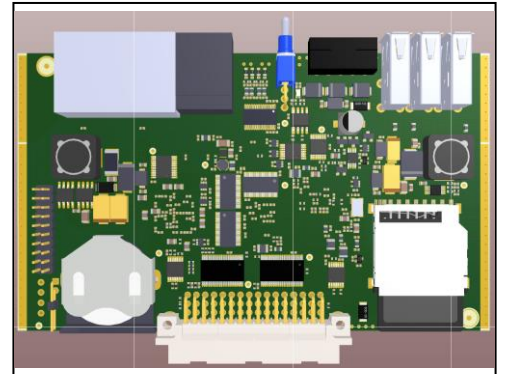


TBOX MS-32-S2

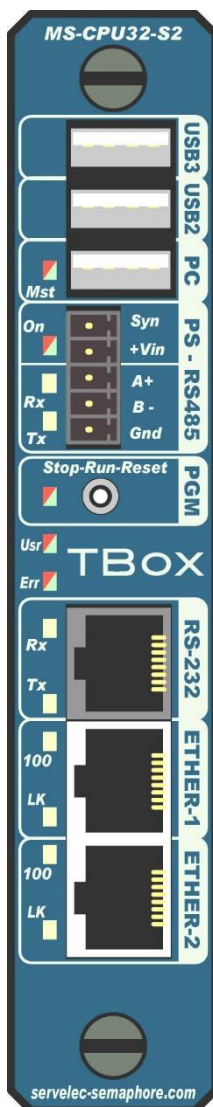
Version 3.05

TBOX MS-32-S2 ARM

- Industrial grade 32bits processor card
- Web Embedded (Web Server, email, FTP, IP forwarding,...)
- Cyber Security embedded (Firewall, SSL, SSH, Login, OpenVPN, ...)
- Full PLC support (IEC1131-3 Ladder Logic, BASIC)
- Truly modular
- Redundancy support (can place two CPU on same rack)
- Embedded LINUX Open Source kernel + TBox Telemetry stack
- Advanced multi-communication features
- Millisecond timestamping
- Extended Telecontrol functions (SoE, RBE, high storage, protocol conversion, etc..)
- Standard protocols support (DNP3, ModBus, IEC-60870-5, TCPIP, HTTP, SNMP, OPC-UA, MQTT...)



Technical Specifications



General

Description	Industrial grade 32-Bits CPU module
Processor	ARM926EJ-S 32 bits, 400 Mhz
Clock	Real Time Clock, backed-up Drift: 2 s./day @25 °C
Button	Push button : RUN - STOP - RESET
LEDs	<p>On (green) ON: CPU powered, either by "Vin" or by MS-PSxxx</p> <p>Run/Stop (green/red) <u>Green</u>: 2 Hz = RUN ; 0.5 Hz = STOP</p> <p><u>Red</u>: 8 Hz = ALARM</p> <p>Usr (green/red) Can be controlled from internal Inputs</p> <p>Err (red) ON: Error on the BUS</p>

Power Supply

Connector	Spring cage terminal blocks (5 x 2.54mm)
Voltage	Vin: 8..30 VDC or via MS-PS-DCN, MS-PS230V or MS-PS-AC30W
Supply Current	Maximum: 1.5 A on V ⁺ toward the bus, and 3 A on 3.3 Volts of the BUS
Card Consumption	P tot = 1.2W (without USB)

Internal Lithium Battery

Voltage	3 V
Model	CR2450
Use	Backup of clock and RAM (datalogging)
Lifetime	When CPU is switched OFF: -Typical 4 years

Memory

Flash		32 Mbytes (Boot Loader, Linux, OS, Application, Sources, Web & Report)
SDRAM		64 Mbytes (Linux, OS, Application)
SRAM		1 Mbytes (Datalogging, log, copy of Tags value)
SD card	Models	SDHC or μ micro SD (industrial)
	References	ACC-SDIN-1GB and ACC-uSDIN-1GB
	Capacity	Max 32 Gbytes (FAT32)

Communication Ports

CPU Built In		- 1 RS232 - 1 RS485 - 2 Ethernet - 1 USB "Host" and "Device" for programming - 2 USB "Host" for USB stick, ...
Additional Communication Modules		- max.: 7 Serial cards (MS-GSM-3G , MS-PSTN, MS-SERIAL, MS-GPS) - max.: 2 Ethernet (MS-ETHER4)
Maximum Communication Ports qty		16 x serial + modem 4 x ethernet

RS 232 - Built In

Connector		RJ45
Cabling	(see cabling below)	(TxD, RxD, RTS, CTS, CD, DTR, DSR, GND)
Protocol		ModBus RTU Master/ Slave (Other protocols with add-on external libraries)
LED		RxD : ON when receiving TxD : ON when transmitting

RS 485 - Built In

Connector		Spring cage terminal blocks (3 x 2.54mm)
Cabling	(see cabling below)	2 Wires (A+, B- and GND)
Protocol		ModBus RTU Master/ Slave (Other protocols with add-on external libraries)
LED		RxD : ON when receiving TxD : ON when transmitting
Isolation		No isolation between signal and Power Supply
Number of slaves		256 (if RS485 technology of slaves allows it too)
Termination		Termination of 120 ohms 1/4W might be required depending on cabling and speed. <i>Failsafe bias</i> resistors included: pull-up and pull down resistors which assures a logical level TRUE when A+ and B- are opened or in short-circuit.

Ethernet - Built In

Quantity	2 x separate Ethernet ports
Model	100 BASE-TX (4 wires) AUTO MDI / MDIX Full Duplex, Auto-negotiation Bridge / Bounding Spanning Tree
Connector	RJ-45
Cabling	AUTO MDI / MDIX (straight or cross cable, auto adapting)
Speed	10/100 Mbits
Protocols	ModBus/TCP 'Client' and 'Server', SMTP(S), FTP(S), SFTP, HTTP, NTP, IEC-60870-5-104, DNP3, SNMP, Ping, ...
IP connections	- Max 64 'Server' HTTP(S) Sessions - ModBus/TCP 'Server' unlimited - Simultaneous 'Client' connection for 'ModBus transactions' - 1 'Client' connection for alarm (one alarm sent at a time)
LED	100: ON when connected at 100 Mhz – OFF when connected at 10 Mhz Lk: ON when linked – FLASH when communicating FD: ON when in Full Duplex
Isolation	1.5 kV between signals and Gnd

USB - Built In

Quantity	3 x separate USB ports
Model	USB 2.0
Communication	1 x Host and Device: for programming 2 x Host: for USB stick, ...
Connector	USB type A female (socket)
Cabling	USB A/A male cable (Host to Host)
Speed	Host & Device: 480 Mbits/sec. 1 x Host: 480 Mbits/sec. 1 x Host: 12 Mbits/sec
Current	Max. 500mA @ 60°C per port

Input/Output

Stop Button Input	Internal digital input associated to the 'STOP' position of the button. To be used with Ladder/BASIC programming
Synchronization Input/Output	Same channel used as Input OR Output. Can be used to synchronize CPU's.
Type	Current sinking
Voltage	max. 30 VDC
Current	max. 45mA
Protection	NO PROTECTION
Connector	Spring Cage Terminal, 0.2..0.75mm ²
Led "Usr" Outputs	This LED can be controlled in the program through 2 x digital outputs: <ul style="list-style-type: none"> - Digital Output "Red" - Digital Output "Green"
Internal Temperature Input	Temperature inside the module
Vin Voltage Input	When powered from "Vin", voltage at "Vin"

Redundancy (Optional)

CPU Position in Rack	slot0 and slot1
Switching between CPU	Max. 10 sec.
Applications	Each CPU has its own application (similar or different applications)
Synchronization	No synchronization between CPUs

Environment

Temperature storage	-40°C to 85°C
Temperature working (ambient)	Industrial Temperature: -40°C to 70°C
Humidity	15 to 95 % without condensation
Altitude	Max. 5000 m

EMC

EMC immunity	EN61326-1, EN61000-4-2, -3, -4, -5, -6, -8
EMI emissions	EN55011

Safety

IEC 60950

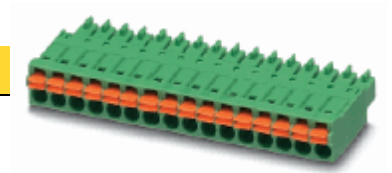
Dimensions

Without connector	Height x length x Depth: 150 x 83 x 29 mm (5.906 x 3.27 x 1.142 inches)
Weight	272 g

Approvals

CE, FCC, UL, CSA, C-Tick

Cabling – Spring Cage Terminal Blocks



Connection capacity

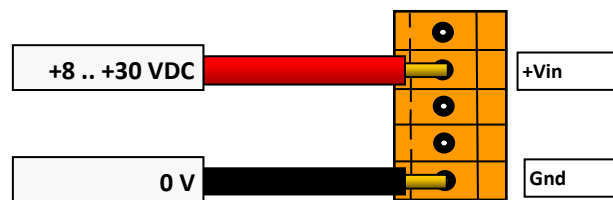
Without ferrule	Solid cable: 0.2 .. 1.5 mm ² (24..16 AWG)
With ferrule without plastic sleeve	Solid or Stranded cable: 0.2 .. 1.5 mm ²
With ferrule with plastic sleeve	Solid or Stranded cable: 0.2 .. 0.75 mm ²

Ferrule specification for 0.75mm² cable

	B: minimum 10 mm C: 1.5 mm D: 3.5 mm
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Cabling – Power Supply

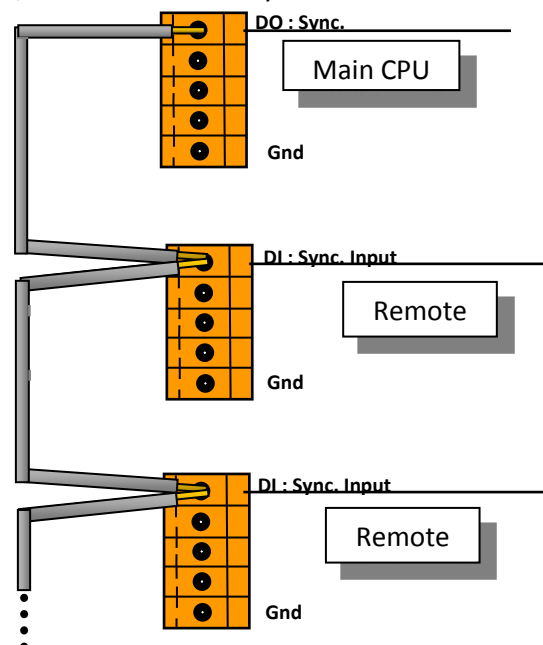
Connector: **Spring cage terminal blocks**



Cabling – Synchronization Input / Output

Connector: **Spring Cage Terminal Blocks**

The synchronization I/O can be cabled only within the same cabinet, between several racks.



Cabling – RS485 communication

Connector: **Spring Cage Terminal Block**

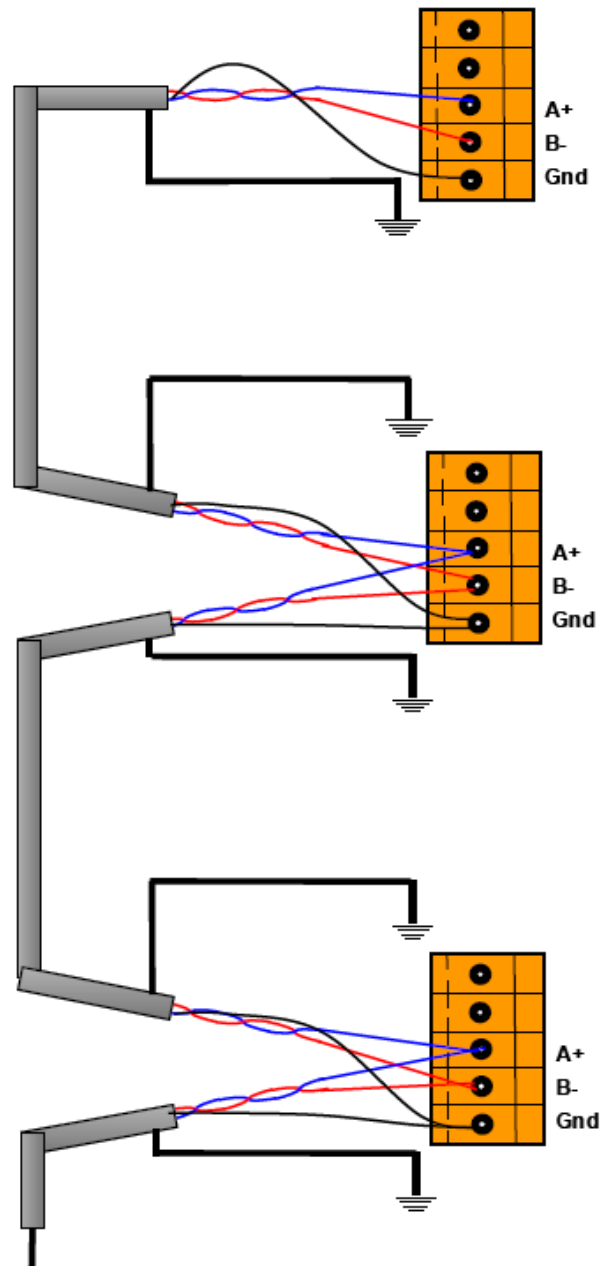
Cabling several CPU together:

A+ to A+
B- to B-
Gnd to Gnd

RS 485 is not isolated. If cabling equipment in different buildings (= different Earth), you have to use ACC-RS485

Cable :

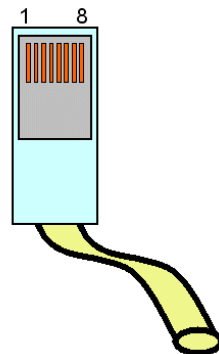
- Twisted pair (2 pairs)
- Minimum section: 0,5mm²
- Screening: pair and global screening



Cabling – RS232 communication

Connector: **RJ45**

1. RI
2. DCD
3. DTR
4. Gnd
5. RxD (input)
6. TxD (output)
7. CTS (input)
8. RTS (output)



Cabling to a PC: - without Flow Control

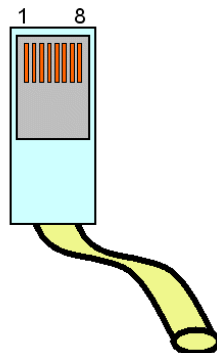
<i>MS-CPU32</i> COM1		PC - DB 9	
RxD	5	2	RxD
TxD	6	3	TxD
GND	4	5	GND
RTS	8	7	RTS
CTS	7	8	CTS

Reference of cable RJ45 to DB9 = **ACC-CABL-PROG45**

Cabling – Ethernet communication

Connector: **RJ45**

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



Cross over cabling :

<i>CPU32</i> – RJ45		PC – Ethernet RJ45
Tx +	1	3 Rx +
Tx -	2	6 Rx -
Rx +	3	1 Tx +
n.u.	4	4 n.u.
n.u.	5	5 n.u.
Rx -	6	2 Tx -
n.u.	7	7 n.u.
n.u.	8	8 n.u.

Straight cabling :

<i>CPU32</i> – RJ45		PC – Ethernet RJ45
Tx +	1	1 Tx +
Tx -	2	2 Tx -
Rx +	3	3 Rx +
n.u.	4	4 n.u.
n.u.	5	5 n.u.
Rx -	6	6 Rx -
n.u.	7	7 n.u.
n.u.	8	8 n.u.