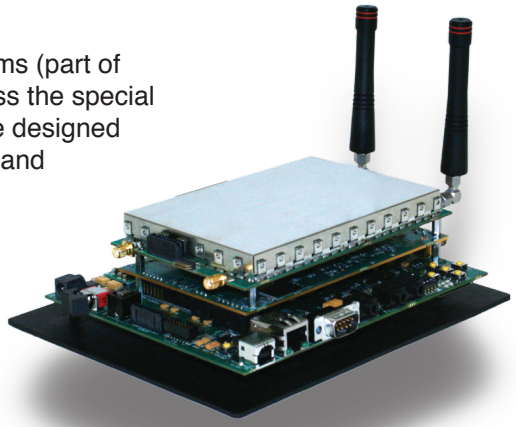
LYRTECH
Infinite possibilities...

Small form factor SDR development platforms

Reference sheet

Lyrtech's small form factor (SFF) software-defined radio (SDR) development platforms (part of Lyrtech's advanced development solutions lineup) are especially designed to address the special SDR needs of the military, public safety, and commercial markets. Our platforms are designed as low-cost, off-the-shelf, integrated hardware and software development solutions, and pack some of the latest DSP and FPGA technology—our expertise.

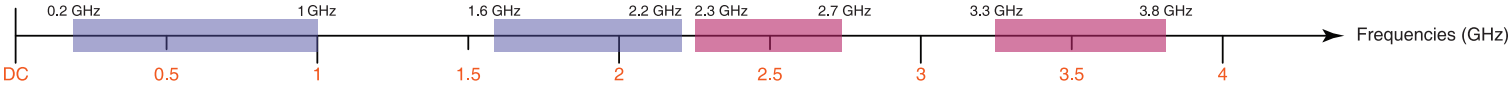


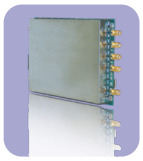
RoHS

Applications

Modularity is one of the key benefits of the SFF SDR development platform. By combining available modules differently, you can target entirely different sets of applications in a snap. To make your life easier we offer eight bundles, targeting some of the more common application needs (note that all RF modules are tunable):

- Low band
- High band
- 2.5 GHz SISO WiMAX
- 3.5 GHz SISO WiMAX
- 2.5 GHz 2×2 MIMO WiMAX
- 3.5 GHz 2×2 MIMO WiMAX
- Cognitive low band
- Spectral analysis



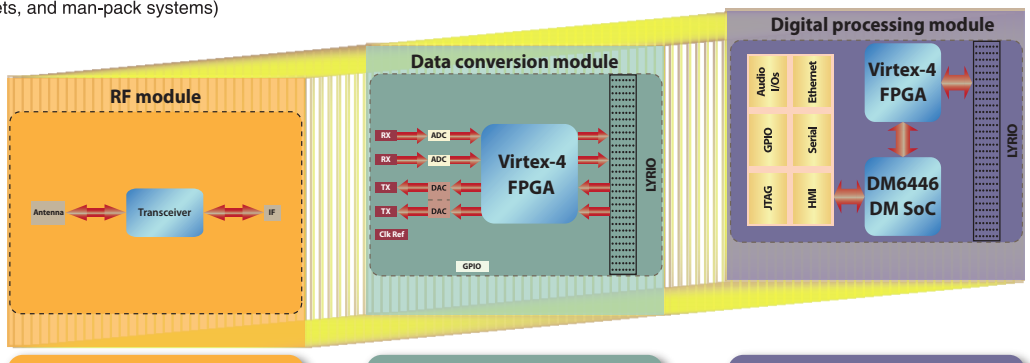


Tunable low-band and high-band ADS

Typically used for:
- GSM, GPRS, EDGE (femto and pico base stations)
- Software-defined radio
- Cognitive radio
- Public safety applications (TETRA and APCO bands)
- MILCOMs (gateways, handsets, and man-pack systems)
- White-space devices
- Mesh networks
- Long-term evolution (LTE)

MIMO/SISO WiMAX ADS

Typically used for:
- WiMAX
- Wi-Fi
- Software-defined radio



Tunable RF modules
(up to two modules—second module only capable of RX)
- Low-band range: 0.2–1.0 GHz
- High-band range: 1.6–2.2 GHz
- Software-selectable, 5 MHz or 20 MHz RX bandwidths

WiMAX RF modules
(up to two modules)
- 2.5 GHz WiMAX range: 2.3–2.7 GHz
- 3.5 GHz WiMAX range: 3.3–3.8 GHz
- Software-selectable, 7 MHz or 22 MHz RX bandwidths

ADACMaster III
- Virtex-4 LX25 or SX35 FPGA
- Two, 14-bit, 125 MSPS ADCs
- Dual-channel, 16-bit, 500-MSPS interpolating DAC
- Multiple clock sources
- AC coupled

SFF SDR evaluation module
- TMS320DM6446 DP SoC
- Virtex-4 SX35 FPGA
- MSP430 MCU for power management
- 128 MB DDR2 SDRAM
- 128 MB NAND flash memory
- Stereo audio codec (8 kHz to 48 kHz)
- 10/100 Mbps Ethernet

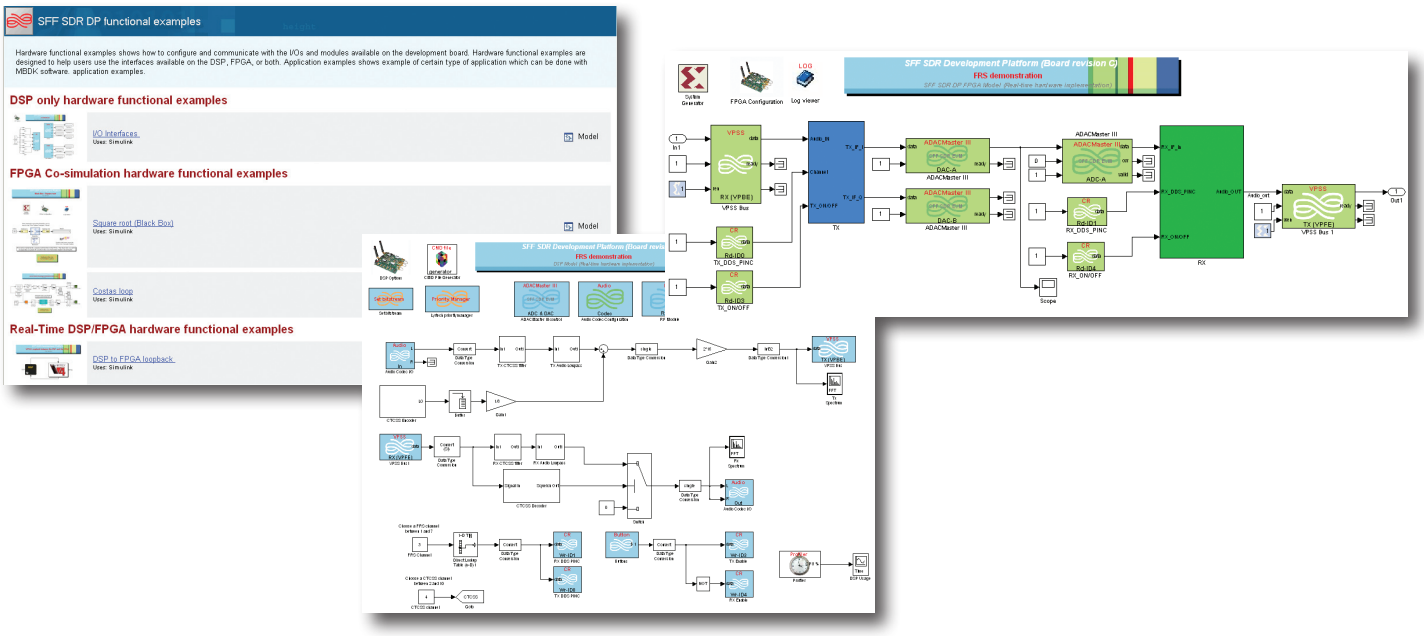
Fully integrated solutions

SFF SDR development platforms integrate a complete array of tools and features, making them perfect for any type of SDR application:

- Embedded, independent power monitoring for each processor in the system
- Tools for real-time data exchanges with the host device CPU
- Seamless hardware and software integration from baseband to antennas
- Real-time and hardware-in-the-loop co-simulation capabilities
- General-purpose processor (GPP), DSP, and FPGA, which makes it easy to implement all protocol layers
- Capable of remote Ethernet access
- Supports many tunable and WiMAX RF modules (see table for details)
- Supports an optional, GPS-disciplined clock synchronization module for mutual boards synchronization or tight clock performance applications

Seamless model-based design

Like most other Lyrtech products, SFF SDR development platforms are seamlessly integrated to the Simulink model-based design environment, making it simple to develop applications and control/validate the different features of their systems in a graphical environment, where programming specific processors is as easy as dragging IP blocks.



SCA integration

The architecture of the platform is also entirely CORBA enabled (GPP, DSP, FPGA) and you can easily develop SCA-compliant waveforms with the SCARI core framework and SCARI tools from the CRC. (**Note that the SCA option is only supported by the tunable, low-band RF module**.)

SFF SDR evaluation module

ADACMaster III

Tunable, low/high-band RF module

2.5 GHz/3.5 GHz WiMAX RF module (SISO configuration)

2.5 GHz/3.5 GHz WiMAX RF module (2×2 MIMO/dual-band SISO configurations)

FRS handset

Headset with microphone

Bundles		Features	Models
SFF SDR evaluation module (×1) ADACMaster III (×1) Tunable, low-band RF module (×1) FRS handset (×1) Handset charger (×1) FRS band antenna (×2) Headset with microphone (×1) MBDK license (×1)	Tunable low band	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • LX25 Virtex-4 FPGA—AC coupled (×1) **RF module** • Selectable bandwidths: 5 MHz or 20 MHz • RF range: 0.2 GHz to 1 GHz	LYR170-641
SFF SDR evaluation module (×1) ADACMaster III (×1) Tunable, high-band RF module (×1) Quadriband GSM antenna (×2) MBDK license (×1)	Tunable high band	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • LX25 Virtex-4 FPGA—AC coupled (×1) **RF module** • Selectable bandwidths: 5 MHz or 20 MHz • RF range: 1.6 GHz to 2.2 GHz	LYR170-642
SFF SDR evaluation module (×1) ADACMaster III (×1) 2.5 GHz WiMAX RF module (SISO configuration) (×1) 2.5 GHz WiMAX antenna (×2) MBDK license (×1) ADACMaster III FPGA target MBDK license (×1)	2.5 GHz WiMAX	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • SX35 Virtex-4 FPGA—AC coupled (×1) **RF module** • Selectable bandwidths: 7 MHz or 22 MHz • RF range: 2.3 GHz to 2.7 GHz	LYR170-653
SFF SDR evaluation module (×1) ADACMaster III (×1) 3.5 GHz WiMAX RF module (SISO configuration) (×1) 3.5 GHz WiMAX antenna (×2) MBDK license (×1) ADACMaster III FPGA target MBDK license (×1)	3.5 GHz WiMAX	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • SX35 Virtex-4 FPGA—AC coupled (×1) **RF module** • Selectable bandwidths: 7 MHz or 22 MHz • RF range: 3.3 GHz to 3.8 GHz	LYR170-654
SFF SDR evaluation module (×1) ADACMaster III (×1) 2.5 GHz WiMAX RF module (MIMO configuration) (×2) 2.5 GHz WiMAX antenna (×4) Mini-ADACSync (×1) MBDK license (×1) ADACMaster III FPGA target MBDK license (×1)	2.5 GHz MIMO WiMAX	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • SX35 Virtex-4 FPGA—AC coupled (×1) **RF modules** • Selectable bandwidths: 7 MHz or 22 MHz • RF range: 2.3 GHz to 2.7 GHz **Mini-ADACSync** Precision, low-jitter clock generator (with GPS time base) Enables complete system synchronization from baseband to RF	LSP000-653
SFF SDR evaluation module (×1) ADACMaster III (×1) 3.5 GHz WiMAX RF module (MIMO configuration) (×2) 3.5 GHz WiMAX antenna (×4) Mini-ADACSync (×1) MBDK license (×1) ADACMaster III FPGA target MBDK license (×1)	3.5 GHz MIMO WiMAX	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • SX35 Virtex-4 FPGA—AC coupled (×1) **RF modules** • Selectable bandwidths: 7 MHz or 22 MHz • RF range: 3.3 GHz to 3.8 GHz **Mini-ADACSync** Precision, low-jitter clock generator (with GPS time base) Enables complete system synchronization from baseband to RF	LSP000-654

Bundles		Features	Models
SFF SDR evaluation module (×1) ADACMaster III (×1) Tunable, low-band RF module (×2) FRS handset (×1) Handset charger (×1) FRS band antenna (×4) Headset with microphone (×1) MBDK license (×1) ADACMaster III FPGA target MBDK license (×1)	Cognitive low band	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • SX35 Virtex-4 FPGA—AC coupled (×1) **RF modules** • Selectable bandwidths: 5 MHz or 20 MHz • RF range: 200 MHz to 1 GHz ※ ***The second RF module is only capable of RX. This gives you one, full-duplex, RX/TX channel and another RX channel for spectral analysis—a typical configuration in cognitive radio applications.***	LSP000-652
SFF SDR evaluation module (×1) ADACMaster III (×1) Tunable, low-band RF module (×1) Tunable, high-band RF module (×1) FRS handset (×1) Handset charger (×1) FRS band antenna (×4) Headset with microphone (×1) MBDK license (×1) ADACMaster III FPGA target MBDK license (×1)	Spectral analysis	**SFF SDR evaluation module** • SX35 Virtex-4 FPGA (×1) • DM6446 DM SoC • 128 MB SDRAM and NAND flash memory **ADACMaster III** • 125 MSPS, 14-bit ADC (×2) • 500 MSPS, 16-bit interpolating DAC (×2) • SX35 Virtex-4 FPGA—AC coupled (×1) **Low-band RF module** • Selectable bandwidths: 5 MHz or 20 MHz • RF range: 0.2 GHz to 1 GHz **High-band RF module** • Selectable bandwidths: 5 MHz or 20 MHz • RF range: 1.6 GHz to 2.2 GHz ※ ***The high-band RF module is only capable of RX. This gives you one, full-duplex, RX/TX channel and another RX channel for spectral analysis.***	LSP000-659

Options

Components	Features		Models
ADACMaster III	• 125-MSPS, 14-bit ADC (×2) • 500-MSPS, 16-bit, interpolating DAC (×2)	LX25 FPGA—AC coupled	LSP151-601
		LX25 FPGA—DC coupled	LSP151-602
		SX35 FPGA—AC coupled	LSP151-611
		SX35 FPGA—DC coupled	LSP151-612
ADACMaster III FPGA target MBDK license	Allows you to target the ADACMaster III's FPGA with MBDK blocks		LSP151-811
Tunable, low-band RF module ※ ***Add an RF module to your ADS (with limited RX functionality) for cognitive radio applications, giving you one full-duplex, RX/TX channel and another RX channel for spectral analysis.***	0.2–1.0 GHz range		LYR173-611
Tunable, high-band RF module ※ ***Add an RF module to your ADS (with limited RX functionality) for cognitive radio applications, giving you one full-duplex, RX/TX channel and another RX channel for spectral analysis.***	1.6–2.2 GHz range		LYR173-612
2.5-GHz WiMAX RF module ※ ***Add an RF module to your ADS for 2×2 MIMO or 2.5–3.5 GHz dual-band applications.***	• Narrowband: 2.3–2.5 GHz range • Wideband: 2.3–2.7 GHz range		LSP154-631
3.5-GHz WiMAX RF module ※ ***Add an RF module to your ADS for 2×2 MIMO or 2.5–3.5 GHz dual-band applications.***	• Narrowband: 3.4–3.6 GHz range • Wideband: 3.3–3.8 GHz range		LSP154-633
Mini-ADACSync	• Four output reference clocks derived from reference clock • Possibility of external or onboard reference clock • High-precision GPS reference clock mode		LSP160-602

FOR MORE INFORMATION

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With over 25 years of experience delivering advanced digital signal processing solutions to companies worldwide, Lyrtech serves customers across the Americas, Asia, and Europe. Lyrtech offers a full range of DSP–FPGA development platforms, as well as product development services. Lyrtech works in partnership with such industry leaders as Texas Instruments, The MathWorks, and Xilinx to deliver unsurpassed quality and support to its large OEM customer base, which includes many prestigious names of the consumer electronics, telecommunications, aerospace, and defense fields. In a world where digital signal processing technology is vital to network and wireless communications, audio and video processing, as well as electronic systems in all fields of technology, Lyrtech is an ideal partner.

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