



Telion-Series Software Defined Radio Transceiver Characteristics (incl. ARDS-compliant waveform)

Last Updated: 12/2010

General characteristics	
Frequency band of operation	1350...1390 MHz
RF channel throughput	Defined by the loaded software. <ul style="list-style-type: none"> • 1.28634 Mb/s for ARDS waveform; • from 100 kb/s to 1.3 Mb/s otherwise.
Signal OC-BW	Depends on the type of modulation chosen and RF bit rate selected. From 12.5 kHz to 2.6 MHz. In ARDS-compliant mode: -3 dB 800 kHz; -20 dB 1.8 MHz; -40 dB 5.8 MHz; -60 dB 10 MHz.
Modulation types supported	Various. Currently supported SOQPSK (ARDS-compliant), MSK, GMSK, FSK.
Error correction	In ARDS-compliant mode: Convolutional code, $r = \frac{1}{2}$, G1 = G1-1011011; G2-1111001. On Rx – Viterbi, hard decision, $k = 7$.
Error detection	Transceiver can support user-defined CRC protocol. Several standard protocols are supported: CRC16 (by default), CRC24 (ARDS-compliant, MIL-STD 188-184), CRC32



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Interleaving/De-interleaving	In ARDS-compliant mode: 36x47 matrix Interleaver/De-interleaver.	
Network topologies supported	TDMA (ARDS-compliant), Push-to-Talk, Point-to-Point, Point-to-Multipoint, proprietary TDMA (including Masterless TDMA).	
RF Network security	The following parameters are user selectable, providing required network security: <ul style="list-style-type: none"> • Hop Rate as fast as 100,000 times per second; • Fast frequency hopping option; • Number of data bytes within each RF packet; • Deviation/modulation index for the RF channel transmissions; • Hop table up to 128 frequency channels long. Each frequency channel is user selectable. 	
	Available cryptography (AES, DES, and 3DES algorithms).	
Methods available to user to overcome in-band interference	User has ability to: <ul style="list-style-type: none"> • Select fast frequency hopping vs. slow frequency hopping; • Select frequency channels for their network, which will be overlapping the in-band interfering signal the least; • Select different hopping rate (including single channel operation); • Select different number of data bytes per each RF packet. 	
<i>Transmitter</i>		
Frequency band	1350...1390 MHz.	
Output power	Programmable with 1 dB steps, up to 1 Watt.	



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Maximum duty cycle	In ARDS-compliant mode < 20%. Otherwise, up to 100% (either CW or modulated).	
Current in transmit mode at maximum output power	<ul style="list-style-type: none"> • 1.8A @ 4 VDC; • 1 A @ 6 VDC; • 500 mA @ 12 VDC. 	
Receiver		
Frequency band	1350...1390 MHz, 25 kHz channel spacing.	
Sensitivity	In ARDS mode: -97 dBm @10 ⁻⁴ (no FEC); -102 dBm @10 ⁻⁴ (with FEC) In Proprietary modes: -110 dBm @ 10 ⁻⁴ (no FEC, 130 kbps) -97 dBm @10 ⁻⁴ (no FEC, 1.3 Mbps)	
Frequency Stability	1.5 ppm	
Demodulation techniques	In ARDS-compliant mode: Coherent In Proprietary modes: Depends on the type of the signal used for the communications.	
Maximum input signal level	At least 0 dBm (sinusoidal signal of this amplitude within the frequency band of transceiver's operation will not result in permanent damage of the transceiver's hardware).	



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RF selectivity	-3 dB 40 MHz -20 dB 72 MHz -60 dB 120 MHz	
Current in full receive mode	<ul style="list-style-type: none"> • 350 mA @ 4.5 VDC; • 250 mA @ 6 VDC; • 125 mA @ 12 VDC. 	
1 st IF Selectivity	-3 dB 2.6 MHz -20 dB 4.5 MHz -60 dB 12 MHz	
2 nd IF Selectivity	<p>In ARDS mode:</p> <p>-3 dB 900 kHz -20 dB 1.98 MHz -40 dB 5.4 MHz -60 dB <6.5 MHz</p> <p>In Proprietary mode: Reconfigurable and determined by the characteristics of the digital filters.</p>	
Image rejection	80 dB	
Spurious rejection	60 dB	
<i>Electrical and Mechanical characteristics</i>		
Input voltage range	3.6...36 VDC.	



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Operating temperature range	-40 ... + 80 deg C.														
Humidity	Up to 95%, non-condensing (-30 ... +60 deg C).														
RF connector	MCX.														
Data connectors	Board-level transceiver provides 30-pin high density data connector. For signals assignment see TBD by Lexycom.														
Data interfaces	<p><i>Serial Ports</i></p> <p>Port1</p> <table border="1"> <thead> <tr> <th>ARDS-compliant mode</th> <th>PTT mode</th> <th>Otherwise</th> </tr> </thead> <tbody> <tr> <td>CDU operation, Menu driven, asynch. NRZL, 2-line operation, 19200-8-N-1 fixed settings. Can be used for software updates.</td> <td>Diagnostics port, asynch. NRZL, 2-line operation, command driven, SMNP-like command set. 57600-8-N-1 fixed settings.</td> <td>Secondary data port or Diagnostics port. Transparent or Command-based operation. Up to 921.6 kb/s, various Parity, number of DataBits, and number of Stop bits.</td> </tr> </tbody> </table> <p>Port2</p> <table border="1"> <thead> <tr> <th>ARDS-compliant mode</th> <th>PTT mode</th> <th>Otherwise</th> </tr> </thead> <tbody> <tr> <td>Data port, SDLC/RS232 switchable (non-dynamic, defined at power-up). In SLDC mode operates</td> <td>Diagnostics port, asynch. NRZL, 2-line operation, command driven, SMNP-like command set. 57600-8-N-1 fixed settings.</td> <td>Secondary data port or Diagnostics port. Transparent or Command-based operation. Up to 921.6 kb/s, various Parity,</td> </tr> </tbody> </table>			ARDS-compliant mode	PTT mode	Otherwise	CDU operation, Menu driven, asynch. NRZL, 2-line operation, 19200-8-N-1 fixed settings. Can be used for software updates.	Diagnostics port, asynch. NRZL, 2-line operation, command driven, SMNP-like command set. 57600-8-N-1 fixed settings.	Secondary data port or Diagnostics port. Transparent or Command-based operation. Up to 921.6 kb/s, various Parity, number of DataBits, and number of Stop bits.	ARDS-compliant mode	PTT mode	Otherwise	Data port, SDLC/RS232 switchable (non-dynamic, defined at power-up). In SLDC mode operates	Diagnostics port, asynch. NRZL, 2-line operation, command driven, SMNP-like command set. 57600-8-N-1 fixed settings.	Secondary data port or Diagnostics port. Transparent or Command-based operation. Up to 921.6 kb/s, various Parity,
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	<p>with Internal or External clock. In External clock mode a 806.4 kbps clock is supplied by the transceiver onto the TxC line.</p>		<p>number of DataBits, and number of Stop bits.</p>	
<p><i>JTAG Port</i> Complies with IEEE 1149.1 standard. Includes TMS, TCK, TRST, TDI, and TDO signals.</p> <p><i>Ethernet Port (optional)</i> 10/100Base-T, full/half duplex, MDI/MDI-X auto crossover.</p> <p><i>USB (optional)</i> 2.0 compliant.</p> <p><i>General Purpose IO lines</i> Up to 12 (TBR) general purpose digital IO lines are available. 3.3V CMOS level. Not-fused, not-isolated.</p> <p>In the ARDS-compliant mode some of the IO lines are used as follows: (*) TransmitBlinking Pulse; (*) Select SLDC/RS232; (*) TimeSlot Pulse.</p> <p>In PTT and masterless-TDMA modes one of the IO lines is used for 1PPS input.</p>				



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	<i>SPI (optional)</i> (TBR)	
Programming the transceiver	Via CDU/Diagnostics port using SNMP-like protocol. Configuration software is included. OR Via JTAG interface.	
Dimensions (board level)	3.18'' x 2.89'' x 0.47''. Fits PC/104 8/16-bit carrier boards.	