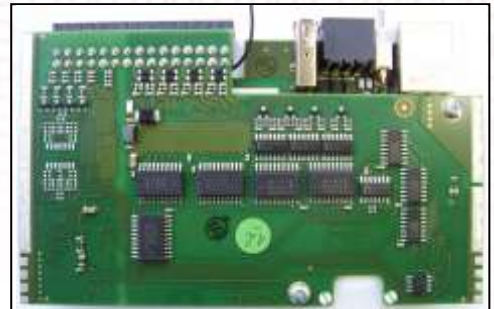




# TBOX TG2-500

**Ref:** TG2-500  
 TG2-500-4E  
 TG2-500-4N

- Ethernet
- USB
- RS232
  - Standard : 3 wires
- RS485
- 4G Modem
  - 4E: Europe
  - 4N: North America
- Backup battery charger



## TG2-500

### Communication ports

RS232  
RS485  
Ethernet  
USB

## TG2-500-4E

### Communication ports

RS232  
RS485  
Ethernet  
USB

#### Options

-4E: GSM 4G

## TG2-500-4N

### Communication ports

RS232  
RS485  
Ethernet  
USB

#### Options

-4N: GSM 4G

## ➤ General Technical Specifications

<b>General</b>		
Processor		32 bits, ARM based, 400 Mhz
Clock		Realtime Clock, backed up
	Clock Drift	Typical: 1.7 sec. @ 25°C
Watchdog		Watchdog circuitry included Maximum process cycle time = 1 sec.
Toggle Switch		STOP - RUN - RESET
LED	Green 2 Hz Green 0.5/Hz Green ON Red 8 Hz	Normal operation Application stopped OS stopped Presence of Alarm(s)
<b>Power Supply</b>		
Voltage		8..30 VDC
	With backup battery	20..30 VDC
Card Consumption		Typical 100 mA (depending on features used)
Protection		Reverse polarity Internal soldered fuse
<b>Battery Charger</b>		
Power supply Vin required		20...30 VDC
Mode		Constant current / limited voltage
Voltage		Maximum: 13.8 V @ 25°C
Current		Maximum: 250 mA
<b>Internal Battery</b>		
Voltage		3 V, lithium battery (CR2450)
Use		Backup of Clock and RAM (datalogging)
Lifetime		Battery consuming only when TBOX LITE is out of power and plastic strip has been removed. - Typical 4 years @ 25°C <b>WARNING:</b> After such a period out of power, the battery must be replaced to maintain the clock and datalogging.
<b>Memory</b>		
Flash		32 MB (Uboot, LINUX, OS, Application, Web & Reports, Sources)
SDRAM		64 MB (Running part of LINUX, OS, Application)
SRAM		1 MB, backed up with Lithium battery (datalogging, log, backup value of Tags)
MicroSD (optional)		Max. 32 GB <b>It is highly recommended to use industrial grade SD card (ref. ACC-μDIN-1Gb)</b>

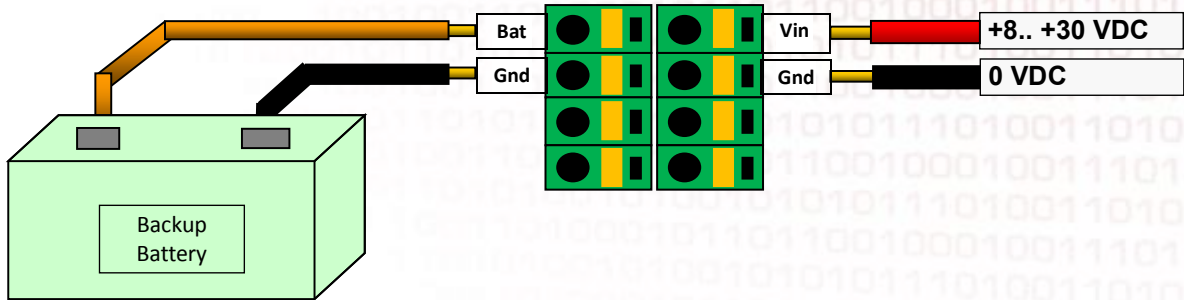
<b>Communication ports</b>	
Built-in Communication ports	- 1 x RS232 - 1 x RS485 - 1 x Ethernet - 1 x USB
Optional Communication ports	- 4G Modem (4E, 4N)
<b>RS232 (Built-in)</b>	
Connector	Spring-cage terminal block
Cabling (see schema next)	2 Wires: TxD, RxD
Protocols	ModBus-RTU 'Slave', 'Master', ASCII (supplementary protocol with addons)
<b>RS485 (Built-in)</b>	
Connector	Spring-cage terminal block
Cabling (see schema next)	2 Wires: A+, B-
Number of slaves	256 (if RS485 technology of slaves allows it too)
Protocol	ModBus-RTU 'Master' and 'Slave' (supplementary protocol with addons)
Isolation	<b>No isolation</b> between signals A - B and Power Supply
Termination	Terminations of 120Ω (between A-B at both ends) are in most cases not necessary, but they increase the quality of the signals for long distance connections. <i>Failsafe bias</i> resistors included: pullup and pulldown resistors which assures a logical level TRUE when A and B are opened or in short-circuit.
<b>Ethernet (Built-in)</b>	
Model	100 BASE-TX (4 wires) Full Duplex / Auto-negotiation
Connector	RJ-45
Cabling	Straight pinned CAT5 shielded cable or Crossover CAT5 shielded cable
Speed	10/100 Mbits
Protocols	ModBus/TCP 'Master' and 'Slave', SMTP(S), FTP(S), HTTP(S), SNMP, IEC 60870-5-104, DNP3, Ping, ...
TCP/IP Connections	- "Client" for Remote Tags: 1 socket – 1 context - "Client" for Alarm: 2 sockets (required for FTP) – 1 context - "Server" ModBus: 64 sockets – 64 contexts - "Server" HTTP: 64 sockets – 64 contexts
LEDs	<b>100:</b> ON when connected at 100 MHz – OFF when connected at 10 MHz <b>Lk:</b> ON when linked – FLASH when communicating
<b>USB (Built in)</b>	
Model	USB 2.0
Use of USB	As "Device": programming, displaying WebForm 2.0, USB stick... As "Host": to Wifi or Serial USB devices
Connector	USB type A female (socket)
Cabling	USB A/A male cable (host to host)
Speed	High Speed (480Mbits / sec.)
Current	Max 500mA

<b>4G Modem (optional)</b>	
Frequencies	<p>Model "Europe"  <b>Penta Band LTE (4G):</b> 800/900/1800/2100/2600 MHz. FDD-Bands (20,8,3,7,1)  <b>Tri Band UMTS-WCDMA (3G):</b> 900/1800/2100 MHz. FDD-Bands (8,3,1)  <b>Dual Band GSM/GPRS/EDGE (2G):</b> 900/1800 MHz.</p> <p>Model "North America"  <b>Penta Band LTE (4G):</b> 700/850/AWS(1700/2100)/1900 MHz. FDD-Bands (13,17,5,4,2)  <b>Tri Band UMTS-WCDMA (3G):</b> 850/AWS(1700/2100)1900 MHz. FDD-Bands (5,4,2)  <b>Quad Band GSM/GPRS/EDGE (2G):</b> 850/900/1800/1900 MHz.</p>
Output Power	<p>Model "Europe"  <b>According to Release 99 (3G):</b>            Class 4 (+33dBm ±2dB) for EGSM900            Class 1 (+30dBm ±2dB) for GSM1800            Class E2 (+27dBm ± 3dB) for GSM 900 8-PSK            Class E2 (+26dBm +3 /-4dB) for GSM 1800 8-PSK            Class 3 (+24dBm +1/-3dB) for UMTS 2100,1800,900. WCDMA FDD-Bands (1,3,8)  <b>According to Release 8 (4G):</b>            Class 3 (+23dBm +2dB) for LTE 2600,2100,1800,900,800. LTE FDD-Bands (7,1,3,8,20)</p> <p>Model "North America"  <b>According to Release 99 (3G):</b>            Class 4 (+33dBm ±2dB) for EGSM850, EGSM900            Class 1 (+30dBm ±2dB) for GSM1800,1900            Class E2 (+27dBm ± 3dB) for GSM 850 8-PSK,GSM 900 8-PSK            Class E2 (+26dBm +3 /-4dB) for GSM 1800 8-PSK, GSM 1900 8-PSK            Class 3 (+24dBm +1/-3dB) for UMTS 1900,AWS,850. WCDMA FDD-Bands (2,4,5)  <b>According to Release 8 (4G):</b>            Class 3 (+23dBm +2dB) for LTE 1900,AWS,850,700,700. LTE FDD-Bands (2,4,5,13,17)</p>
SIM card	Standard size, 1.8 V or 3 V SIM card accepted
Antenna connector	Screw connector, type SMA Female (Jack) on <b>TBox TG2</b>
LED	<p>ON Flashing: connected to the Network            ON: Indicates the modem in 'On line' (= connected in DATA or IP)            T/R Transmit or Received = ON</p>
GSM Module Approvals	R&TTE, GCF, CE, FCC, PTCRB, UL California RoHS AT&T and Verizon operator approvals
<b>Environment</b>	
Storage	-40°C...+85°C
Working	-40°C...+70°C
Humidity	0 to 95 % without condensation
Altitude	Max. 5000 m
<b>Dimensions</b>	
Without connector	Height x Depth x Width: <b>150x83x29 mm</b> (5.906x3.27x1.142 inches)
With rack, without connector	Height x Depth x Width: <b>152x115x40 mm</b> (5.984x4.428x1.575 inches)
Weight	600 g with Rack1
<b>Approvals</b>	
	CE, FCC, CSA for US and Canada, C-Tick, A-Tick, RoHS



➤ **Cabling Schematic**

➤ **Power Supply**



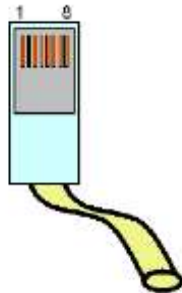
A power supply of **minimum 20 VDC** is required to charge the **external 12 V backup battery**.  
 When the voltage at Vin disappears, this battery powers **TBox TG2** down to 10 V. **Below 10 V, this battery is automatically disconnected.**

The Gnd connection should be used only for power supply.

➤ **Ethernet**

Straight pinned CAT5 shielded cable or Crossover CAT5 shielded cable:

**RJ45 Connector**



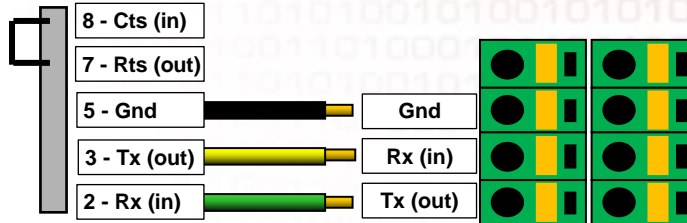
**Pin OUT**

- 1. Tx -
- 2. Tx +
- 3. Rx +
- 4. Not used
- 5. Not used
- 6. Rx -
- 7. Not used
- 8. Not used

➤ RS232 (built-in)

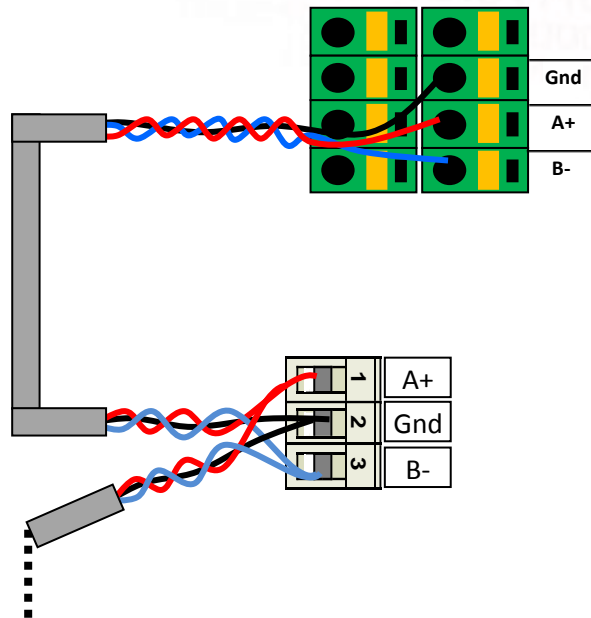
Cabling to a PC (DTE – DTE cabling)

**DB9 Female to PC**



➤ RS485 (built-in)

*Example:*  
Cabling **TBox TG2**  
to **TBox MS16**



About RS485 cabling:

**Use a twisted pair** for signal A and B.

**RS 485 is not isolated.** If cabling equipment in different buildings (different Earth), you have to use ACC-RS485 (ask your local distributor)

**Maximum length** depends on quality of cable, speed and quantity of stations (max. 256 **TBox** stations). In good condition, guaranteed to 1.2 km (max. 256 **TBox** stations @ 9600 Bps) In practice, longer distance can be reached with lower Baudrate and fewer stations.



**Cable:**

- Twisted pair (2 pairs: one pair for A and B; one pair for Gnd)
- cross-section: minimum 0.5mm<sup>2</sup>
- screening: pair and global screening
- reference: Li2YCY-PiMF