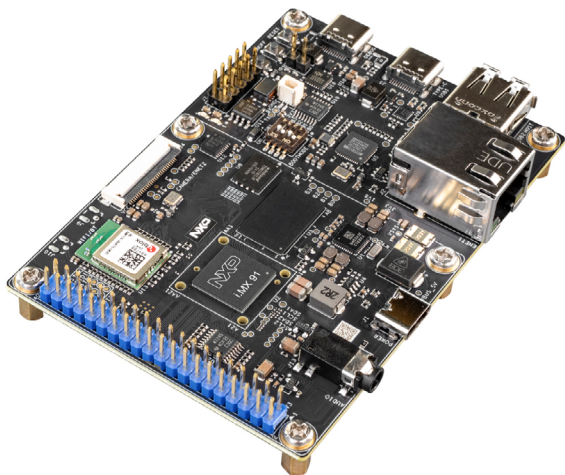




# FRDM i.MX 91S Development board



The FRDM i.MX 91S Development Board is a cost-effective, compact platform built around the i.MX 91 applications processor, optimized for embedded Linux development. It integrates the NXP IW610 wireless module, enabling robust Wi-Fi 6 + Bluetooth LE 5.4 / 802.15.4 connectivity for Industrial and IoT applications. Designed for rapid prototyping, the board supports GoPoint for i.MX Applications Processors, providing a suite of pre-integrated demos and reference implementations.

The FRDM i.MX 91S features integrated 256MB NAND flash memory supporting direct boot (NAND boot). This includes a deeply trimmed, lightweight file system optimized for reliability and minimal resource consumption. Its small footprint maximizes usable storage while ensuring efficient operation. This file system serves as an ideal starting point – its modular design is fully customizable, allowing you to tailor it further to your specific application needs and optimize performance.

## Specifications

- i.MX 91 applications processor with 1× Arm® Cortex®-A55
- LPDDR4 16-bit 512MB
- QSPI NAND Flash, 256MB
- 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 C for power supply
- Onboard IW610 module Wi-Fi® 6 + Bluetooth® LE 5.4 + 802.15.4
- One 2×5 Pin NXP custom interface with:
  - One CAN port
  - Two channels for ADC
  - I<sup>2</sup>C/I<sup>3</sup>C expansion
- One 1 Gbps Ethernet (ETER)
- External RTC with coin cell connector
- 40 pin (2 × 20) expansion I/O

## Kit contents

FRDM-IMX91S	FRDM i.MX 91S development board
USB Type-C Cable	USB 2.0 Type-C Male to USB 2.0 Type-A Male for debug and power supply *Note - wall adapter is not included
TF Card	Linux® BSP image programmed in 32G TF card
Documentation	Quick Start Guide

## Software and expansion boards

Software and documentation available at:

[nxp.com/FRDM-IMX91S](http://nxp.com/FRDM-IMX91S)

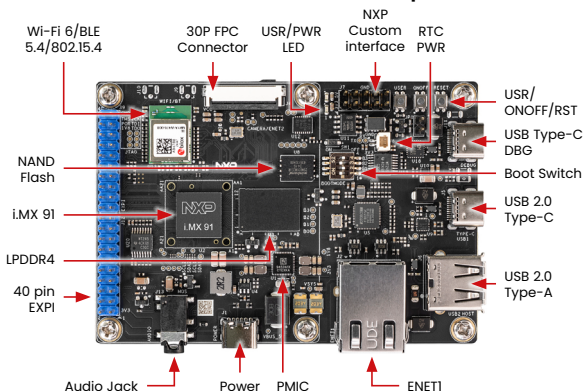
See a variety of demos and develop faster with GoPoint:

[nxp.com/GoPoint](http://nxp.com/GoPoint)

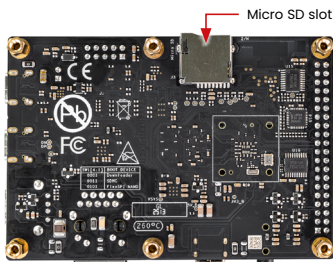
## Recommended Expansion Boards

TM050RDH03-4I	Parallel LCD display module 5" TFT 800×480 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 91S development board



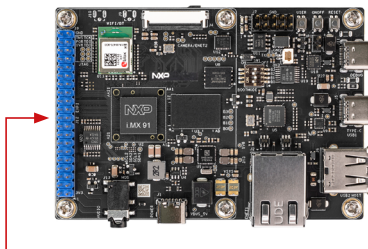
**Figure 1:** Top view of the FRDM i.MX 91S development board



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

## Get to know the FRDM i.MX 91S 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 91S development board:

### 1 Confirm boot switches

Boot switches should be set to boot from “USDHC2 4-bit SD3.0” (SW1[4-1] are used for boot, see figure 3). See the table below:

BOOT Device	SW1 [4-1]
USDHC2 4-bit SD3.0	0011

Note: 1=ON 0=OFF

### 2 Connect USB debug cable

Connect the UART cable to port J11 (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

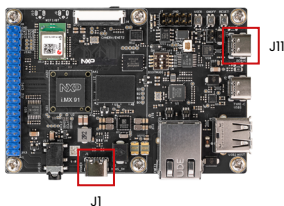
### 3 Connect Power Supply

Connect the USB C power supply to J1, the board will power on automatically.

### 4 Board boot up

The serial port starts to print log information to the PC, as the board boots up.

Congratulations, you are up and running! See complete instructions for Getting Started in [nxp.com/FRDM-IMX91S/start](https://nxp.com/FRDM-IMX91S/start)



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

## Additional information

### Boot Switch Configurations

SW1 [4-1] is the boot configuration switch. By default, the boot device is USDHC2 4-bit SD3.0.

Note: 1=ON 0=OFF

BOOT MODE	SW1-4	SW1-3	SW1-2	SW1-1
Serial downloader	0	0	0	1
USDHC2 4-bit SD3.0	0	0	1	1
FlexSPI Serial NAND	0	1	0	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 20 cm between the radiator and your body.

## Support

Visit [www.nxp.com/support](http://www.nxp.com/support) for a list of phone numbers within your region.

## Warranty

Visit [www.nxp.com/warranty](http://www.nxp.com/warranty) for complete warranty information.

## [nxp.com/FRDM-IMX91S](http://nxp.com/FRDM-IMX91S)

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Document Number: FRDMIMX91SQSG REV 0

Aras Number: 926- 10082 REV A