



Characteristics

- Status LEDs
- DC input: 8 to 50 Vdc
- Temperature range: -30 - 85°C
- Dimensions: 78.1x66.8x37.2mm
- Weight: <190gr.
- Certifications: CE, FCC, PTCRB, RoHS, IS09001

Processor

- Flash: 4G 31MB; 3G 10MB
- RAM: 4G 18MB; 3G 10MB
- CPU: 4G ARM11; 3G ARM11

4.3 Analog Inputs

The STD and DB15 models have two independent, unbalanced and multiplexed analog inputs which can be configured in 0-50V mode. Please read section Interface Description 7 (DIP Switches) to learn how to setup the mode of the analog input (current or voltage).

Both ADC inputs have a resolution of 10 bits, which means that the default resolution is 48.8mV (0-50V). The A/D converter uses the successive approximation conversion technique.

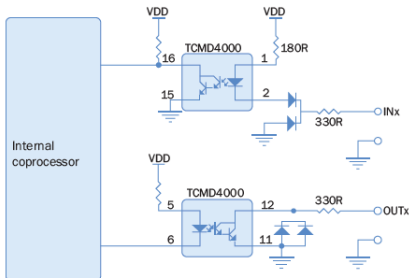
The maximum A/D conversion rate is 5 samples per second.

To know how to read the analog inputs values please read the MTX-IoT Family Software Manual.



4.4 Optoisolated I/O

The STD and DB15 models have two optoisolated inputs and two optoisolated outputs, located in the DB15 HD expansion port. Please refer to section Interface Description 4.1 (Connector pinout) to view the exact location of each I/O. The electrical equivalent circuits of these I/O are shown in following figure:

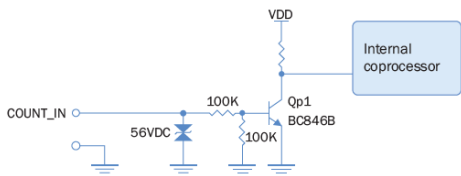


To know how to read and write these lines please read the MTX-IoT Family Software Manual.

4.5 Counter Input

The STD and DB15 models have a counter input located in the DB15 HD expansion port. Please refer to section Interface Description 4.1 (Connector pinout) to view the exact location of the signal I/O.

The electrical equivalent circuits of the counter input is shown in following figure:



3. Status LEDs

The MTX-IoT modem family has a tricolor status LED (blue, green and red).

The green color LED is handled automatically by the modem and indicates its different operating modes, as shown in table below. The LED mode configuration is set by the AT+LSLED command.

TERMINAL STATUS	<mode>=1	<mode>=2 <Flash>=def.	<mode>=2 <flash>=user defined
<ul style="list-style-type: none"> • GSM CS data call in progress/established • GSM voice call in progress/established • UMTS voice call in progress/established • UMTS CS data call in progress 	Permanently ON	10ms ON 990ms OFF	<flash> ms ON 990 ms OFF
<ul style="list-style-type: none"> • GSM PS data transfer • UMTS data transfer 	Permanently ON	10ms ON 1990ms OFF	<flash> ms ON 1990 ms OFF
<ul style="list-style-type: none"> • ME registered to a network. No call, no data transfer 	Permanently ON	10ms ON 1990ms OFF	<flash> ms ON 3990 ms OFF
<ul style="list-style-type: none"> • Limited Network Service (e.g. no SIM, no PIN or during network search) 	500ms ON 500ms OFF	10ms ON 990ms OFF	<flash> ms ON 990 ms OFF

The blue and red color LEDs can be controlled independently by the user. This allows to define the functionality of this LED. You can configure both LEDs in the following way:

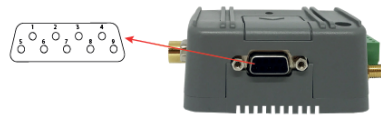
- Permanently OFF
- Permanently ON
- Fast blink: 60ms ON, 60ms OFF
- Medium blink: 500ms ON, 500ms OFF
- Slow blink: 1000ms ON, 1000ms OFF
- Pulse: 100ms ON, 900ms OFF

To learn how to use these LEDs please read the MTX-IoT Family Software Manual.

3. DB9 Connector: 8-wire RS232

The STD and DB9 models support a standard RS232 8-wire serial interface (EIA/TIA 574) via its 9 pin Sub-D connector, shown below.

Port signals are connected to an internal coprocessor through a transceiver. In the STD model, which has two RS232 and a RS485 port, this coprocessor selects which of those ports are connected to the GSM engine's UARTs ASC0 and ASC1. Users can select the ports configuring the device's DIP switches. Please read section Interface Description 7 (DIP Switches) to learn how to configure DIP switches in order to select the port of your choice.



The MTX-IoT modem is designed to be used as a DCE (data circuit-terminating equipment). Based on the conventions for DCE-DTE connections, it communicates with the customer application (DTE- data terminating equipment) using the following signals:

- Port TxD @ application sends data to TXD of MTX-IoT Terminal
- Port RxD @ application receives data from RXD of MTX-IoT Terminal

The RS-232 interface is implemented as a serial asynchronous transmitter and receiver conforming to ITU-T V.24 Interchange Circuits DCE. It is configured for 8 data bits, no parity and 1 stop bit and can be operated at fixed bit rates from 1200bps to 921600bps.

The DB9 connector pinout is shown in the table below:

PIN	SIGNAL	DIRECTION	DESCRIPTION
1	DCD 0	Output	Data carrier detected
2	RD 0	Output	Received data
3	TD 0	Input	Transmitted data
4	DTR 0	Input	Data terminal ready
5	GND	-	Ground connection
6	DSR 0	Output	Data set ready
7	RTS 0	Input	Request to send
8	CTS 0	Output	Clear to send
9	VEXT	Output	Output voltage reference (4V)

6. DIP Switches

The MTX-IoT modems include 8 DIP microswitches allowing the user to configure some functionalities of the device. These switches are located close to the SIM card holder, so you can access them through the same removable panel of the SIM card holder.

By default, all switches are delivered in OFF state. In the following picture you can see them in their default OFF state with their corresponding numbers:



The table below explains the functionality of each one:

SW5	SW2	SW1	DB9	DB15	CONNECTOR	RF/GPS	SPECIAL
OFF	OFF	OFF	RS232 (ASC0)	RS232 (ASC1)	RS485 (uP-UART)	-	-
OFF	OFF	ON	RS232 (uP-UART)	RS232 (ASC1)	RS485 (ASC0)	-	-
OFF	ON	OFF	RS232 (ASC0)	RS232 (uP-UART)	RS485 (ASC1)	-	-
OFF	ON	ON	RS232 (ASC0)	-	RS485 (uP-UART)	RF UART (ASC1)	-
ON	OFF	OFF	RS232 (uP-UART)	-	RS485 (ASC0)	RF UART (ASC1)	-
ON	OFF	ON	-	RS232 (ASC0)	RS485 (uP-UART)	RF UART (ASC1)	-
ON	ON	OFF	-	-	-	-	ASC0: uP-UART
ON	ON	ON	-	-	-	-	-

SW7	ANALOG I1	SW8	ANALOG I2	SW3	PERIODIC RESET
OFF (default)	Voltage mode (0-50V)	OFF	Voltage mode (0-50V)	OFF	Disabled
ON	Current mode (0-20mA)	ON	Current mode (0-20mA)	ON	Device will be restarted periodically

5. RS485 Bus

The STD models have a terminal block with a 5-way connector shared with the Power Supply section, as shown and described below, used to implement the RS485 interface.

Port signals +RxA and -RxB are connected to an internal coprocessor through a transceiver. In the STD model, which has two RS232 and a RS485 port, this coprocessor selects which of those ports are connected to the GSM engine's UARTs ASC0 and ASC1. Users can select the ports configuring the device's DIP switches. Please read section Interface Description 7 (DIP Switches) to learn how to configure DIP switches in order to select the port of your choice.

It meets or exceeds the requirements of ANSI TIA/EIA-485-A.



PIN	SIGNAL	DIRECTION	LIMITS	DESCRIPTION
1	-RxB	I/O		RS485 B signal
2	+RxA	I/O		RS485 A signal
3	Auto on	Input	0-VIN	Automatic restart after shutdown enable signal (n/a in MTX-65I-RS485 FW2.00 (Auto-on) and MTX-65I-RS485-LC)
4	VIN	Input	6.5-40VDC	Positive power input
5	GND	Input		Negative power (ground)

4. DB15 HD Connector: I/O expansion port

4.1 Connector Pinout

The STD and DB15 models have a DB15 HD female connector used as I/O expansion port. The pinout of this port and functionalities of each signal are shown in figure below:



PIN	SIGNAL	DIRECTION	DESCRIPTION
1	NC		Not connected
2	RD 1	Output	RS232_1 signal: Received data
3	TD 1	Input	RS232_1 signal: Transmitted data
4	IN 1	Input	Opto-isolated input 1 (active low)
5	OUT 3	Output	Opto-isolated output 3 (open collector)
6	NC		Not connected
7	RTS 1	Input	RS232_1 signal: Request to send
8	CTS 1	Output	RS232_1 signal: Clear to send
9	INS	Input	Counter input
10	VEXT	Output	Output voltage reference (4V)
11	IN 2	Input	Opto-isolated input 2 (active low)
12	OUT 4	Output	Opto-isolated output 4 (open collector)
13	ADC 2	Input	Analog to Digital converter input 2
14	GND		Ground connection

16 Analog input/output

ABSOLUTE MAXIMUM RATINGS					
Symbol	Parameter	Conditions	Min	Max	Unit
V _i	Input voltage	Voltage mode	-12.5	85	V
I _i	Input current	Current mode	-6	42	mA
	Electrostatic discharge	Human body model	2000		V
		Charge device model	500		V

15 Optoisolated input/output

ABSOLUTE MAXIMUM RATINGS (TCMD4000 OPTOCOUPLER)					
Symbol	Parameter	Conditions	Mn	Max	Unit
Input					
V _{re}	Reverse voltage		6		V
I _r	Forward current		60		mA
I _{fsm}	Forward surge current		1.5		A
P _{avg}	Power dissipation		100		mW
Output					
V _{ceo}	Collector-emitter voltage		35		V
V _{cco}	Emitter-collector voltage		7		V
I _c	Collector current		80		mA
I _{cm}	Collector peak current	t _r /T=0.5, t _r ≤ 10ms	100		mA
P _{avg}	Power dissipation		150		mW
Coupler					
V _{iso}	AC isolation test voltage (RMS)		3750		V _{rms}
P _{tot}	Total power dissipation		250		mW