

# Technical Manual for

## RTCU M10 / M10G

Version 1.04





## Introduction

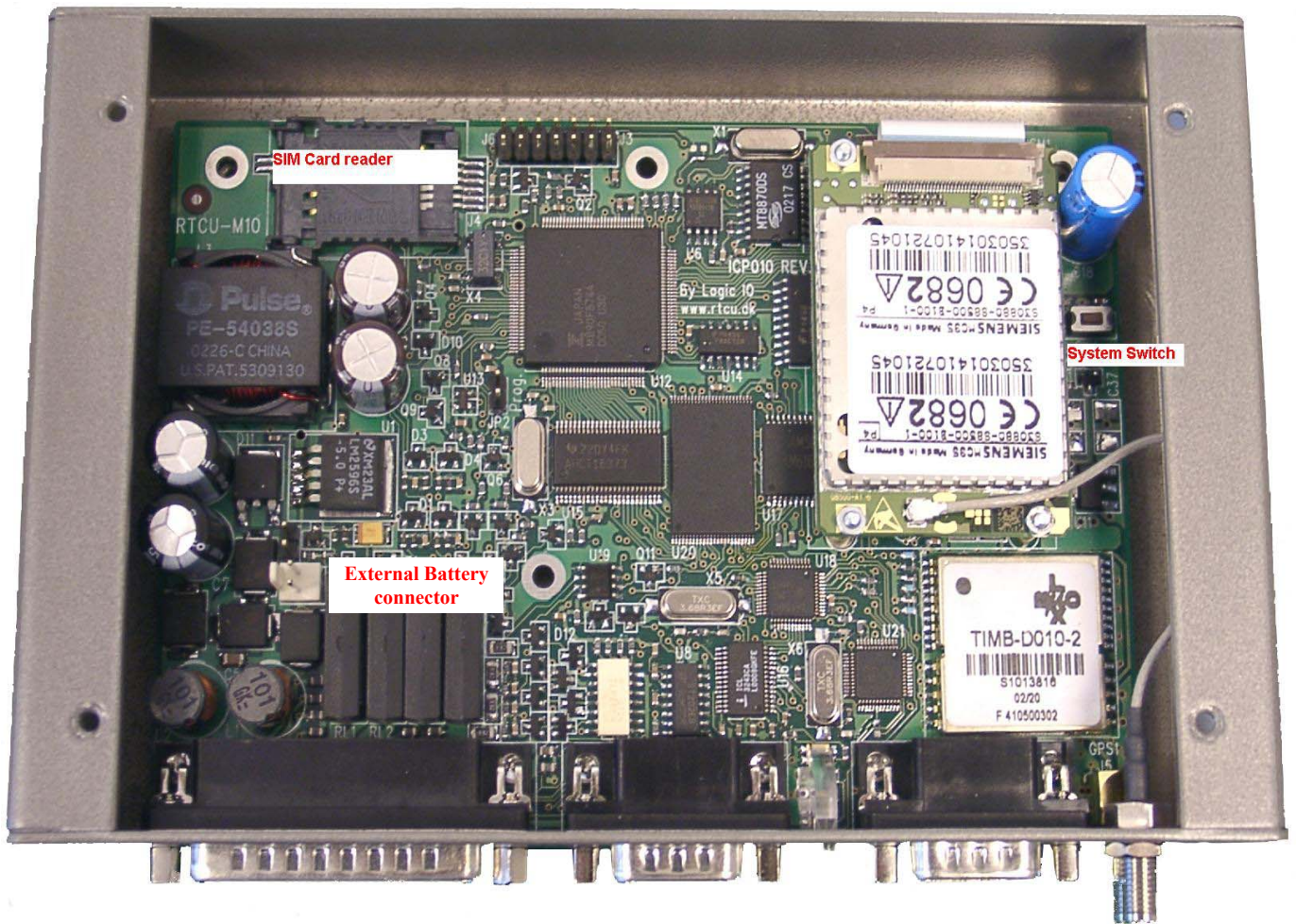
This manual contains technical documentation allowing easy installation and use of the RTCU M10 / M10G unit. In the following text “RTCU M10” will refer to both the RTCU M10 and the RTCU M10G. The only difference between the two versions is that the RTCU M10G includes an on-board 12-channels GPS-receiver.

The RTCU M10 another member of the growing range of sophisticated and advanced Remote Telemetry and Control Units (RTCU) all based on the same concept. The RTCU M10 extends the usage into the area of mobile tracking / locating applications by the inbuilt GPS-receiver. The RTCU M10 is also an exclusive member of the next-generation of RTCU units that has a full TCP/IP stack implemented to support communicating via GPRS. For more information about these possibilities and the programming of the unit we ask you to please consult the RTCU Programming Documentation and/or the RTCU IDE Online help.

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## Graphical view



## External connections

Connections to external equipment are done via one 25-pin Male SUB-D connector and two 9-pin Male SUB-D connectors. Connection to Dual-band GSM antenna is via a SMA Female and connection to a 5V active GPS antenna is done via the SMB Female connector

All connectors are located at one side of the unit, se picture below:



## Power supply

The RTCU-M10 unit is to be supplied with 8..36 VDC from an external DC power source connected to the Power / IO connector, or by the Logic IO battery pack connected to the external battery connector (see graphical view).

Power/IO connector, 25 pins Male connector:

Pin	Name	Description
1	SUPP	Power supply, positive (+) connection
2	SUPP	Power supply, positive (+) connection
14	GND	Power supply, ground (-) connection
15	GND	Power supply, ground (-) connection

### Analog Inputs

The analog inputs are voltage inputs, with a range from 0V to 5V DC

The input signal is connected between AI<sub>n</sub> and AGND. AGND must be connected to the reference of the connected equipment.

Power/IO connector, 25 pin Male connector:

Pin	Name	Description
9	AGND	Analog ground
22	AI1	Analog input number 1
10	AI2	Analog input number 2
23	AI3	Analog input number 3
11	AI4	Analog input number 4

### Digital Inputs

The digital inputs are isolated from the rest of the RTCU with optocouplers (however, the RTCU shares the GND pin with the inputs) and they are also low-pass filtered and transient protected. To activate the inputs, connect a positive voltage between the input and GND connector.

Power/IO connector, 25 pins Male connector:

Pin	Name	Description
3	DI1	Digital input number 1
16	DI2	Digital input number 2
4	DI3	Digital input number 3
17	DI4	Digital input number 4
14	GND	Power supply, ground
15	GND	Power supply, ground



**Digital outputs**

The digital outputs interfaces to the outside world via relay contacts. All outputs have a Normally Open contact set.

Power/IO connector, 25 pin Male connector:

Pin	Name	Description
5	R1A	Contact set for relay output number 1
18	R1B	
6	R2A	Contact set for relay output number 2
19	R2B	
7	R3A	Contact set for relay output number 3
20	R3B	
8	R4A	Contact set for relay output number 4
21	R4B	

**Serial port 1 / Programming connector**

This connector can be used as a general-purpose serial port, and as a programming connector. In order to use the connector as a programming connector, the RSDDET pin (pin 6) must be connected to GND. When using this connector as a general-purpose serial port, the RSDDET pin (pin number 6) must be left unconnected.

Serial port 1/Programming connector, 9 pin Male connector:

Pin	Name	Description
1	NC	Leave unconnected
2	RxD	RS232 Receive data TO RTCU
3	TxD	RS232 Transmit data FROM RTCU
4	NC	Leave unconnected
5	GND	Ground
6	RSDDET	Programming cable detect, normally unconnected (if programming cable, connect to GND)
7	NC	Leave unconnected
8	NC	Leave unconnected
9	NC	Leave unconnected



**Serial port 2 used as RS232 port**

This connector can be used as a general-purpose serial port. The pin-out is the same as a standard PC serial COM port. The serial port 2 can be used either as a RS232 port, or as a RS485 port, see below.

Serial port 2, 9 pin Male connector:

Pin	Name	Description
1	DCD	Data Carrier Detect
2	RxD	Receive data
3	TxD	Transmit data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

**Serial port 2 used as RS485 port**

The RS485 port is a multidrop port, with maximum 32 units connected simultaneously to the line. The RS485 connection contains the A (positive) and B (negative) signals, as well as a signal ground, which always needs to be connected to the common signal ground for all units connected to the RS485 bus ! The RS485 port is shared with the Serial port 2, if the RS485 port is used, the RS232 interface cannot be used, and vice versa. The maximum cable length for the RS485 bus is approx 400 meters, however this limit can be influenced by the quality of the cable, signaling rate, noise etc.

Power/IO connector, 25 pins Male connector:

Pin	Terminal	Description
12	RS485 A+	Positive wire for RS485 port
25	RS485 B-	Negative wire for RS485 port
13	GND	Ground for RS485 port



## Installing SIM card / connecting the GSM and GPS antenna

### SIM Card

The RTCU unit contains a standard SIM card reader. It is located in the upper left corner on the printed circuit board (please see the graphical view). The SIM card reader is opened by carefully pressing down on the lid of the reader, and at the same time, pressing the lid towards the screw terminals. It is then possible to open the SIM card reader, and insert your SIM card into it. Close the lid by pressing it down, while at the same time, pressing it towards the programming connector.

### GSM Antenna

The RTCU unit contains an SMA Female connector for connection of a suitable GSM Dual band antenna (900/1800 MHz). When installing the antenna, please make sure that the antenna is not in close proximity of metallic parts or anything else that can influence the efficiency of the GSM antenna. Please consult the installation guide that follows the GSM antenna.

### GPS Antenna

The RTCU unit contains an SMB Female connector for connection of a suitable GPS antenna. The GPS antenna must be a 5V active GPS antenna mounted with a SMB Male connector.

When installing the antenna, please make sure that the antenna has a reasonable view of the sky so that it can receive the weak signals from the satellites. Please also consult the installation guide that follows the GPS antenna.

## Switches / Indicators

A status indicator is present on the unit (see the graphical view). Different colors/blinking patterns are used to signal different types of errors/status change in the RTCU unit:

**Fastest blinking, green**  
**Fast blinking, green (or yellow)**

The unit is initializing, preparing to start the VPL program  
 The VPL program is not executing, stopped by the reset/diagnostic switch.

**Slow blinking green (or yellow)**  
**Fast blinking, red (or yellow)**  
**Alternating Fast/Slow, red (or yellow)**

The unit is executing the VPL program  
 A runtime error has been detected in the program  
 The unit has lost its Firmware! This can only happen if, during a firmware upgrade, the RTCU Unit loses power, or the communication is lost completely. In this case, simply upload the firmware to the unit again.







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If the color of the status indicator is yellow, the unit is actively communicating with for example, the RTCU-IDE program (or another program, supporting the RTCU protocol, RACP).

The RTCU unit contains a combined reset/diagnostic switch. This switch is located just to the right of the GSM-Module (System switch). When this switch is activated during reset of the unit (or power on), the VPL program/project uploaded to the unit will not be started. The status indicator indicates this. If the switch is activated for more than 3 seconds, the unit will reset (same as power on).



A two-colored (red/green) indicator is visible above the status indicator. This indicator can be controlled from within the VPL program in the unit. The green part is accessed as LED1 and the red part as LED2

## Specifications for the RTCU M10

Analog inputs	Min		Max			
	0	-	+5	VDC	Resolution is 10 bits. All inputs are protected against transients and lowpass filtered.	
Digital inputs	Min	Typ	Max			
	Logic "High"	8	12	40	VDC	All inputs are protected against transients and lowpass filtered. All inputs are optically isolated
	Logic "Low"	-5	-	3	VDC	
Digital outputs (Relay)	Min		Max			
	-	-	30	Volt	Normally open contacts.	
	-	-	1	Amp		
Power supply	Min	Typ	Max			
Operating Voltage	9	-	36	VDC	Protected against wrong polarity.	
Unit Active with GSM off		85		mA	@ 12 VDC supply voltage. .	
Unit Active with GSM on		100	360	mA		
Unit in Sleep with GSM off		40		mA		
Unit in Powerdown		0,8		mA		
Storage temperature	-40	-	+90	°C	External connections: • SUB-D9M for RS232 port 1 (service-port) • SUB-D9M for RS232 port 2 (general) • SUB-D25M for power, digital, analog and RS485. • SMA-Female for GSM antenna.	
Operating temperature (According to GSM 11.10 specification)	-25	-	+55	°C		
Restricted operation (deviations from the GSM specification may occur)	-29	-	+70	°C		
Humidity (non condensing)	5	-	90	%		
Weight	0.4			Kg		
External dimensions	W* 172 x H 110 x D 31 mm			*W 202 with mounting flanges		
Ingress Protection (IP)	IP54 , Aluminum enclosure					
Approvals	EN-50081-1 Emission EN-61000-6-2 Immunity			 10R-024063 		

Technical data subject to change

## Specifications for the RTCU M10G

Analog inputs	Min		Max			
	0	-	+5	VDC	Resolution is 10 bits. All inputs are protected against transients and lowpass filtered.	
Digital inputs	Min	Typ	Max			
	Logic "High"	8	12	40	VDC	All inputs are protected against transients and lowpass filtered. All inputs are optically isolated
	Logic "Low"	-5	-	3	VDC	
Digital outputs (Relay)	Min		Max			
	-	-	30	Volt	Normally open contacts.	
	-	-	1	Amp		
Power supply	Min	Typ	Max			
Operating Voltage	9	-	36	VDC	Protected against wrong polarity.	
Unit Active with GSM/GPS off		85		mA	@ 12 VDC supply voltage. .	
Unit Active with GSM on		100	360	mA		
Unit Active with GPS on		180		mA		
Unit Active with GSM/GPS on.		195	460	mA		
Unit in Sleep with GSM/GPS off		40		mA		
Unit in Powerdown		0,8		mA		
Storage temperature	-40	-	+90	°C	External connections: • SUB-D9M for RS232 port 1 (service-port) • SUB-D9M for RS232 port 2 (general) • SUB-D25M for power, digital, analog and RS485. • SMA-Female for GSM antenna. • SMB-Male for active (3V) GPS antenna.	
Operating temperature (According to GSM 11.10 specification)	-25	-	+55	°C		
Restricted operation (deviations from the GSM specification may occur)	-29	-	+70	°C		
Humidity (non condensing)	5	-	90	%		
Weight	0.4			Kg		
External dimensions	W* 172 x H 110 x D 31 mm			*W 202 with mounting flanges		
Ingress Protection (IP)	IP44 , Aluminum enclosure					
Approvals	EN-50081-1 Emission EN-61000-6-2 Immunity			 10R-024063		

Technical data subject to change