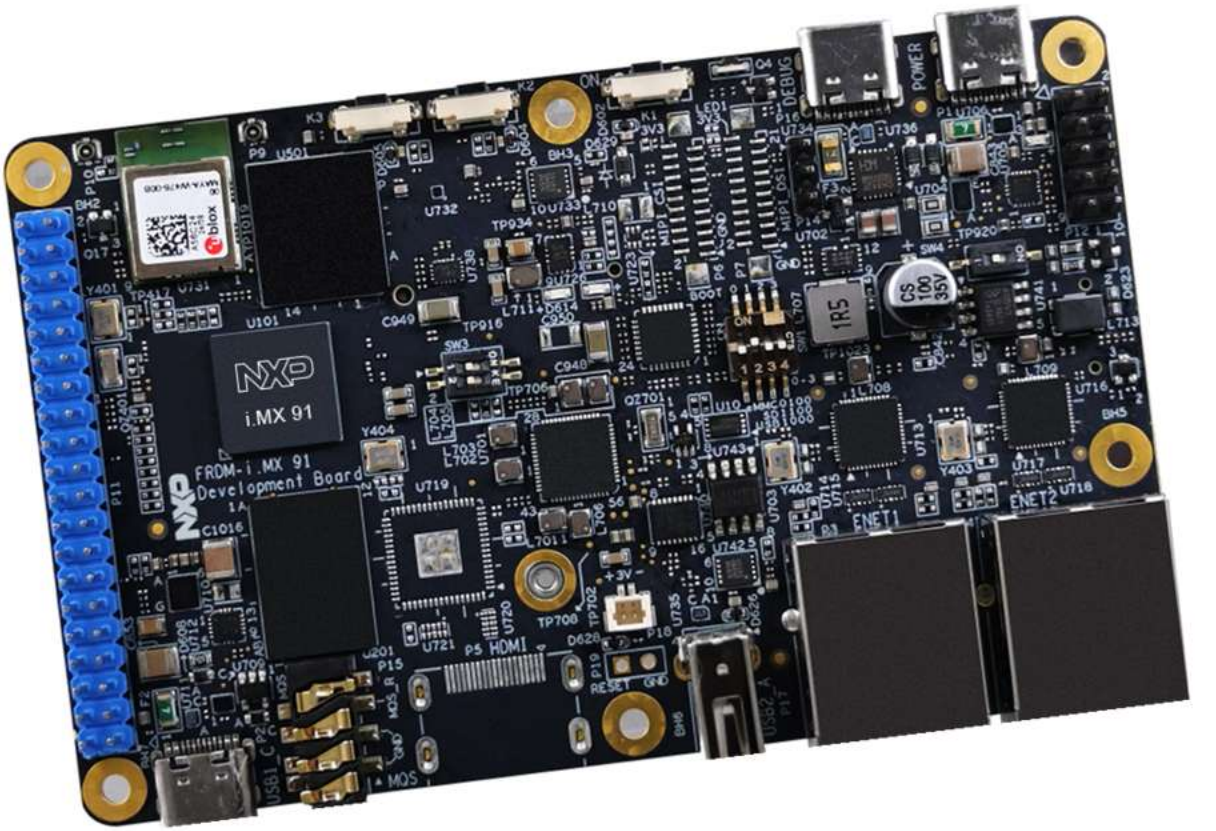
Quick Start Guide

FRDM-IMX91

FRDM i.MX 91 Development board



The FRDM i.MX 91 development board is a low-cost and compact development board featuring the i.MX 91 applications processor. Equipped with an onboard IW610 module. The board is ideal for developing modern Industrial and IoT applications, and supports GoPoint for i.MX Applications Processors, which accelerates the time to market by providing comprehensive demos for a variety of use cases.

Specifications

- i.MX 91 applications processor with 1x Arm® Cortex®-A55
- LPDDR4 16-bit 1GB
- eMMC 5.1, 8GB
- Power Management IC (PMIC)
- MicroSD 3.0 card slot
- One USB 2.0 Type-C connector
- One USB 2.0 Type-C for debug
- One USB 2.0 Type-A connector
- One USB Type-C PD only
- Onboard Wi-Fi® 6 + Bluetooth® LE 5.4/802.15.4 module
- Optional M.2 Key-E for Wi-Fi/BT/802.15.4
- One 2x5 Pin NXP custom interface with:
  - One CAN port
  - Two channels for ADC
  - I^2C/I3C expansion
- On-board EEPROM
- Two 1 Gbps Ethernet
  - Port0 supports ETER
  - Port1 supports TSN
- External RTC with coin cell connector
- 40 pin (2 x 20) expansion I/O

Kit contents

FRDM-IMX91	FRDM i.MX 91 development board
USB Type-C Cable	PD 45W, 5V/3A; 9V/3A; 15V/3A; 20v/2.5A supported *Note - wall adapter is not included
USB Type-C Cable	USB 2.0 Type-C Male to USB 2.0 Type-A Male
Software	Linux® BSP image programmed in eMMC
Documentation	Quick Start Guide

Software and expansion boards

Software and documentation available at:
nxp.com/FRDM-IMX91

GoPoint is part of the FRDM ecosystem.

Recommended Expansion Boards

TM050RDH03-41	Parallel LCD display module 5" TFT 800X480 RGB
8MIC-RPI-MX8	8-microphone array proto board for voice enablement
MX93AUD-HAT	Audio expansion board with multiple features

Get to know the FRDM i.MX 91 development board

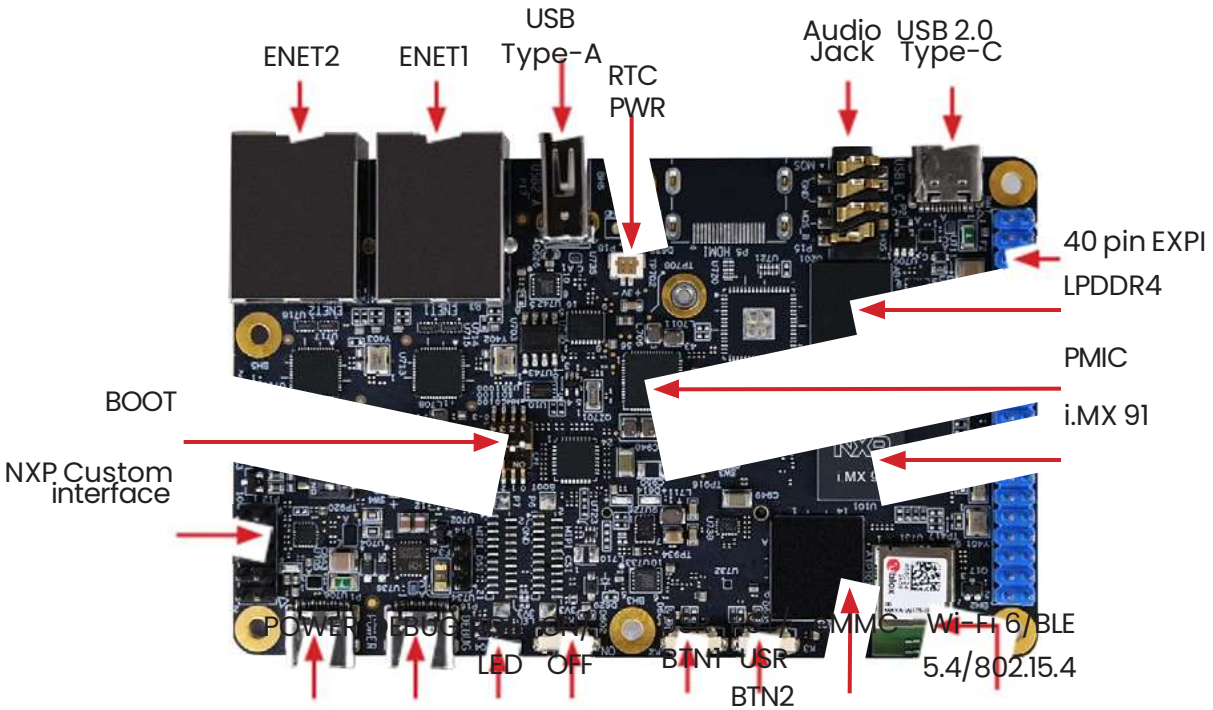


Figure 1: Top view of the FRDM i.MX 91 development board

Figure 2: Bottom view of the FRDM i.MX 91 development board

Get to know the FRDM i.MX 91 development board

continued

	3V3	1	2	5V	
I2C4.SDA	GPIO_2	3	4	5V	
I2C4.SCL	GPIO_3	5	6	GND	
PDM.CLK	GPIO_4	7	8	GPIO_14	UART3.TXD
	GND	9	10	GPIO_15	UART3.RXD
SAI3,MCLK	GPIO_17	11	12	GPIO_18	SAI3.RXBCLK
	GPIO_27	13	14	GND	
	GPIO_22	15	16	GPIO_23	
	3V3	17	18	GPIO_24	
SPI3.SOUT	GPIO_10	19	20	GND	
SPI3.SIN	GPIO_9	21	22	GPIO_25	
SPI3.SCK	GPIO_11	23	24	GPIO_8	SPI3.CS0
	GND	25	26	GPIO_7	SPI3.CS1
	GPIO_0	27	28	GPIO_1	
PDM.BITSTREAM_0	GPIO_5	29	30	GND	
PDM.BITSTREAM_1	GPIO_6	31	32	GPIO_12	PDM.BITSTREAM_2
PDM.BITSTREAM_3	GPIO_13	33	34	GND	
SAI3_RXSYNC	GPIO_19	35	36	GPIO_16	SAI3.TXBCLK
SAI3_TXSYNC	GPIO_26	37	38	GPIO_20	SAI3.RXDATA0
	GND	39	40	GPIO_21	SAI3.TXDATA0

Note: Please refer to i.MX 91 Applications Processor Reference Manual for more function alternation.

Setting up the system

Follow these steps to run the pre-loaded Linux® image on the FRDM i.MX 91 development board:

1 Confirm boot switches

Boot switches should be set to boot from "eMMC" (SW1[4-1] are used for boot, see figure 3). See the table below:

BOOT Device	SW1 [4-1]
eMMC/uSDHC1	0010

Note: 1=ON 0=OFF

2 Connect USB debug cable

Connect the UART cable to port P16 (see figure 3) and into the PC (as a host terminal). UART connections display on the PC. Open a terminal window, the first port is for A55 core system debugging.

In the terminal window for debugging, use the following configuration:

- Baud rate: 115200bps
- Data bits: 8
- Parity: None
- Stop bits: 1

3 Connect peripherals (optional)

Plug the parallel LCD panel (TM050RDH03-41) into P11 2x20 Pin EXPI. Switch DTB to "imx91-11x11-frdm-tianma-wvga-panel.dtb" in u-boot phase.

4 Board boot up

The serial port starts to print log information to the PC, as the board boots up, one penguin will display in the top-left corner of the display, and then you will see the Linux terminal Icon on the top left and timer on right top corner.

Congratulations, you are up and running! See complete instructions for Getting Started in nxp.com/FRDM-IMX91/start

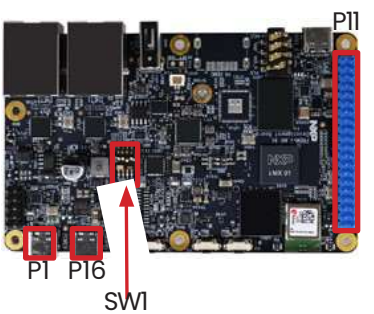


Figure 3: Available connections and switches to get started with the FRDM i.MX 91 development board

Additional information

Boot Switch Configurations

SW1 [4-1] is the boot configuration switch. By default, the boot device is eMMC/uSDHC1.

Note: 1=ON 0=OFF

BOOT MODE	SW1-4	SW1-3	SW1-2	SW1-1
From internal fuses	0	0	0	0
Serial downloader	0	0	0	1
USDHC1 8-bit eMMC 5.1	0	0	1	0
USDHC2 4-bit SD3.0	0	0	1	1
FlexSPI Serial NOR	0	1	0	0
FlexSPI Serial NAND 2K page	0	1	0	1
Reserved	0	1	1	0
Reserved	0	1	1	1

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

Attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this product does cause harmful interference to radio or television reception, which can be determined

by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This equipment should be installed and operated with a minimum distance 20cm between the radiator and your body.

Support

Visit nxp.com/support for a list of phone numbers within your region.

Warranty

Visit nxp.com/warranty for complete warranty information.

nxp.com/FRDM-IMX91

Document Number: FRDMIMX91QSG REV 0
Aras Number: 926-10056 REV A