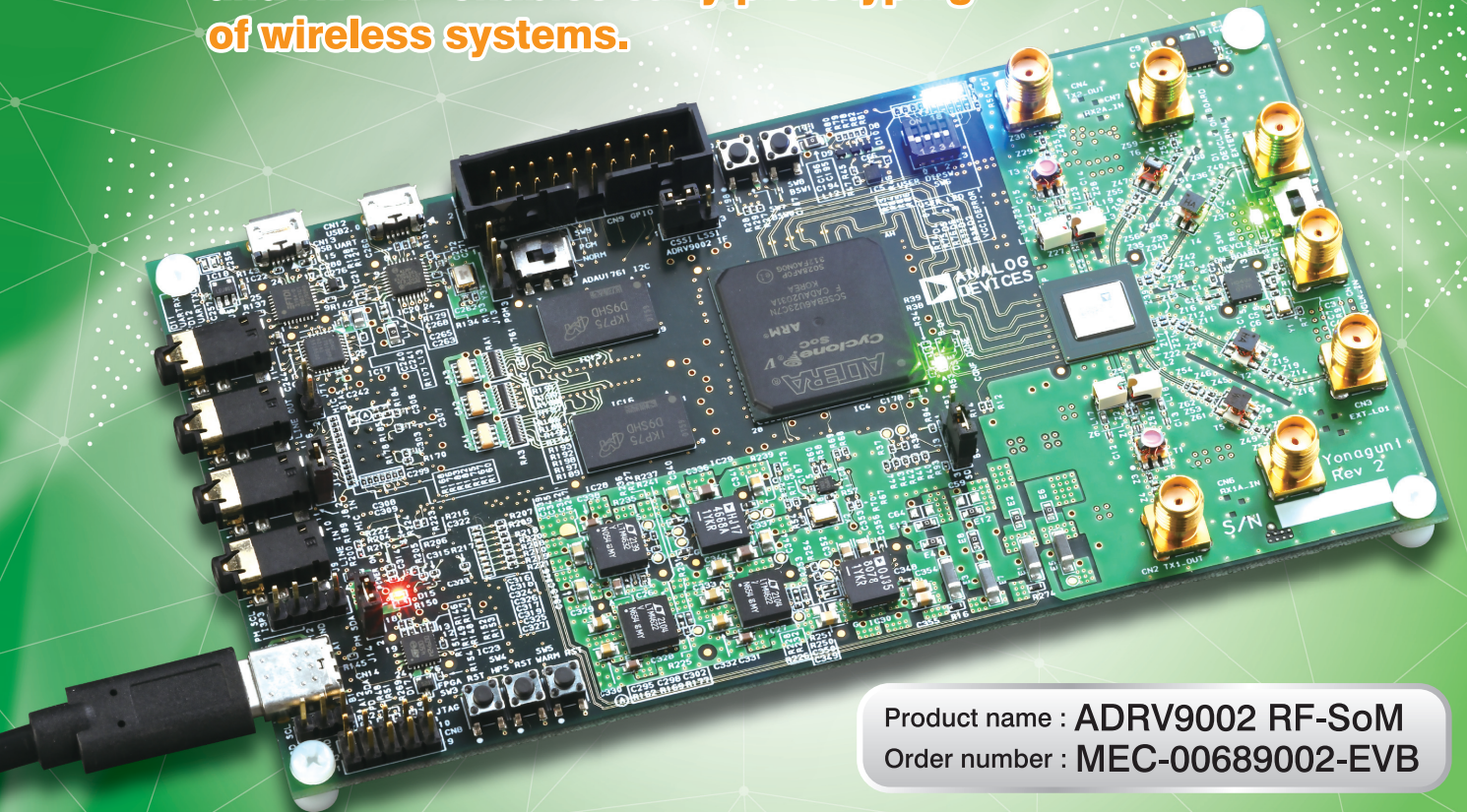


RF System-on-Module (RF-SoM) for Software Defined Radio (SDR) development

RF-SoM that can be used as a reference design for Analog Devices' RadioVerse ADRV9002

Open data on hardware, software, and HDL IP enables early prototyping of wireless systems.



Product name : ADRV9002 RF-SoM
Order number : MEC-00689002-EVB

Features

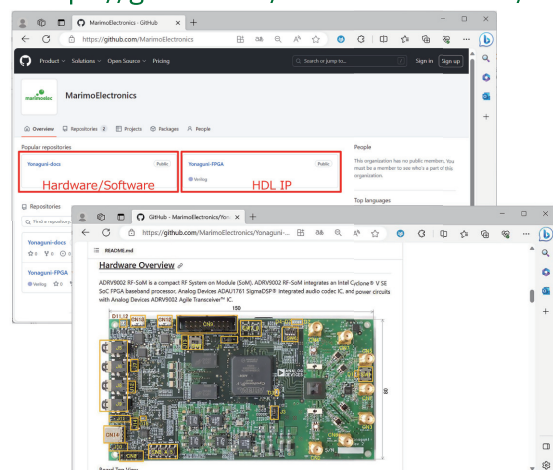
- Implements Analog Devices RF transceiver ADRV9002.
- Enables wideband RF front end supporting 30MHz – 6GHz.
- Simple power supply circuits using μ Module.
- All-in-one configuration with audio codec.
- Equipped with Intel Cyclone V SoC, a low-cost baseband processor.
- Porting know-how for Linux, U-Boot, HDL IP, etc., and references such as circuit diagrams for custom board design using ADRV9002 are released as open data.
- Demo designs will also be released from time to time.

Marimo Electronics can undertake design and development using Analog Devices' RadioVerse RF transceiver products.

Marimo Electronics is an Alliance Partner of Analog Devices.



<https://github.com/MarimoElectronics/>



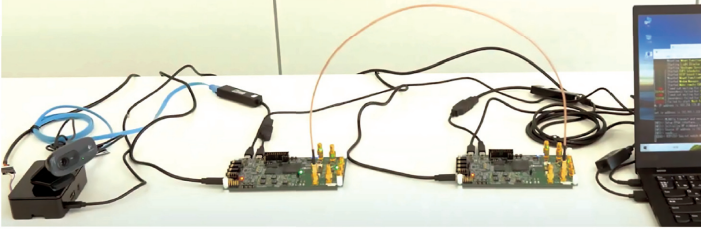
Realize various radio devices!

Amateur radio

WiFi

Local 5G

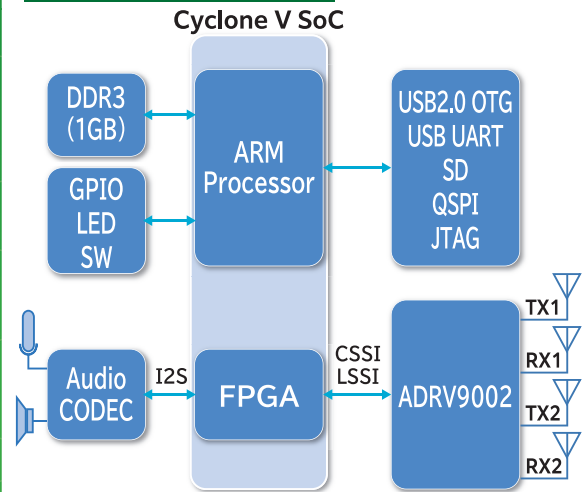
Application example: Video transmission radio



<https://youtu.be/HG0OW8UGiRw>



System diagram



Specification List

Items	Specifications	Remarks
RF part		
RF front end	Analog Devices ADRV9002	ADRV9002BBCZ
RF receive inputs	2 channels (RX1A_IN, RX2A_IN), 30MHz ~ 6GHz	SMA connectors ※1, ※2
RF transmit outputs	2 channels (TX1_OUT, TX2_OUT), 30MHz ~ 6GHz	SMA connectors
External LO inputs	2 channels (EXT_LO1, EXT_LO2), 60MHz ~ 3GHz	SMA connectors ※3
Internal clock	Onboard TCXO, 49.152MHz	
External clock input	DEVCLK_IN, 10MHz ~ 80MHz, Single end mode	SMA connector
Internal/external clock selection LED	Lights up when internal clock is selected, Green	
Baseband processor part		
Baseband processor	Intel Cyclone V SoC	5CSEBA6U23C7N
HPS clock, FPGA clock	Onboard OSC, 25MHz	
HPS memory	DDR3 (1GB)	
JTAG	JTAG port	JTAG 10pin connector
MSEL DIP switch	FPGA configuration selection, MSEL [4:0]	
Boot selection	SD card/onboard QSPI flash memory	
FPGA configuration device	SD card/onboard QSPI flash memory (64MB)	
microSD card slot	microSD card (16GB ~ 64GB)	※4
CONF_DONE LED	Lights up when FPGA configuration is complete, Green	
VCCIO error LED	Lights up due to incorrect CSSI/LSSI IO voltage setting, Red	
USB interface	USB2.0 OTG	※5
UART interface	USB UART	
Reset switches	FPGA Reset, HPS Reset, HPS Warm Reset	Push button
User SoC resources		
GPIO	16bit, 3.3V CMOS USR_OUT [15:0]	
USER LEDs	4bit USER_LED [3:0], Blue	
USER DIP switch	4bit USER_DSW [3:0]	
USER push button switches	2bit USER_BSW [1:0]	
Audio part		
Audio CODEC	Analog Devices ADAU1761	Can be connected to SigmaStudio via I2C port
Audio inputs/outputs	LINE_IN, LINE_OUT, MIC_IN, HP_OUT	3.5mm audio JACK
Power supply part		
Power supply	USB power delivery, Negotiation 9V/3A	USB Type-C connector
PMBus power manager interface	Programming the LTC2977 and LTC294	3.3V I2C interface
Power ON LED	Lights up when powered on, Amber	
Others		
Board size	150mm×80mm, t=2.4mm	Material FR-4
Accessories	USB power delivery AC adapter, SD card (32GB)	

※1 RX1B and RX2B cannot be used.

※2 There is a degradation from 4GHz to 6GHz compared to Analog Devices' ADRV9002NP/W2/PCBZ. Details are posted on Github.

※3 External LO input is optional and not tested.

※4 SD cards that has been confirmed to work.

※5 For Ethernet connection, please separately prepare a microB-A conversion adapter that plugs into the USB2.0 OTG and a USB2.0-Ethernet conversion adapter. Adapters that have been confirmed to work are posted on Github.