LOCOSYS Technology Inc.
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Product name	Description	Version
TMC2001	TMC receiver/Mini-B 10pin/CLA,1.2A/UART,38400	1.0
TMC2002	TMC receiver/Mini-B 5pin/CLA,1.2A/UART,38400	
TMC2003	TMC receiver/Mini-B 5pin/CLA,1.2A/UART,38400	

Datasheet of TMC receiver, TMC2001~3

1 Introduction

TMC2001~3 series products are integrated FM TMC (Traffic Message Channel) receiver, antenna and cigarette lighter adaptor. The product can receive and decode TMC information efficiently and output data with LOCOSYS AdvanceTMC Protocol which is NMEA-like compatible. It also acts as an in-vehicle power charger. Combined it with compatible PND (Personal Navigation Device) can alert the driver of a problem, such as traffic tie-ups, on the planned route and calculate an alternative route avoid the incident. This makes the dynamic route guidance reality.

2 Features

- Worldwide FM band support (RDS, RBDS)
- Auto-search tuning for TMC
- Integrated with FM antenna
- 12V~24V cigarette lighter adaptor
- Plug and play. No professional installation required.

3 Application

- Personal navigation device
- Smart phone with GPS function.
- Automotive navigation

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Fig3-1. TMC2001 installation with PND.

Fig3-2. TMC2003 installation with PND.

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4 FM radio tuner

4.1 FM radio tuner

Frequency	87.5 MHz -108 MHz (US/Europe, Default Europe)

4.2 Interface

Protocol	LOCOSYS AdvanceTMC Protocol	UART: 38400 bps, 8 data bits, no parity, 1 stop bits
Interface	Connect to PND via USB Mini-B plug	

4.3 LOCOSYS AdvanceTMC Protocol

LOCOSYS AdvanceTMC Protocol is a NMEA-like ASCII message for easy integration into GPS navigation devices or other NMEA based devices. Any TMC receivers or navigation devices built-in LOCOSYS AdvanceTMC Protocol will automatically search TMC channel after power is on or software command resets.

Navigation software can use the following command to query the version in order to identify the TMC receiver which is running with LOCOSYS AdvanceTMC Protocol.

$PLTCM,V

After receiving the above command, TMC receiver will output the following message.

$PLTV,"LOCOSYS,V01.10-B20090715,01,01100,00"*4A

Table 4.3-1 PLTV Data Format

Name	**Example**	**Units**	**Description**
Message Header	$PLTV		PLTV message header
Firmware version	V01.10-B20090715		Firmware version and build date.
Function	01		01 = TMC only, 02 = GPS and TMC
Chip	01100		
Mode	00		Reserved
Checksum	*4A		
Terminator	<CR><LF>		End of message termination

Note: This PLTV data format was revised and applied to the firmware after the build date B20090715.

Some examples of commonly-used commands are listed below. For more commands, please refer to the document of LOCOSYS AdvanceTMC Protocol.

- Search next available TMC channel upwards
  $PLTCM,+
- Search next available TMC channel downwards
  $PLTCM,-
- Tune to frequency 100.7MHz and stay on this frequency
  $PLTCM,H2,10070
- Tune to frequency 87.5MHz and automatic search TMC channel from this frequency

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$PLTCM,S2,8750

- Tune to frequency 92.1MHz and automatic search TMC channel from this frequency, then stay on the searched TMC channel

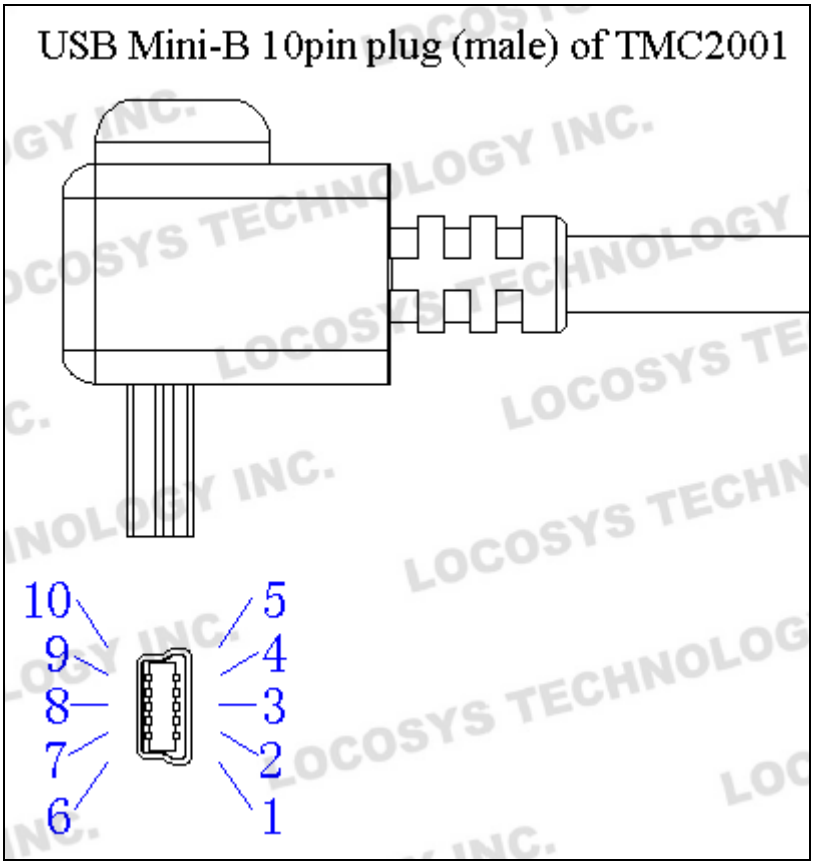
  $PLTCM,O2,9210

5 Pin assignment and descriptions

- TMC2001

Table 5-1. Pin descriptions of USB Mini-B 10pin plug of TMC2001

Pin #	Name	Type	Description
1	+5V	P	+5Vdc source to PND
2 ~ 3	NC		Not connect
4	GND	P	Ground
5	GND	P	Ground
6	RX	I	Data input (3.3V). TMC receives data from PND.
7	TX	O	Data output (3.3V). TMC transmits data to PND.
8 ~ 10	NC		Not connect



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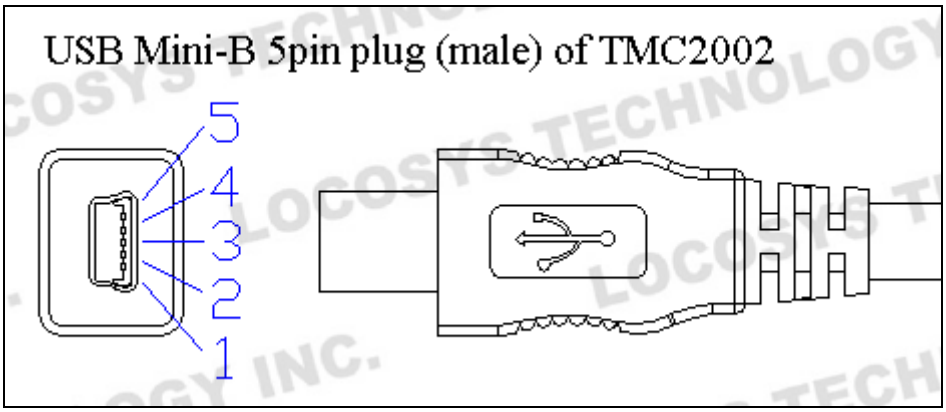
- TMC2002

Table 5-2. Pin descriptions of USB Mini-B 5pin plug of TMC2002

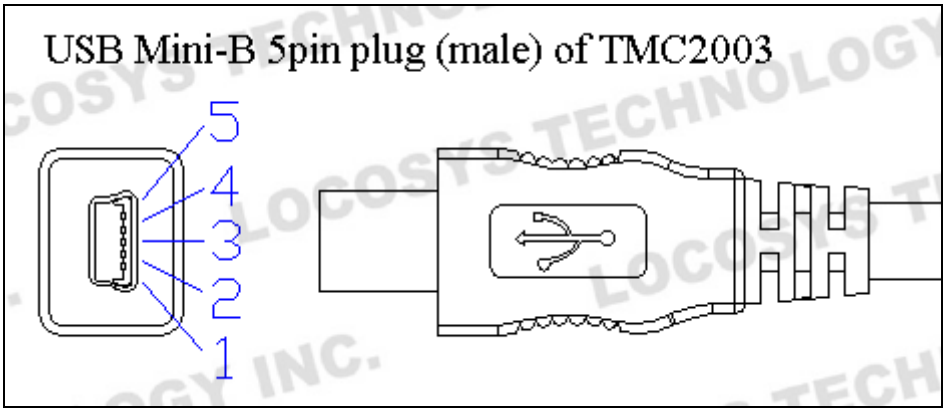
Pin #	Name	Type	Description
1	+5V	P	+5Vdc source to PND
2	RX	I	Data input (3.3V). TMC receives data from PND.
3	TX	O	Data output (3.3V). TMC transmits data to PND.
4	GND	P	Ground
5	GND	P	Ground



- TMC2003

Table 5-3. Pin descriptions of USB Mini-B 5pin plug of TMC2003

Pin #	Name	Type	Description
1	+5V	P	+5Vdc source to PND
2	TX	O	Data output (3.3V). TMC transmits data to PND.
3	RX	I	Data input (3.3V). TMC receives data from PND.
4	+5V	P	+5Vdc source to PND
5	GND	P	Ground



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6 LED indicator

There is a green LED indicator on the CLA. It lights on when the CLA receives power input to indicate the CLA is working.

7 DC & Environment characteristics

7.1 DC characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input voltage	V_{IN}	DC	10	12	28	V
Input current	I_{IN}	Vin = 12V			1250	mA
Output voltage	V_{OUT}	Off load	4.75	5.1	5.25	V
		Load = 1.2A	4.75	4.8	5.25	
Output current	I_{OUT}	Vin = 12V			1200	mA
Efficiency	EFF	Vin = 12V Load = 1.2A	70			%
TX pin output high voltage	TXV_{OH}		2.5		3.6	V
TX pin output low voltage	TXV_{OL}				0.6	V
RX pin input high voltage	RXV_{IH}		2.0		3.6	V
RX pin input low voltage	RXV_{IL}				0.6	V
Quiescent current (no load)	I_Q	Vin = 12V		21		mA
Input reverse voltage protection (1)	V_{RVP}		-32			V
Output short current limit (2)	I_{SHORT}			5.8		mA
Output over current protection	I_{OCP}	Vin = 12V		2		A
Output ripple	V_{RIPPLE}	Vin = 12V Load = 1.2A			120	mV
Operating frequency	F_{OSC}	Ta = 25℃		52		KHz
Fuse		Fast action	1.6			A
			250			V

<Note 1> The CLA shall not be damaged (fuse may be burned out) or cause damage to the device powered by the CLA when CLA are connected in reverse voltage.

<Note 2> Auto recovery after short circuit is removed.

7.2 Temperature characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
Operating Temperature	Topr	0	-	45	℃
Storage Temperature	Tstg	-20	25	75	℃

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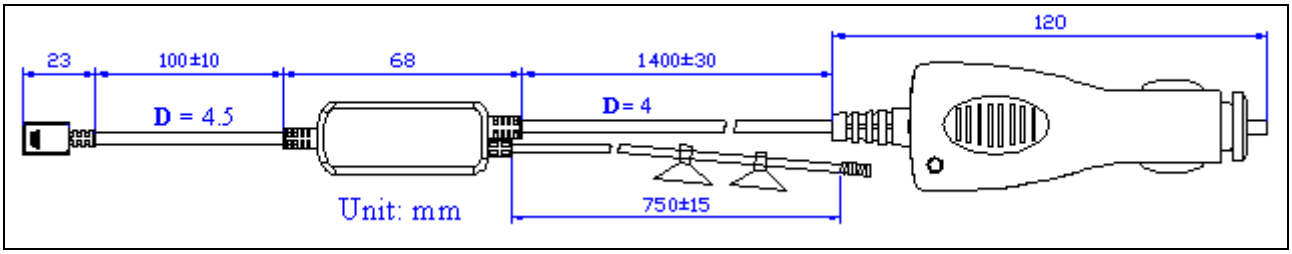
7.3 Humidity range

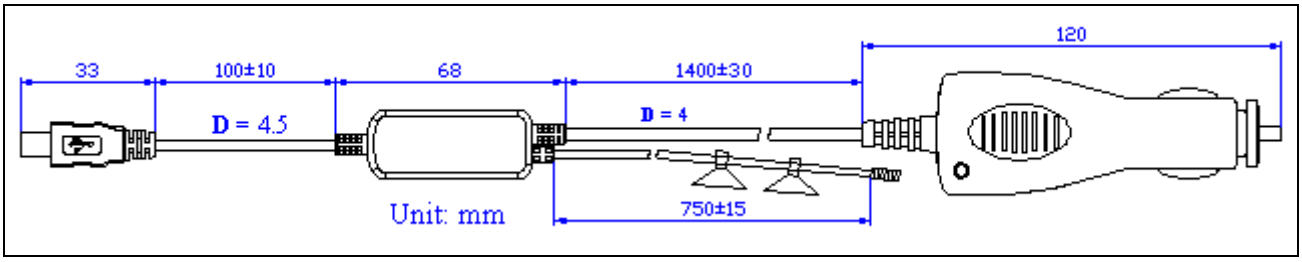
Operation	30% ~ 95%
Storage	10% ~ 95%

8 Mechanical specification

- Dimension of TMC2001



- Dimension of TMC2002 and TMC2003



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Document change list

Revision 1.0

- First release on Dec. 22, 2009