces
value range: 50, 75, 100, 110, 150, 200, 300, 600, 1200, 1500, 2400, 4800, 9600, 19200, 38400 bits/sec; 50-600 bits/sec only on selected interfaces		
Modem control	direct link (TxD/RxD only)	CMU - serial interfaces

Modem control:

- Direct link (TxD/ RxD only)
- WT link full duplex (no handshake)
- WT link half duplex (RTS/ CTS handshake)
- WT link half duplex (RTS/ DCD handshake)
- Dial up (external modem DCD handshake)

Settings

Modem control:

- Loop switch unit (RP570/71 Host interface only, DSTC 3002)
- Link with collision avoidance (DCD handshake, DNP 3 only)

Transmit delay time	disabled	CMU - serial interfaces
value range: disabled, 1... 10000 ms		

Following parameters can be defined for Ethernet interfaces:

Parameter name	Default	Parameter location
Interface mode	Auto-Negotiation	CMU - serial interfaces

Interface Mode:

- Auto-Negotiation
- 100BaseT full duplex
- 100BaseT half duplex
- 10BaseT full duplex
- 10BaseT half duplex

Node name	none	CMU - Network Interfaces
IP Address	none	CMU - Network Interfaces
Subnet mask	0.0.0.0	CMU - Network Interfaces
Default Gateway IP	0.0.0.0	CMU - Network Interfaces

Setting

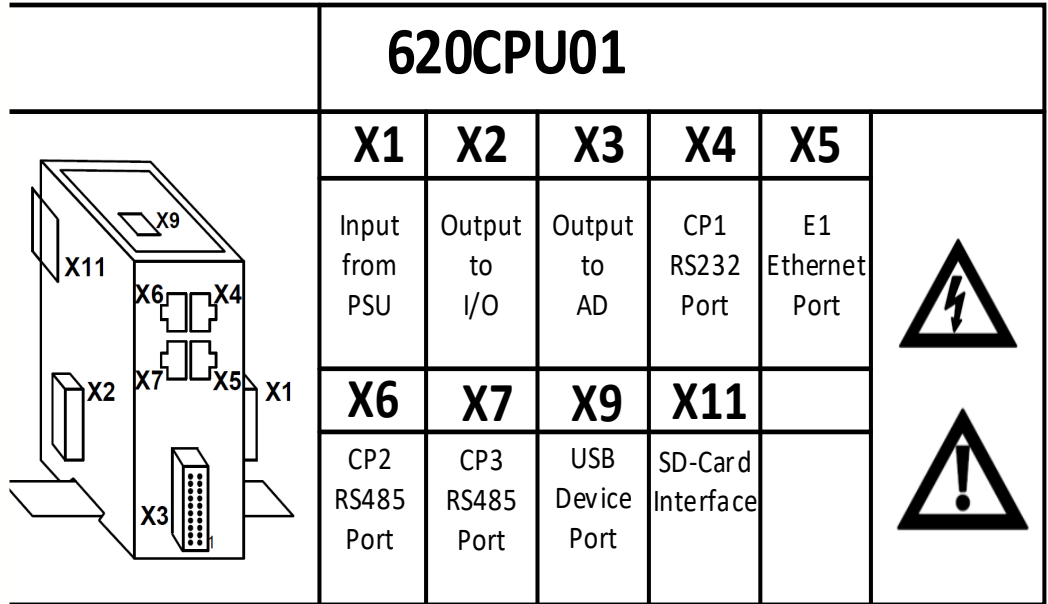
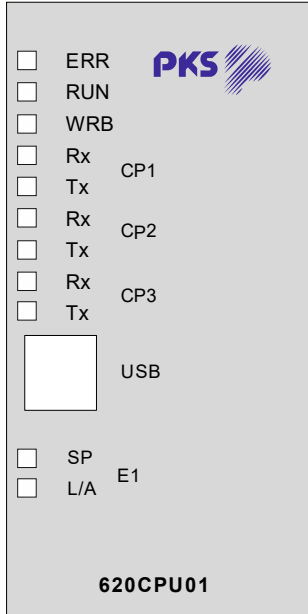


Fig.2: 620CPU01 front plate

Fig.3: 620CPU01 label

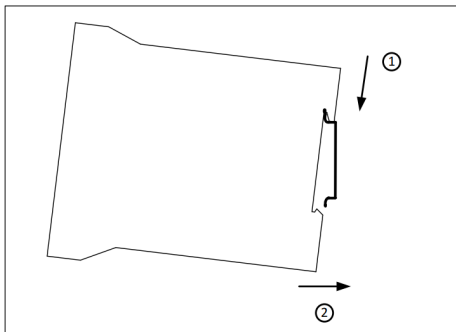


Fig.4: RTU620 DIN rail mounting - step 1

- 1 Insert upper edge into DIN rail and push downwards
- 2 Push lower edge towards DIN rail and snap in the module

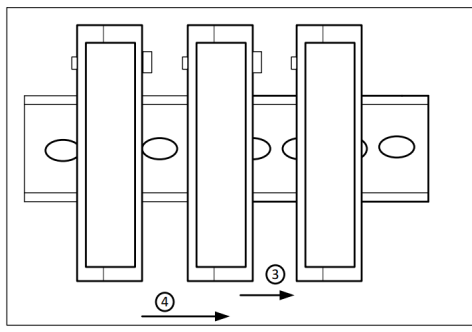


Fig.5: RTU620 DIN rail mounting - step 2

3 + 4 :

Shift one module connector into the other starting from right to left

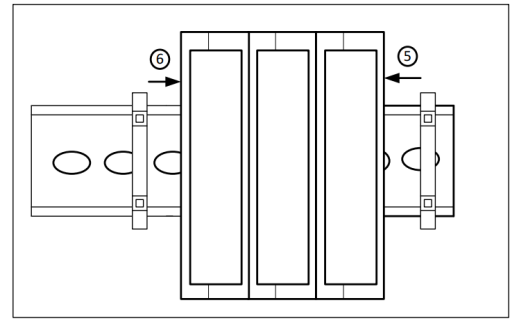


Fig.6: RTU620 DIN rail mounting - step 3

5 + 6 :

Mount end stops at the left and right side

Technical Data

In addition to the PKS RTU620 general technical data, the following applies:

Main Processing Unit MPU

CPU	ARM9, AT91SAM9260 @ 200 MHz
RAM	64 MByte
NAND Flash	4 GByte

SD card

Connector	SD card slot (push push)
Type	SD 2.0, class 2
Capacity	4 GByte

Real time clock RTC

Battery	Lithium 3 V DC, CR2032
Time resolution	1 sec, 1ms with timesync
Battery lifetime	> 10 years

Ethernet interface E1

Connector	RJ45
Type	IEEE 802.3, 10/100BaseT

USB interface

Connector	USB Type B (configuration interface)
Type	USB 2.0 device, low and full speed (max. 12 MBit/s)

Serial interface CP1

Connector	RJ45
Type	RS232C
Bit rate	100 bit/s - 38.4 kbit/s
Signal lines	GND E2/102 TxD D1/103 RxD D2/104 RTS S2/105 CTS M2/106 DTR S1.2/108 DCD M5/109
Level	typical: ± 6V

Serial interfaces CP2 and CP3

Connector	RJ45
Type	RS485
Bit rate	300 bit/s - 38.4 kbit/s
Level	Δ = 3V (typical)

Current consumption for power supplied via WRB

5 V DC	max. 300 mA
±15 V DC
18/ 24 V DC

Technical Data

Signaling by LEDs

ERR (red)	ON: RTU in error state Flashing: RTU in warning state
RUN (green)	Communication module in operation
WRB (green)	Transmission on to the I/O bus
Tx	Transmit data on serial communication ports CP
Rx	Receive data on serial communication ports CP
SP	Ethernet communication speed: ON: 100 Mbit/s OFF: 10 Mbit/s
L/A	Link up (ON) / Activity (Flashing) on Ethernet interface E

Environmental conditions

Operating temperature EN 60068-2-14	-25 °C ... 70 °C
Start up EN 60068-2-1	-40 °C
Max. operating temperature, max. 96h EN 60068-2-2	+85 °C
Relative humidity EN 60068-2-30	5 ... 95 % (non condensing)

Mechanical layout

Dimensions	35 mm x 98 mm x 117 mm (Width x Height x Depth)
Housing type	Plastic housing (V-0), IP20, RAL 7035 light gray
Mounting	DIN rail mounting EN 50022 TS35: 35 mm x 15 mm or 35 mm x 7.5 mm
Weight	0.15 kg

Immunity Test

Electrostatic discharge IEC 61000-4-2 (level3)	8kV / 6 kV Contact Performance criteria A
Radiated Radio- Frequency Electromagnetic Field IEC 61000-4-3 (level 3)	10 V/m Performance criteria A
Electrical Fast Transient / Burst IEC 61000-4-4 (level 3)	4 kV Performance criteria A
Surge IEC 61000-4-5 (level 3)	2 kV Performance criteria A
Conducted Disturbances, induced by Radio- Frequency Fields IEC 61000-4-6 (level 3)	10 V Performance criteria A
Damped oscillatory wave IEC 61000-4-18(level 3)	2.5 / 1kV Performance criteria A