

Nitrogen8M_Mini SOM

User Manual

REVISION HISTORY

Date	Revision	Description
4/8/2019	0.1	First Draft

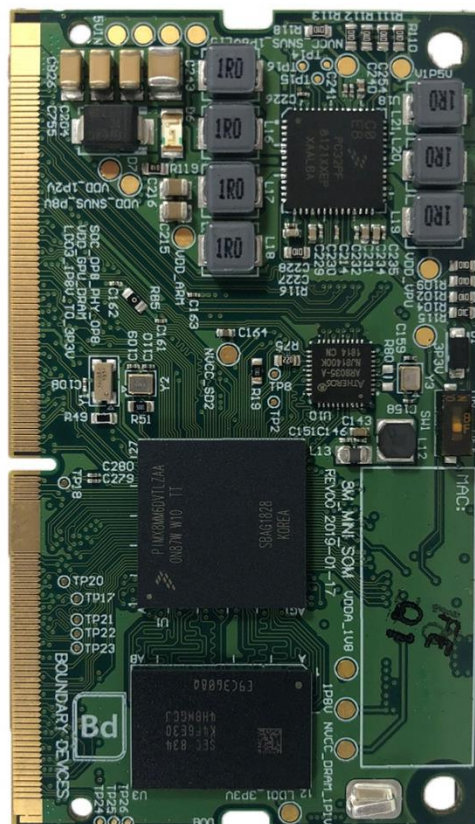




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1. NITROGEN8M_MINISOM OVERVIEW

1.1 NITROGEN PLATFORM

The first Nitrogen platform was launched in 2014 after the worldwide success of Boundary Devices' i.MX 6 SABRE Lite Reference Design (now BD-SL-i.MX6). The Nitrogen platforms consist of Single Board Computers (SBC) and System on Modules (SOM) using BD's proprietary board layout design and featuring NXP's i.MX 6, i.MX 7, and i.MX 8 applications processors.

The Nitrogen platforms come fully supported by Boundary Devices' engineering team, and includes a full Board Support Package. Nitrogen platforms are designed to serve as a development platform as well as a production-ready solution. All Nitrogen boards can be de-populated or fully customized to meet specific project and budget requirement. Contact a Boundary Devices representative at info@boundarydevices.com to learn more.

1.2 NITROGEN8 FAMILY

The Nitrogen8 family of SBCs and SOMs are the latest in Boundary Devices' i.MX based embedded computing solutions. The Nitrogen8 family includes the Nitrogen8M, Nitrogen8X and Nitrogen8MAX featuring NXP's i.MX 8 family of processors that were released in 2018.

The different Nitrogen8 series of SBCs and SOMs include offerings designed to best leverage the advantages of the i.MX 8, i.MX 8X, and i.MX 8M applications processors to fit a variety of embedded and IoT applications including: industrial automation, aviation & aerospace, HMI, industrial control, robotics, building control, digital displays, infotainment, telematics, and more.

1.3 SOFTWARE SUPPORT

Boundary Devices provides a full Board Support Package (BSP) for all Nitrogen boards.

The BSP includes bootloader, kernel and user-space components optimized for each platform.

Industry leading OS-Level support can be found on the Boundary Devices website via the Blog (<https://boundarydevices.com/blog>) and Wiki (<https://boundarydevices.com/wiki>). You can also find images for the latest versions of popular OS supported by the Nitrogen platforms including: Yocto, Buildroot, Ubuntu, Debian, Android, QNX, and FreeRTOS. Visit <https://boundarydevices.com/wiki/operating-systems/>

Boundary Devices does not provide application development or support, but does have large list of software partners who can. You can browse our partners at <https://boundarydevices.com/support>

1.4 MAIN SPECIFICATIONS

Introducing the Nitrogen8M_Mini SOM, featuring NXP's new i.MX 8M Mini applications processor. The RAM (2-4GB), and eMMC (8-128) can be modified to fit your requirements. The Nitrogen8M_Mini SOM is designed for mass production use with a guaranteed 10 year life span, FCC Pre-scan results, and a stable supply chain. Industrial temperature and conformal coating options are available. No cost carrier board review is available with volume purchase. Contact us for more information.

1.4.1 CPU

CPU Name	NXP i.MX 8M Mini Quad
CPU Type	x4 Cortex-A53 x1 Cortex-M4F
CPU Cores	4
CPU Clock (Max)	2GHz

1.4.2 MEMORY & STORAGE

MEMORY & STORAGE	
RAM	2GB LPDDR4 (up to 4 GB)
eMMC	8GB eMMC (upto 128 GB)

1.4.3 MULTIMEDIA

MULTIMEDIA	
2D/3D Graphics Acceleration	GCNanoUltra for 3D, GC320 for 2D
Video Encode / Decode	1080p60 H.264, VP8/1080p60 H.265, H.264, VP8, VP9
Camera Interfaces	x1 4-Lane MIPI CSI

1.4.4 DISPLAY & AUDIO CONNECTIONS

DISPLAY CONNECTIONS	
MIPI DSI	x1 4-lane (up to 1080p60)
AUDIO INTERFACES	
Headphone	Via Carrier



1.4.5 NETWORKING CONNECTIONS

NETWORKING CONNECTIONS	
Ethernet	10/100/1GB (PHY ONLY)
WiFi	802.11ac (BD-SMAC / QCA9377)(via Carrier)
Bluetooth	BT4.1 (BD-SMAC / QCA9377)(via Carrier)

1.4.6 CONNECTIVITY PORTS

CONNECTIVITY PORTS	
I2C	x3 (via Carrier)
SPI	x2(via Carrier)
UART	Up to x4 RS-232(via Carrier)
SD / MMC	x2(via Carrier)
USB	X1 USB 2.0 Host + x1 USB 2.0 OTG (via Carrier)
RTC	x1 + battery (via Carrier)
PCIe	x1(via Carrier)

1.4.7 MISCELLANEOUS SPECIFICATIONS

PCB SPECIFICATIONS	
Dimensions (L x W)	69.60 mm x 40mm
MISCELLANEOUS SPECIFICATIONS	
Temperature Rating	0°- +70°C (-40°- +85°C optional)
Power Supply	5V

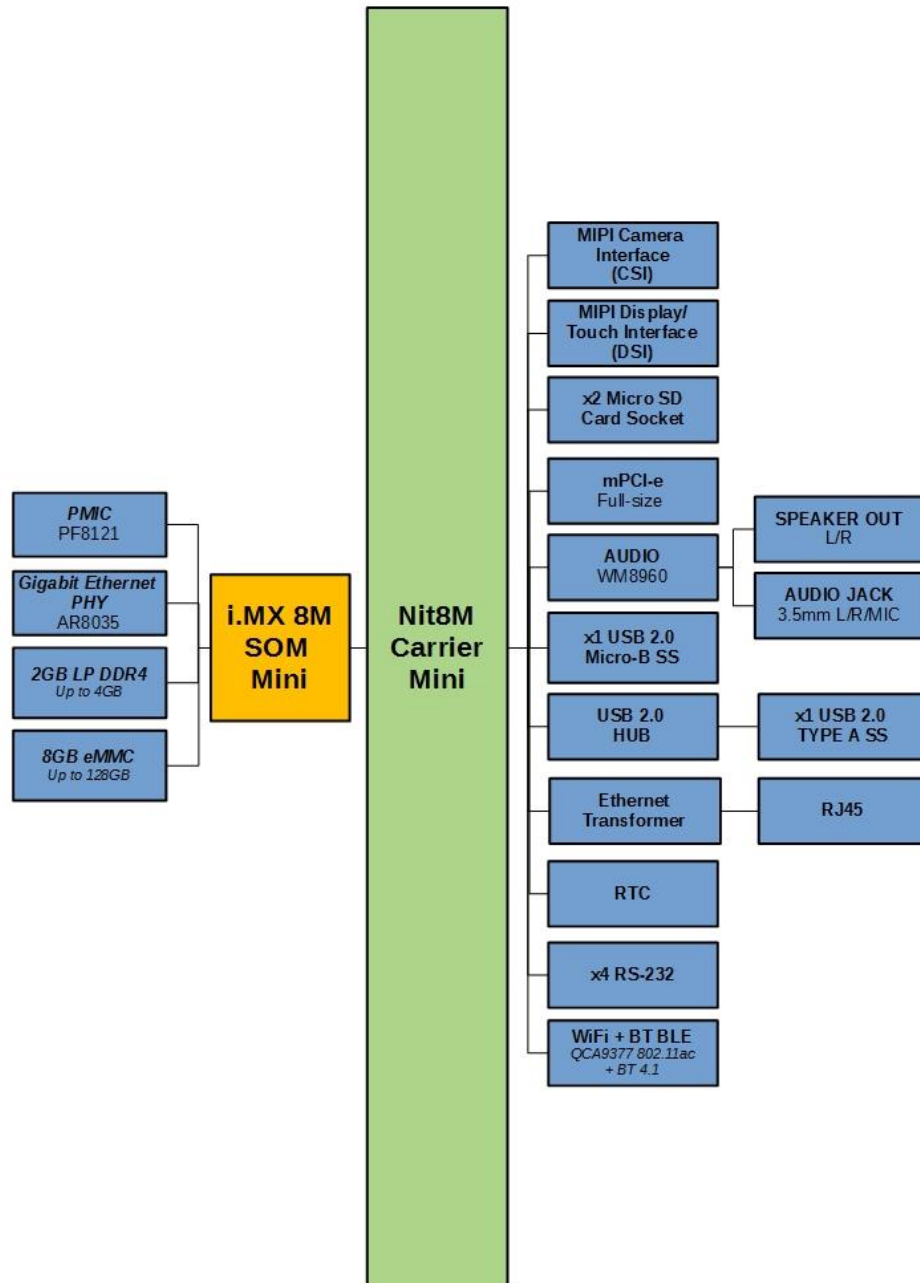


1.5 SUPPORTED OPERATING SYSTEMS

OS SUPPORTED	
Yocto	Yes
Debian	Yes
Ubuntu	Yes
Android	Yes

2.ARCHITECTURE OVERVIEW

2.1 BLOCK DIAGRAM





3.ELECTRICAL CHARACTERISTICS

3.1 ELECTRICAL CHARACTERISTICS OF NITROGEN8M_MINI SOM

PARAMETER	MIN	TYP	MAX	UNIT
Main Input Voltage		5		V
Power Consumption*		600mW	2400	mW
CPU Clock		1.6GHz	2	GHz

*The Power Consumption refers to a single board with no other peripherals plugged in



4.CONNECTOR DETAILS

4.1 CONNECTOR LAYOUT

**260 Pin SODIMM Edge Connector to Carrier Board Interface
(TE 2309414-1)**

PIN#	Function	PIN#	Function
1	+5V	2	+5V
3	+5V	4	+5V
5	+5V	6	+5V
7	+5V	8	+5V
9	GND	10	GND
11	GND	12	GND
13	GND	14	GND
15	GND	16	GND
17	GND	18	GND
19	LDO3_1P8V_TO_3P3V	20	GND
21	LDO3_1P8V_TO_3P3V	22	LICELL
23	RGMII_ACT	24	SAI1_RXFS
25	RGMII_LINK	26	SAI1_RXC
27	GND	28	SAI1_RXD0
29	TRX3_N	30	SAI1_RXD1
31	TRX3_P	32	SAI1_RXD2
33	GND	34	SAI1_RXD3
35	TRX2_N	36	SAI1_RXD4
37	TRX2_P	38	SAI1_RXD5
39	GND	40	SAI1_RXD6
41	TRX1_N	42	SAI1_RXD7
43	TRX1_P	44	GND
45	GND	46	SAI1_MCLK
47	TRX0_N	48	GND
49	TRX0_P	50	SAI1_TXFS
51	GND	52	SAI1_TXC
53	CLKOUT2	54	SAI1_TXD0
55	CLKIN2	56	SAI1_TXD1
57	GND	58	SAI1_TXD2
59	CLKOUT1	60	SAI1_TXD3
61	CLKIN1	62	SAI1_TXD4
63	GND	64	SAI1_TXD5
65	JTAG_TMS	66	SAI1_TXD6
67	JTAG_TCK	68	SAI1_TXD7
69	JTAG_TDI	70	GND
71	JTAG_TDO	72	WIFI_RESET
73	JTAG_MOD	74	WL_WAKE_HOST
75	JTAG_NTRST	76	SAI5_RXC
77	GND	78	SD3_DATA3
79	SD2_RESET_B	80	SD3_DATA2
81	SD2_CD	82	SD3_DATA1
83	SD2_DATA0	84	SD3_DATA0

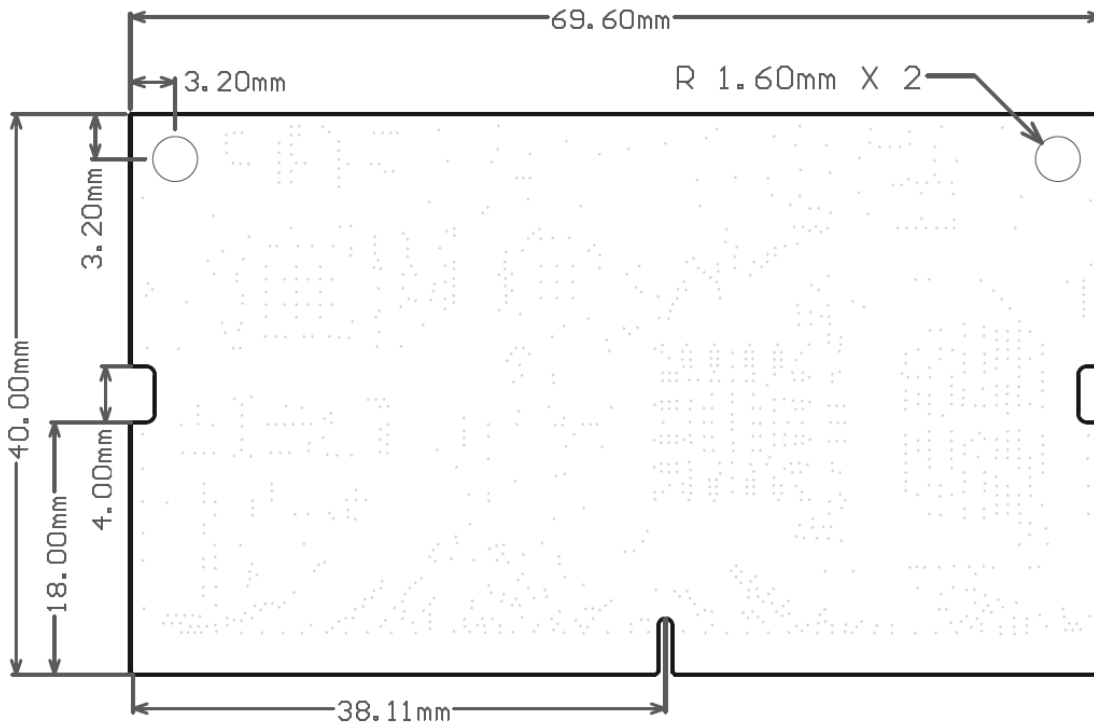
85	SD2_DATA1	86	SD3_CMD
87	SD2_DATA2	88	GND
89	SD2_DATA3	90	SD3_CLK
91	SD2_CMD	92	GND
93	GND	94	SAI2_TXFS
95	SD2_CLK	96	UART1_TXD
97	GND	98	UART1_RTS
99	USB_OTG2_PWR	100	UART1_RXD
101	USB_OTG2_OC	102	SAI2_TXC
103	USB_OTG2_VBUS	104	SAI2_RXD0
105	GND	106	UART1_CTS
107	USB_OTG2_D_P	108	SAI2_TXD
109	USB_OTG2_D_N	110	CLK_REQ_O
111	GND	112	BT_WAKE_DEV
113	USB_OTG1_PWR	114	SLOW_CLK
115	USB_OTG1_OC	116	BT_REG_ON
117	USB_OTG1_ID	118	SAI2_RXC
119	GND	120	GND
121	USB_OTG1_D_P	122	PCIE_RST_B
123	USB_OTG1_D_N	124	PCIE_DIS_B
125	GND	126	GND
127	USB_OTG1_VBUS	128	PCIE_TX_P
129	QSPIA_NSS0	130	PCIE_TX_N
131	QSPIA_DATA0	132	GND
133	QSPIA_DATA1	134	PCIE_RX_P
135	QSPIA_DATA2	136	PCIE_RX_N
137	QSPIA_DATA3	138	GND
139	GND	140	PCIE_REFCLK_P
141	QSPIA_SCLK	142	PCIE_REFCLK_N
143	GND	144	GND
145	GND	146	GND
147	TP18	148	CSI_D0_N
149	UART4_RXD	150	CSI_D0_P
151	UART4_TXD	152	GND
153	GND	154	CSI_D1_N
155	GND	156	CSI_D1_P
157	GND	158	GND
159	GND	160	CSI_D2_N
161	GND	162	CSI_D2_P
163	GND	164	GND
165	GND	166	CSI_D3_N
167	GND	168	CSI_D3_P
169	GND	170	GND
171	UART2_RXD	172	CSI_CK_N
173	UART2_TXD	174	CSI_CK_P
175	GND	176	GND
177	GND	178	I2C3_SCL
179	TP20	180	I2C3_SDA
181	GND	182	GND
183	GND	184	NAND_CLE
185	I2C4_SDA	186	SPDIF_EXT_CLK/PWM1



187	I2C4_SCL	188	GND
189	GND	190	I2C2_SDA
191	TP17	192	I2C2_SCL
193	GND	194	GND
195	TP21	196	DSI_D0_P
197	TP22	198	DSI_D0_N
199	TP23	200	GND
201	GND	202	DSI_D1_P
203	ECSPi2_SCLK	204	DSI_D1_N
205	GND	206	GND
207	ECSPi2_MOSI	208	DSI_CLK_P
209	ECSPi2_MISO	210	DSI_CLK_N
211	ECSPi2_SS0	212	GND
213	UART3_TXD	214	DSI_D2_P
215	UART3_RXD	216	DSI_D2_N
217	UART3_CTS	218	GND
219	UART3_RTS	220	DSI_D3_P
221	GPIO1_IO5/M4NMI	222	DSI_D3_N
223	GPIO1_IO08	224	GND
225	GPIO1_IO11	226	GPIO1_IO09
227	ON_OFF	228	TOUCH_RESET
229	RTC_IRQ	230	TOUCH_INT
231	EXT_RESET_N	232	GPIO1_IO01
233	HP_DET	234	SPDIF_TX/PWM3
235	MIC_DET	236	GND
237	GND	238	SPDIF_RX/PWM2
239	SAI3_MCLK/PWM4	240	GND
241	GND	242	SAI5_MCLK
243	SAI3_TXC	244	GND
245	SAI3_RXD	246	SAI5_RXFS
247	SAI3_TXD	248	SAI5_RXD0
249	TP26	250	SAI5_RXD1
251	TP25	252	SAI5_RXD2
253	TP24	254	SAI5_RXD3
255	GND	256	GND
257	GND	258	GND
259	GND	260	GND

5.MOUNTING INFORMATION

5.1 NITROGEN8M_MINI SOM MOUNTING SPECIFICATIONS



COMPANY	BOUNDARY DEVICES		
ASSY #	ASM_NIT8M_MINI_SOM	REV	REV00
DATE	2019-01-15		