OVERVIEW

TS-ISO485 is a PC/104 (standard format) peripheral board that provides two PC compatible COM ports capable of running up to 115K baud. The TS-ISO485 is compatible with any Technologic Systems' SBC that has a PC/104 connector built-in.

Each COM port has opto-isolated RS-485 drivers capable of running in full or half duplex mode. On-board logic automatically controls transmit enable for half duplex operation. TS-ISO485 features include:

- ✔ Two RS-485 capable serial ports
- ✔ Full or Half Duplex modes supported (Jumper Configurable)
- ✔ Standard 16C550 UART with 16 byte FIFO
- ✔ Jumper selectable COM port (8 distinct IO locations)
- ✔ Jumper selectable IRQ (IRQ 4,5,6,7,9 are available)
- ✔ Supports IRQ line sharing
- ✔ Compatible with TS ARM and x86 SBCs
- ✔ Transient suppression circuitry for noise immunity
- ✔ Hardware detection of receive character gap of 3 character times
- ✔ On board LEDs show TX and RX activity for each COM port

> **↗ Notes**
>
> If you are using TS-ISO485 with a Technologic Systems' ARM SBC, only IRQ lines 5, 6 and 7 are available, then IRQ sharing is recommended (Shared Jumper ON).
> With a X86 SBC, all the IRQ lines can be used.

HARDWARE CONFIGURATION
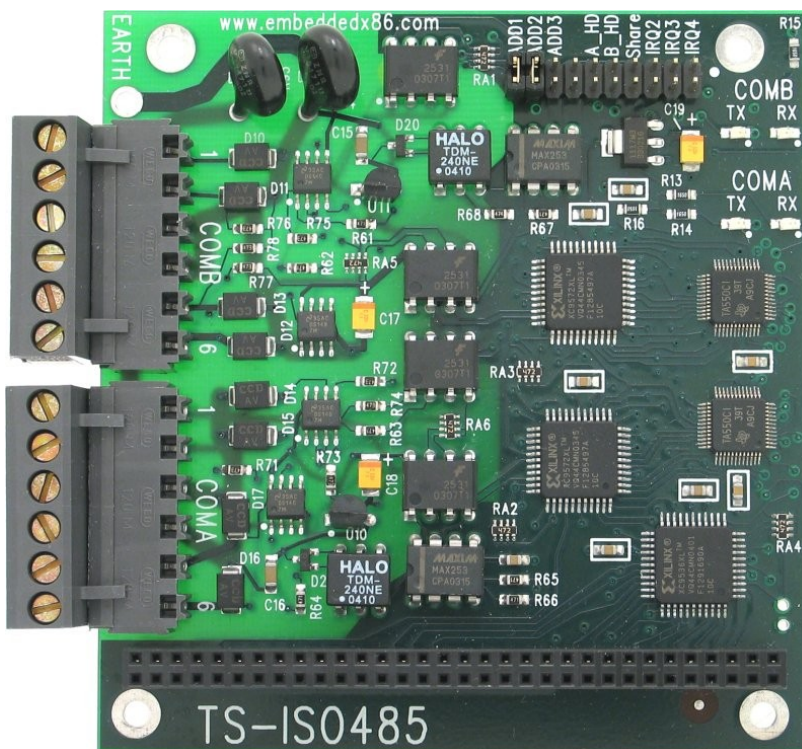
COMA and COMB terminal strip Pin-Out

COM Pin	Full-Duplex Signal	Half-Duplex Signal
1	Trasmit +	Tx/Rx +
2	Trasmit -	Tx/Rx -
3	GND	GND
4	GND	GND
5	Receive -	N/C
6	Receive +	N/C

Full-Duplex/Half-Duplex Jumper Settings

- ✔ **A_HD** Jumper installed will set **COMA** for **half-duplex**, jumper open is full duplex

- ✔ **B_HD** jumper installed will set **COMB** for **half duplex**, jumper open is full duplex

HARDWARE CONFIGURATION

Jumper settings for COM/IO selection

COM port selected		Jumpers ADD3-1		
COMA	COMB	ADD3	ADD2	ADD1
COM3(3E8)	COM4(2E8)	OFF	OFF	OFF
COM4(2E8)	COM5(3A8)	OFF	OFF	ON
COM5(3A8)	COM6(2A8)	OFF	ON	OFF
COM6(2A8)	COM7(3A0)	OFF	ON	ON
COM7(3A0)	COM8(2A0)	ON	OFF	OFF
COM9(398)	COM10(298)	ON	OFF	ON
COM11(390)	COM12(290)	ON	ON	OFF
COM15(368)	COM16(268)	ON	ON	ON

Jumpers settings for IRQ selection

IRQ selected		Jumper IRQ4-2		
COMA	COMB	IRQ4	IRQ3	IRQ2
None	None	OFF	OFF	OFF
Reserved		OFF	OFF	ON
IRQ3	IRQ4	OFF	ON	OFF
IRQ5	IRQ6	OFF	ON	ON
IRQ4	IRQ3	ON	OFF	OFF
IRQ6	IRQ7	ON	OFF	ON
IRQ7	IRQ9	ON	ON	OFF
IRQ9	IRQ1	ON	ON	ON

✔ The share jumper will enable IRQ sharing for COMA and COMB using the IRQ selected for COMA.

DRIVER SUPPORT

The TS-ISO485 uses a TS-UART serial port to communicate with the radio module and to provide software compatibility. The standard serial 16C550 COM port interface appears as a selectable PC-compatible COM port for software compatibility and no special drivers are required. For example, the TS-Linux distribution already includes Linux drivers for the 16C550 UART chip by default. One can use any terminal emulator, as minicom, to open and configure the serial port in use by this board with the appropriate /dev entry, enabling communication to the modem device plugged on the socket.

TESTING TS-ISO485 WITH LINUX AND ARM

All the Technologic Systems' ARM SBCs include Linux installed by default with built-in support for the standard 16C550 UART, making the TS-ISO485 an out-of-the-box solution.

Address decode and IRQ jumpers need to be configured prior to use the system. For IRQ selection, remember that only IRQ 5, 6 and 7 are available on ARM systems. On these boards, the ISA IRQ 5 corresponds to ARM IRQ 22, ISA IRQ 6 is ARM IRQ 33 and ISA IRQ 7 is ARM IRQ 40. For that reason, IRQ sharing is highly recommended on ARM systems (Shared Jumper ON).

After jumper configuration and power on, Linux will automatically detect the serial ports and will install the proper device entries at /dev. Use the setserial utility to make sure the TS-ISO485 serial ports are configured properly, or to change any parameter. That is specially useful for IRQ configuration, for example:

```
$ setserial -g /dev/cua/2
/dev/cua/2, UART: 16550A, Port: 0x89c003e8, IRQ: 40
$ setserial /dev/cua/2 IRQ 22
$ setserial -g /dev/cua/2
/dev/cua/2, UART: 16550A, Port: 0x89c003e8, IRQ: 22
```

In addition, the file /proc/tty/driver/serial on the Linux proc filesystem provides information about the serial driver and configuration:

```
$ more /proc/tty/driver/serial
serinfo:1.0 driver:5.05c revision:2001-07-08
2: uart:16550A port:89C003E8 irq:22 baud:9600 tx:104 rx:32 RTS|DTR
3: uart:16550A port:89C002E8 irq:33 baud:9600 tx:88 rx:0
```

In order to test communication, use the simple echo and cat commands on the Linux shell prompt. For example:

```
$ cat < /dev/cua/2 &
$ echo "testing serial" > /dev/cua/3
testing serial
$
```

Assuming that COMA and COMB are connected, all the TX and RX LEDs will blink and the sent data will be correctly received. If you are using Full-Duplex, wire-connect terminals 5 and 6 of one COM port to the terminals 2 and 1 of the other COM port, respectively, in order to create a connection between COMA and COMB. For Half-Duplex, connect terminal 1 of one COM port to the terminal 1 of the other COM port. Do the same for the terminal 2.

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