



TRM-xxx-DP1203

Data Guide
(Preliminary)

Wireless made simple[®]

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General Description

The TRM-xxx-DP1203 is a complete Radio Transceiver Module operating in the 433, 868 and 915 MHz license free ISM (Industrial Scientific and Medical) frequency bands.

The TRM-xxx-DP1203 offers the unique advantage of high data rate communication up to 152.3kbps. The radio module is suitable for applications seeking to satisfy the European (ETSI EN300-220-1 and EN301 439-3) or the North American (FCC part 15.247 and 15.249) regulatory standards.

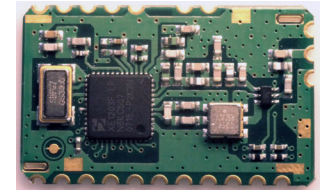


Figure 1: TRM-xxx-DP1203 Module

The TRM-xxx-DP1203 modules can be used in any environment where wireless remote connection is an advantage. The TRM-xxx-DP1203 modules are perfect for complex wireless networks involving high speed data rate applications.

Features

- True UART to antenna solution
- 433/868/915MHz
- No RF knowledge required
- 30.5mm x 18.5mm
- Direct Digital Interface
- Fully assembled and tested
- Surface mount
- Supply voltage 2.4V–3.6V
- Frequency synthesizer step size of 500Hz
- Output power is programmable up to 15dBm
- High Rx 0.1% sensitivity down to –113dBm at 4.8kbps
- Data rate up to 153.2kbps
- Current consumption
Tx = 62mA at 15dBm,
Rx = 14mA
- Digital RSSI (Received Signal Strength Indicator)
- Digital FEI (Frequency Error Indicator)

Applications

- Home automation
- Process, access and building controls
- Home appliance interconnections

Electrical Specifications

Absolute Maximum Ratings

Absolute Maximum Ratings			
Description	Min.	Max.	Unit
Vdd – Power Supply	2.4	3.6	VDC
Operating Temperature	–40	+85	°C
Storage Temperature	–55	+125	°C
Soldering Temperature (max 15 seconds)		+260	°C

Figure 2: Absolute Maximum Ratings



Warning: ESD sensitive device. Precautions should be taken when handling the device in order to prevent permanent damage.



Warning: Linx radio frequency (“RF”) products may be used to control machinery or devices remotely, including machinery or devices that can cause death, bodily injuries, and/or property damage if improperly or inadvertently triggered, particularly in industrial settings or other applications implicating life-safety concerns. No Linx Technologies product is intended for use in any application without redundancies where the safety of life or property is at risk.

The customers and users of devices and machinery controlled with RF products must understand and must use all appropriate safety procedures in connection with the devices, including without limitation, using appropriate safety procedures to prevent inadvertent triggering by the user of the device and using appropriate security codes to prevent triggering of the remote controlled machine or device by users of other remote controllers.

All RF products are susceptible to RF interface that can prevent communication.

Do not use any Linx product over the limits in this data guide.

Excessive voltage or extended operation at the maximum voltage could cause product failure. Exceeding the reflow temperature profile could cause product failure which is not immediately evident.

Do not make any physical or electrical modifications to any Linx product. This will void the warranty and regulatory and UL certifications and may cause product failure which is not immediately evident.

Detailed Electrical Specifications

Figure 3 gives the specifications of the TRM-xxx-DP1203 modules under the following conditions:

Supply voltage $V_{DD} = 3.3V$, temperature = $25^{\circ}C$, frequency deviation $\Delta f = 5kHz$, Bit-rate = 4.8kbps, base-band filter bandwidth $BW_{SSB} = 10kHz$, carrier frequency $f_c = 434MHz$ for the TRM-433-DP1203, $f_c = 869MHz$ for the TRM-868-DP1203 and $f_c = 915MHz$ for the TRM-915-DP1203, bit error rate $BER = 0.1\%$ (measured at the output of the bit synchronizer), antenna output matched at 50Ω .

Detailed Electrical Specifications

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
FR	Synthesized Frequency Range	TRM-433-DP1203	433		435	MHz
		TRM-868-DP1203	868		870	MHz
		TRM-915-DP1203	902		928	MHz
IDDSL	Sleep Mode Supply Current			0.2	1	μA
IDDST	Standby Mode Supply Current	39MHz running		0.85	1.1	mA
IDDR	Rx Mode Supply Current			14	17	mA
IDDT	Tx Mode Supply Current	$P_{RF} = 5dBm$		33	40	mA
		$P_{RF} = 11dBm$		62	75	mA
RFS	RF Sensitivity	A-mode		-111	-108	dBm
FDA	Frequency Deviation	Programmable	1		255	kHz
BR	Bit Rate	Programmable	1.2		152.3	kbps
P_{RF}	RF Output Power	RFOP1 (programmable)	-3	0		dBm
		RFOP2 (programmable)	+2	+5		dBm
		RFOP3 (programmable)	+7	+10		dBm
		RFOP3 (programmable)	+12	+15		dBm
TS_TR	Transmit Wake-up Time	From Oscillator Enabled		150	250	μs
TS_RE	Receive Wake-up Time	From Oscillator Enabled		0.5	08	ms
TS_OS	Quartz Oscillator Wake-up Time	Fundamental		1	2	ms
XTAL	Quartz Oscillator Frequency			39		MHz
VIH	Digital Input Level High	% VDD	75			%
VIL	Digital Input Level Low	% VDD			25	%

Figure 3: Detailed Electrical Specifications

Application Information

Pin-out Diagram

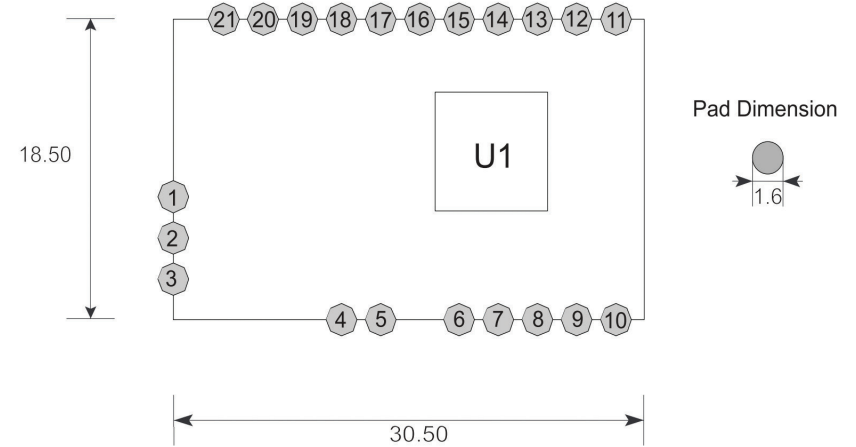


Figure 4: Pin-out Diagram

Figure 5: Pin Descriptions



Depending on the ConfigSwitch 1-bit Register or the input level at the

ConfigSwitch, SWITCH pin and SWParam Configuration Register			
ConfigSwitch Register	Switch pin	RTParam_switch_ext configuration parameter	SWParam configuration set selected
0	Switch is an output: '1' in transmitter mode '0' in the other mode	0	Set #1 SWParam_mode_1 SWParam_Power_1 SWParam_Rmode_1 SWParam_t_delsig_in_1 SWParam_freq_1
1	Switch is an output: '1' in transmitter mode '0' in the other mode	0	Set #2 SWParam_mode_2 SWParam_Power_2 SWParam_Rmode_2 SWParam_t_delsig_in_2 SWParam_freq_2
X	0	0	Set #1 SWParam_mode_1 SWParam_Power_1 SWParam_Rmode_1 SWParam_t_delsig_in_1 SWParam_freq_1
X	1	0	Set #2 SWParam_mode_2 SWParam_Power_2 SWParam_Rmode_2 SWParam_t_delsig_in_2 SWParam_freq_2

Figure 7: ConfigSwitch, SWITCH pin and SWParam Configuration Register

Standard Sequence for Switching between Receiver and Transmitter

The TRM-xxx-DP1203 is able to switch between any configuration by using the 3-wire bus or by using the pin SWITCH. This section (Figures 8 and 9) describes the switching sequence from Set #1 to Set #2.

Switching sequence by using the 3-wire bus

Switch_ext = 0 (Bit 3, Address 00010)

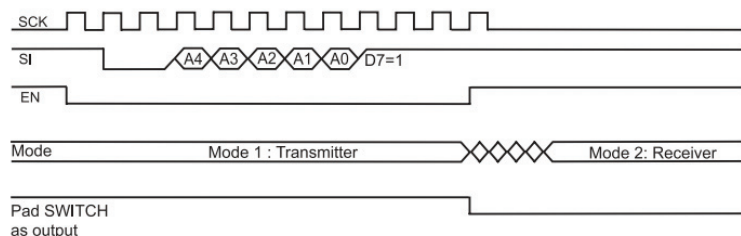


Figure 8: Switching Sequence Using 3-wire Bus

Switching sequence by pad SWITCH

Switch_ext = 1 (Bit 3, Address 00010)

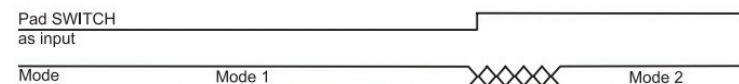
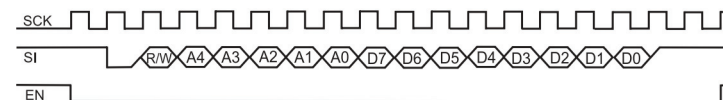


Figure 9: Switching Sequence by Pad SWITCH

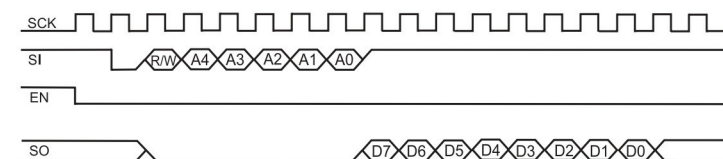
Serial Control Interface

A 3-wire bidirectional bus (SCK, SI, SO) is used to control the TRM-xxx-DP1203 (Figure 9). The output signal, SO, is provided by the TRM-xxx-DP1203 in opposition to the SCK and SI, which need to be provided by the external application as an 8-bit microcontroller. An access Read or Write with the XE1203 is possible only when the enable signal is active (active LOW).

For more information about the 3-wire bus, please refer to the XE1203 datasheet chapter; *Serial Interface Definition and Principles of Operation*.



Write sequence into configuration register



Read sequence of configuration register

Figure 10: 3-wire Bidirectional Bus

Typical Applications

The schematic in Figure 11 shows the TRM-xxx-DP1203 interfaced with a SEMTECH's microcontroller XE8806A.

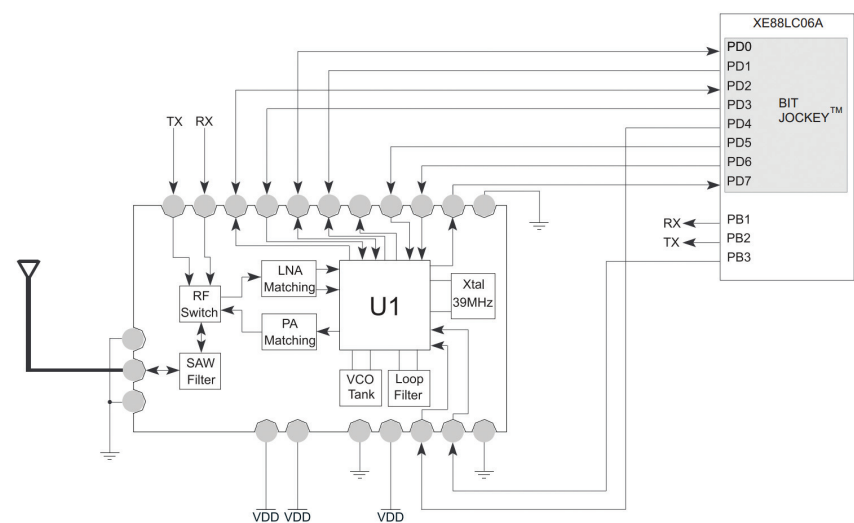


Figure 11: TRM-xxx-DP1203 and XE8806A Interfaced Schematic

Mechanical Dimensions

Figure 12 shows the physical footprint and dimensions of the TRM-xxx-DP1203 module, which should be implemented on the motherboard.

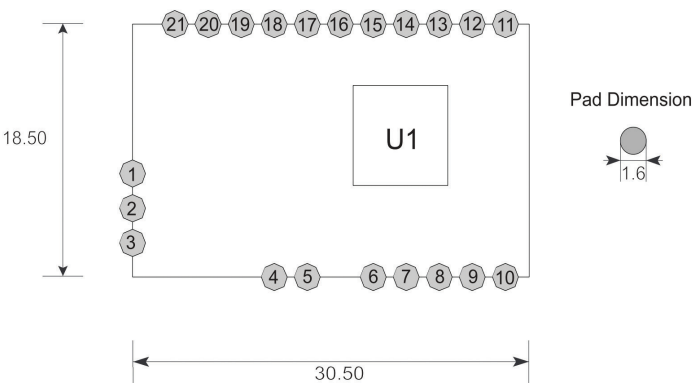


Figure 12: Mechanical Dimensions

Custom Applications

For cost-sensitive applications, such as wireless sensors and AMR, Linx Technologies can embed the application software directly into the microcontroller built into the module. For more information on this service, please contact Linx Technologies.

Ordering Information

Ordering Information		
Part No.	Description	Radiotronix Part No.
TRM-433-DP1203	433MHz DP1203 RF Transceiver Module	Wi.DP1203-433-R
TRM-868-DP1203	868MHz DP1203 RF Transceiver Module	Wi.DP1203-868-R
TRM-915-DP1203	915MHz DP1203 RF Transceiver Module	Wi.DP1203-915-R

Figure 13: Ordering Information



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