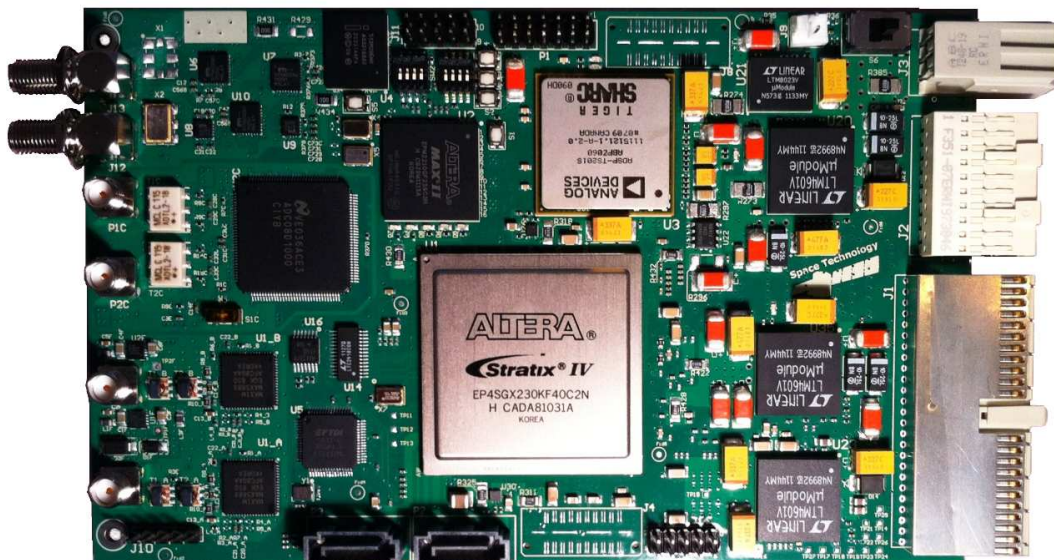


S4MDM1.5 Wideband programmable SW radio IF-BB modem Board

Technical Specifications

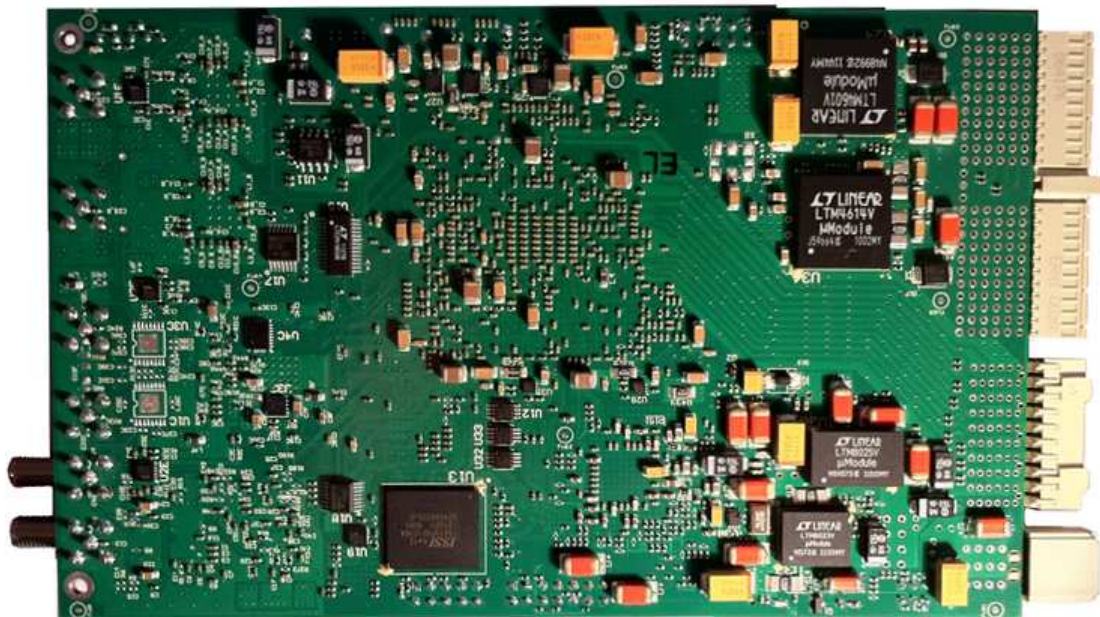
- S4MDM1.5 is a wideband SW Radio Modem Board mechanically compatible with Compact PCI 3U form factor (16 mm x 10 mm), equipped with state-of-art wideband ADC and DAC converter and ALTERA STRATIX 4 FPGA SW radio modem processor
 - 2 Maxim MAX5889 (12 bits) single channel DAC converter, each converter core can run up to at a max sampling rate of 0.6Gsp/s.
 - 1 NATIONAL (8 bits) ADC08D1000 dual channel ADC converter, each converter core can run up to at a max sampling rate of 1.5Gsp/s.
 - 1 ADSP-TS201S 600MHz Floating Point DSP with 24Mb of internal RAM
 - 1 EP4SGX230KF40C3N FPGA belonging to ALTERA STRATIX 4 (40 nm CMOS) family of devices.
 - 1 SRAM Memory device 512K x 36 bits (SRAM PN IS61VPS51236A-200B3) with parallel access at 200MHz full rate (parallel 36 bits for a max through put in excess of 200*4Mbytes/sec.) directly from FPGA, and via FPGA decoding with access by the DSP with two wait states
 - External clock can be used for the data converter and fast processing FPGA clock. This clock can be AC coupled from KHz up to 1200MHz. The clock can also be injected from front panel SMA connector (50 Ohm matched interface) using a 350mV single ended signal or differentially via backplane using a AC coupled signal source with at least 400mV of differential peak to peak dynamic.
 - **The S4MDM1.5 Board can be assembled in a 19" 3U or 6U Sub-Rack.**



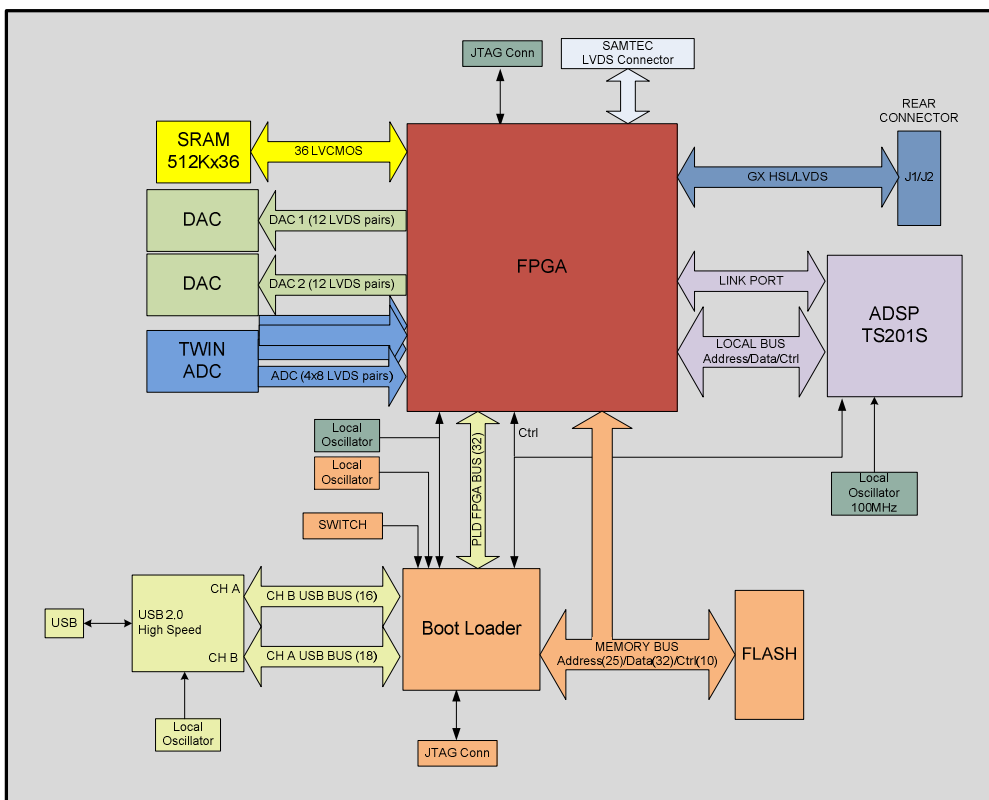
Assembled Board top view

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Assembled Board bottom view

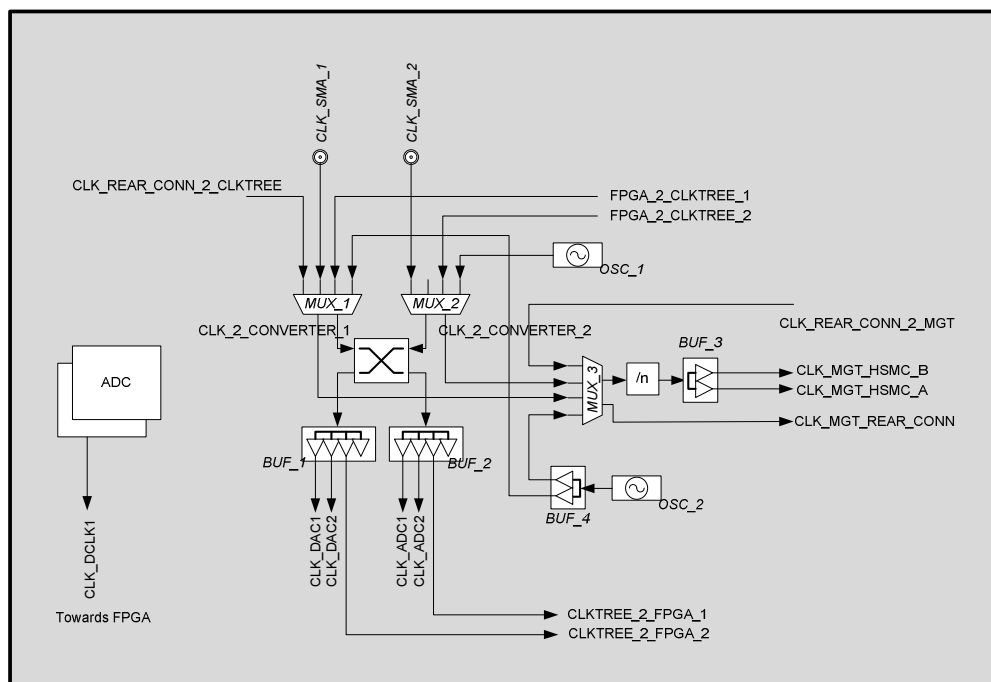


Wideband Soft Radio Board Block diagram

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- PC USB C++ SW driver aimed to establish a bidirectional link between the Board and an external PC equipped with Window XP O.S. is included in the bundle associated with the Board purchase.
- ALTERA STRATIX 4 selected device is programmable in place using ALTERA programming POD.
- A 20 LVDS couples connector SAMTEC QSH-040-01-F-D-DP-A-K used to connect to a fast Logic Analyzer is provided (LA can run in parallel with PG)
- Eight ALTERA transceiver input buffers each capable of running at full speed (6.375Gbps) via ERNI ZD 973046 connector can serially interface the Board to a backplane (see tables below in the brochure)
- Eight ALTERA transceiver output buffers each capable of running at full speed (6.375Gbps) via ERNI ZD 973046 connector can serially interface the Board to a backplane (see Table 2 below in the brochure)
- Up to 32 LVDS differential couples/64 single ended 2.5V LVCMOS running on ERNI 64785 can interface in parallel to the backplane (see Table 1 below in the brochure)
- 512Mbit on board Flash memory for FPGA and DSP FW storage
- Highly configurable HW clock tree for flexible processing configuration



Wideband Soft Radio Board Clock tree HW

- In addition to providing a wealth of hardware resources, this board provides a highly configurable and flexible architecture for digital signal processing:

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- ALTERA FPGA is re-configurable via ALTERA Programming POD.
- Equipped with a two channel High speed 2.0 USB interface.
- Self boot capability at power on reset for both Microcontroller and FPGAs through the on board flash memory
- The Board is a 12V single level power supplied system.
- High speed clock and I, Q data lines are coupled via the front Panel SMA connectors using plain 50Ohm local termination (those termination can be removed if necessary).
- Nominal Analog Output Voltage: Single Ended output either AC or DC coupled (AC or DC output is factory customized) 500mV max.
- Single Channel typical power consumption: strongly depend from FPGA activated modules and switching clock (ask ST Technical support)
- Dual Channel typical power consumption: strongly depend from FPGA activated modules and switching clock. (ask ST Technical support)
- Typical applications include: **Telecom, Soft Radio Receivers and Transmitters, Radar, Musical Instruments, Antenna Beam Former, Digital IF sampler, Digital Instrumentation, Image Processing, and ASIC fast prototyping.**

	A	B	C	D	E
1	NC	NC	RXP1	NC	NC
2	NC	NC	RXN1	RXP2	TXP3
3	TXP4	RXP0	TXP2	NC	TXN3
4	NC	RXN0	NC	RXN2	RXP3
5	TXN4	TXP7	TXN2	GND	RXN3
6	NC	GND	NC	RXP11	TXP13
7	RXP4	TXN7	TXP8	GND	TXN13
8	RXN4	RXCLKP0	NC	RXN11	RXP13
9	TXP5	NC	TXN8	TXCLKP0	RXN13
10	TXN5	RXCLKN0	NC	TXCLKN0	TXP14
11	RXP5	RXP7	TXP9	TXN11	TXN14
12					
13			key		
14					
15	NC	RXN7	TXN9	TXN11	RXP14
16	TXP6	GND	NC	TXP0	RXN14
17	NC	TXP1	TXN1	GND	TXP15
18	TXN6	GND	NC	TXN0	TXN15
19	NC	RXP8	RXP10	GND	RXP15
20	TXN6	GND	NC	RXP12	RXN15
21	NC	RXN8	RXN10	RXN12	RXP17
22	RXP6	GND	NC	TXP12	RXN17
23	NC	RXP9	TXP10	NC	RXP16
24	RXN6	NC	NC	TXN12	RXN16
25	NC	RXN9	TXN10	NC	NC

Table 1
Wideband Soft Radio Board P1
Connector Pin-out

	A	B	C	D
1	CLK_IN1_N	CLK_IN1_P	LVDS_CLK_IN_P	LVDS_CLK_IN_N
2	GXB_RX_N0	GXB_RX_P0	GXB_TX_P0	GXB_TX_N0
3	GXB_RX_N1	GXB_RX_P1	GXB_TX_P1	GXB_TX_N1
4	GXB_RX_N2	GXB_RX_P2	GXB_TX_P2	GXB_TX_N2
5	GXB_RX_N3	GXB_RX_P3	GXB_TX_P3	GXB_TX_N3
6	GXB_RX_N4	GXB_RX_P4	GXB_TX_P4	GXB_TX_N4
7	GXB_RX_N5	GXB_RX_P5	GXB_TX_P5	GXB_TX_N5
8	GXB_RX_N6	GXB_RX_P6	GXB_TX_P6	GXB_TX_N6
9	GXB_RX_N7	GXB_RX_P7	GXB_TX_P7	GXB_TX_N7
10	CLK_IN2_N	CLK_IN2_P	LVDS_CLK_OUT_P	LVDS_CLK_OUT_N

Table 2
Wideband Soft Radio Board P2 Connector Pinout

S4MDM1.5 SW Radio HW Platform is unique since it is capable to integrate in so narrow room (16 mm by 10 mm) the functionality of a dual Modem Transceiver capable of signaling at IF 140MHz (two IF real channel in TX and RX) through digital direct up and down conversion.

On the RX side S4MDM1.5 thanks to the dual ADC integrated in a single NATIONAL die can be simply interleaved at achieve RF ADC (8 bits) sampling at 3.0Gbps.

The S4MDM1.5 SW Radio Board can be assembled:

- -vertical in a standard 19” 3U Sub Rack slot or as half slot of a standard 19” 6U Sub Rack.
- - horizontal in a standard 19” 1U case

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