Allwinner A20 SoC Compute Module

Cost efficient, high performance, reliable
+ Easy design-in at low risk
+ Cost saving by short development cycles
+ Development board and starter kit available

Your own PCB design must simply 5V-power the A20 SODIMM and can get connected by just wiring an Ethernet socket.

Features

ARM Dual Cortex-A7 processor with 1GHz:

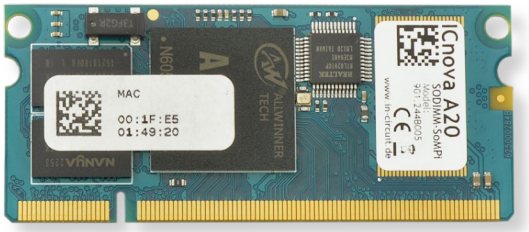
- 32kB Data Cache, 32kB Instruction Cache

On-Board memory:

- 0.5GB - 1GB DDR3 RAM

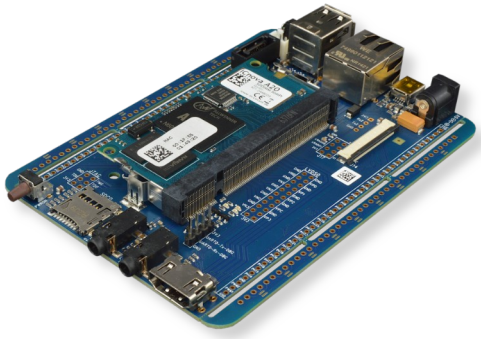
Available interfaces:

- 1x 10/100MBit Ethernet PHY (RTL8201CP)
- 2x USB 2.0 High Speed Host (480 Mbit)
- 6x UART + 1x DBG-UART
- 1x CAN Bus Controller
- 2x SPI
- 2x I²C (TWI)
- 1x Analog audio input/output and I2S compliant audio Interface
- 2x High Speed Memory Card Hosts (MCI)
- 2x PS2 compliant keyboard and mouse Interface
- 1x SATA Host Controller with eSATA support
- 1x JTAG
- LVDS up to 1920x1080@60fps, HDMI output
- CMOS Sensor Interface (CSI)



Access to all available GPIOs!

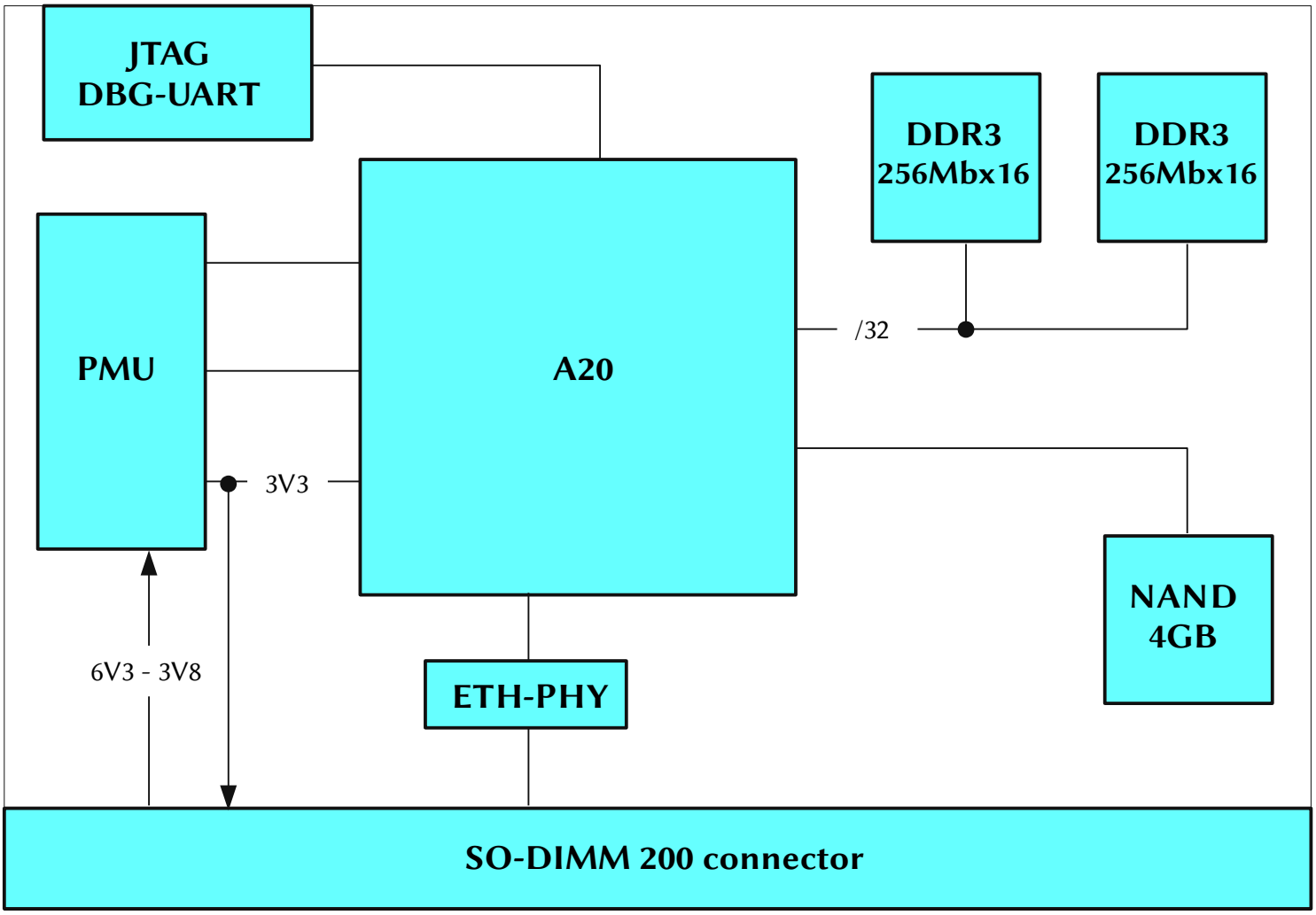
Only one 3.8V to 6.3V power supply required (USB power for instance)
All Voltages Generated On-Board with Power Management Unit
Power consumption max. 2W



Dimensions:

- 67.6 x 29 x 5mm
- Operating Temperature: 0℃ to +70℃
- Storage Temperature: –20℃ to +70℃

Block diagramm



The ICnova A20 SODIMM Module incorporates the following features:

- High processor speed at low power consumption
- High bandwidth 1GByte DDR3 RAM on a dedicated memory bus
- one ethernet PHY by REALTEK (RTL8201CP)

Achieving high data rate communication using 100Mbit Ethernet or 480Mbit USB2.0 is easily possible as well as controlling TFT or LCD displays or accessing periphery via SPI, I2C, UART, and many others.

Nearly all signals of the A20 are available at the pins on the SODIMM module.
The memory interface is not provided in order to assure signal integrity.

A detailed description of the pins can be found on the following pages.

Pinout

ICnova A20 SODIMM200									
Pin	**Name**	**V-Level**	**I/O Line**	**MUX2**	**MUX3**	**MUX4**	**MUX5**	**MUX6**	**MUX7**
1	PWM0	3.3V	PB2	PWM0					
2	JTAG_TDO	3.3V	PB16	SPI2_MOSI	JTAG_DO0				
3	PWM1	3.3V	PI3	PWM1	TWI4_SDA				
4	JTAG_TDI	3.3V	PB17	SPI2_MISO	JTAG_DI0				
5	GND	0V	ground						
6	JTAG_TMS	3.3V	PB14	SPI2_CS0	JTAG_MS0				
7	PH14	3.3V	PH14	LCD1_D14	ETXD3	KP_IN4	SMC_VPPEN	EINT14	CSI1_D14
8	JTAG_TCK	3.3V	PB15	SPI2_CLK	JTAG_CK0				
9	PH15	3.3V	PH15	LCD1_D15	ETXD2	KP_IN5	SMC_VPPPP	EINT15	CSI1_D15
10	GND	0V	ground						
11	PH16	3.3V	PH16	LCD1_D16	ETXD1	KP_IN6		EINT16	CSI1_D16
12	PH0/UART3-TX	3.3V	PH0	LCD1_D00		UART3_TX		EINT0	CSI1_D0
13	PH17	3.3V	PH17	LCD1_D17	ETXD0	KP_IN7	SMC_VCCEN	EINT17	CSI1_D17
14	PH1/UART3-RX	3.3V	PH1	LCD1_D01		UART3_RX		EINT1	CSI1_D1
15	PH18	3.3V	PH18	LCD1_D18	ERXCK	KP_OUT0	SMC_SCK	EINT18	CSI1_D18
16	PH2/UART3-RTS	3.3V	PH2	LCD1_D02		UART3_RTS		EINT2	CSI1_D2
17	PH19	3.3V	PH19	LCD1_D19	ERXERR	KP_OUT1	SMC_SDA	EINT19	CSI1_D19
18	PH3/UART3-CTS	3.3V	PH3	LCD1_D03		UART3_CTS		EINT3	CSI1_D3
19	PH20	3.3V	PH20	LCD1_D20	ERXDV	CAN_TX		EINT20	CSI1_D20
20	PH4/UART4-TX	3.3V	PH4	LCD1_D04		UART4_TX		EINT4	CSI1_D4
21	PH21	3.3V	PH21	LCD1_D21	EMDC	CAN_RX		EINT21	CSI1_D21
22	PH5/UART4-RX	3.3V	PH5	LCD1_D05		UART4_RX		EINT5	CSI1_D5
23	GND	0V	ground						
24	PH6/UART5-TX	3.3V	PH6	LCD1_D06		UART5_TX	MS_BS	EINT6	CSI1_D6
25	PH22	3.3V	PH22	LCD1_D22	EMDIO	KP_OUT2	SDC1_CMD		CSI1_D22
26	PH7/UART5-RX	3.3V	PH7	LCD1_D07		UART5_RX	MS_CLK	EINT7	CSI1_D7
27	PH23	3.3V	PH23	LCD1_D23	ETEN	KP_OUT3	SDC1_CLK		CSI1_D23
28	PH8	3.3V	PH8	LCD1_D08	ERXD3	KP_IN0	MS_D0	EINT8	CSI1_D8
29	PH24	3.3V	PH24	LCD1_CLK	ETXCK	KP_OUT4	SDC1_D0		CSI1_PCLK
30	PH9	3.3V	PH9	LCD1_D09	ERXD2	KP_IN1	MS_D1	EINT9	CSI1_D9
31	PH25	3.3V	PH25	LCD1_DE	ECRS	KP_OUT5	SDC1_D1		CSI1_FIELD
32	PH10	3.3V	PH10	LCD1_D10	ERXD1	KP_IN2	MS_D2	EINT10	CSI1_D10
33	PH26	3.3V	PH26	LCD1_HSYNC	ECOL	KP_OUT6	SDC1_D2		CSI1_HSYNC
34	PH11	3.3V	PH11	LCD1_D11	ERXD0	KP_IN3	MS_D3	EINT11	CSI1_D11
35	PH27	3.3V	PH27	LCD1_VSYNC	ETXERR	KP_OUT7	SDC1_D3		CSI1_VSYNC
36	PH12	3.3V	PH12	LCD1_D12		PS2_SCK1		EINT12	CSI1_D12
37	GND	0V	ground						
38	PH13	3.3V	PH13	LCD1_D13		PS2_SDA1	SMC_RST	EINT13	CSI1_D13
39	VBUSEN#	3.3V	vbus enable input						
40	GND	0V	ground						
41	GND	0V	ground						
42	GND	0V	ground						
43	I2S-MCLK	3.3V	PB5	I2S_MCLK	AC97_MCLK				
44	UART0-TX-DBG	3.3V	PB22	UART0_TX	IR1_TX				
45	I2S-BCLK	3.3V	PB6	I2S_BCLK	AC97_BCLK				
46	UART0-RX-DBG	3.3V	PB23	UART0_RX	IR1_RX				
47	I2S-LRCK	3.3V	PB7	I2S_LRCK	AC97_SYNC				
48	TWI1-SCK	3.3V	PB18	TWI1_SCK					
49	I2S-DO0	3.3V	PB8	I2S_DO0	AC97_DO				

Pinout

ICnova A20 SODIMM200									
Pin	**Name**	**V-Level**	**I/O Line**	**MUX2**	**MUX3**	**MUX4**	**MUX5**	**MUX6**	**MUX7**
50	TWI1-SDA	3.3V	PB19	TWI1_SDA					
51	I2S-DO1	3.3V	PB9	I2S_DO1					
52	TWI2-SCK	3.3V	PB20	TWI2_SCK					
53	I2S-DO2	3.3V	PB10	I2S_DO2					
54	TWI2-SDA	3.3V	PB21	TWI2_SDA					
55	I2S-DO3	3.3V	PB11	I2S_DO3					
56	GND	0V	ground						
57	I2S-DI	3.3V	PB12	I2S_DI	AC97_DI	SPDIF_DI			
58	LVDS1-VN3	3.3V	PD19	LCD0_D19	LVDS1_VN3				
59	SPI2-CS1	3.3V	PB13	SPI2_CS1		SPDIF_DO			
60	LVDS1-VP3	3.3V	PD18	LCD0_D18	LVDS1_VP3				
61	GND	0V	ground						
62	GND	0V	ground						
63	LVDS0-VP3	3.3V	PD8	LCD0_D8	LVDS0_VP3				
64	LVDS1-VNC	3.3V	PD17	LCD0_D17	LVDS1_VNC				
65	LVDS0-VN3	3.3V	PD9	LCD0_D9	LVDS0_VN3				
66	LVDS1-VPC	3.3V	PD16	LCD0_D16	LVDS1_VPC				
67	GND	0V	ground						
68	GND	0V	ground						
69	LVDS0-VPC	3.3V	PD6	LCD0_D6	LVDS0_VPC				
70	LVDS1-VN2	3.3V	PD15	LCD0_D15	LVDS1_VN2				
71	LVDS0-VNC	3.3V	PD7	LCD0_D7	LVDS0_VNC				
72	LVDS1-VP2	3.3V	PD14	LCD0_D14	LVDS1_VP2				
73	GND	0V	ground						
74	GND	0V	ground						
75	LVDS0-VP2	3.3V	PD4	LCD0_D4	LVDS0_VP2				
76	LVDS1-VN1	3.3V	PD13	LCD0_D13	LVDS1_VN1				
77	LVDS0-VN2	3.3V	PD5	LCD0_D5	LVDS0_VN2				
78	LVDS1-VP1	3.3V	PD12	LCD0_D12	LVDS1_VP1				
79	GND	0V	ground						
80	GND	0V	ground						
81	LVDS0-VP1	3.3V	PD2	LCD0_D2	LVDS0_VP1				
82	LVDS1-VN0	3.3V	PD11	LCD0_D11	LVDS1_VN0				
83	LVDS0-VN1	3.3V	PD3	LCD0_D3	LVDS0_VN1				
84	LVDS1-VP0	3.3V	PD10	LCD0_D10	LVDS1_VP0				
85	GND	0V	ground						
86	GND	0V	ground						
87	LVDS0-VP0	3.3V	PD0	LCD0_D0	LVDS0_VP0				
88	HPL	3.3V	HPL						
89	LVDS0-VN0	3.3V	PD1	LCD0_D1	LVDS0_VN0				
90	HPR	3.3V	HPR						
91	GND	0V	ground						
92	HPCOM	3.3V	HPCOM						
93	IR-TX	3.3V	PB3	IR0_TX		SPDIF_MCLK		STANDBYWFI	
94	HPCOMFB	3.3V	HPCOMFB						
95	IR-RX	3.3V	PB4	IR0_RX					
96	FMINL	3.3V	FMINL						
97	LRADC1	3.3V	LRADC1						
98	FMINR	3.3V	FMINR						
99	LRADC0	3.3V	LRADC0						

Pinout

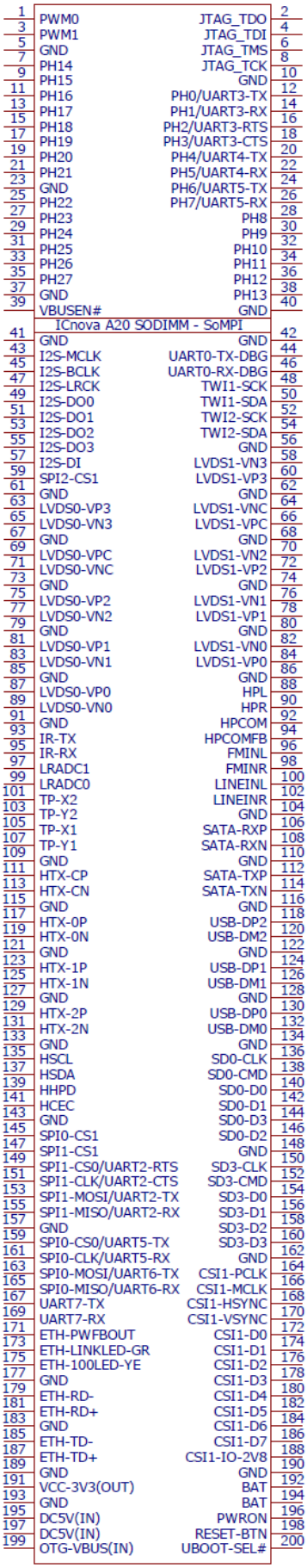
ICnova A20 SODIMM200									
Pin	**Name**	**V-Level**	**I/O Line**	**MUX2**	**MUX3**	**MUX4**	**MUX5**	**MUX6**	**MUX7**
100	LINEINL	3.3V	LINEINL	line left channel input					
101	TP-X2	3.3V	TPX2	adc input					
102	LINEINR	3.3V	LINEINR	line right channel input					
103	TP-Y2	3.3V	TPY2	adc input					
104	GND	0V	ground						
105	TP-X1	3.3V	TPX1	adc input					
106	SATA-RXP	3.3V	SATA-RXP	sata positive receive					
107	TP-Y1	3.3V	TPY1	adc input					
108	SATA-RXN	3.3V	SATA-RXM	sata negative receive					
109	GND	0V	ground						
110	GND	0V	ground						
111	HTX-CP	3.3V	HTXCP	hdmi clock positive					
112	SATA-TXP	3.3V	SATA-TXP	sata positive transmit					
113	HTX-CN	3.3V	HTXCN	hdmi clock negative					
114	SATA-TXN	3.3V	SATA-TXM	sata negative transmit					
115	GND	0V	ground						
116	GND	0V	ground						
117	HTX-0P	3.3V	HTX0P	hdmi data0 positive					
118	USB-DP2	3.3V	DP2	usb dp signal					
119	HTX-0N	3.3V	HTX0N	hdmi data0 negative					
120	USB-DM2	3.3V	DM2	usb dm signal					
121	GND	0V	ground						
122	GND	0V	ground						
123	HTX-1P	3.3V	HTX1P	hdmi data1 positive					
124	USB-DP1	3.3V	DP1	usb dp signal					
125	HTX-1N	3.3V	HTX1N	hdmi data1 negative					
126	USB-DM1	3.3V	DM1	usb dm signal					
127	GND	0V	ground						
128	GND	0V	ground						
129	HTX-2P	3.3V	HTX2P	hdmi data2 positive					
130	USB-DP0	3.3V	DP0	usb dp signal					
131	HTX-2N	3.3V	HTX2N	hdmi data2 negative					
132	USB-DM0	3.3V	DM0	usb dm signal					
133	GND	0V	ground						
134	GND	0V	ground						
135	HSCL	3.3V	HSCL	hdmi ddc clock					
136	SD0-CLK	3.3V	PF2	SDC0_CLK		UART0_TX			
137	HSDA	3.3V	HSDA	hdmi ddc data					
138	SD0-CMD	3.3V	PF3	SDC0_CMD		JTAG_DO1			
139	HHPD	3.3V	HHPD	hdmi hot plug detection					
140	SD0-D0	3.3V	PF1	SDC0_D0		JTAG_DI1			
141	HCEC	3.3V	HCEC	hdmi cec					
142	SD0-D1	3.3V	PF0	SDC0_D1		JTAG_MS1			
143	GND	0V	ground						
144	SD0-D3	3.3V	PF4	SDC0_D3		UART0_RX			
145	SPI0-CS1	3.3V	PI14	SPI0_CS1	PS2_SCK1	TCLKIN0	EINT26		
146	SD0-D2	3.3V	PF5	SDC0_D2		JTAG_CK1			
147	SPI1-CS1	3.3V	PI15	SPI1_CS1	PS2_SDA1	TCLKIN1	EINT27		
148	GND	0V	ground						
149	SPI1-CS0/UART2-RTS	3.3V	PI16	SPI1_CS0	UART2_RTS		EINT28		

Pinout

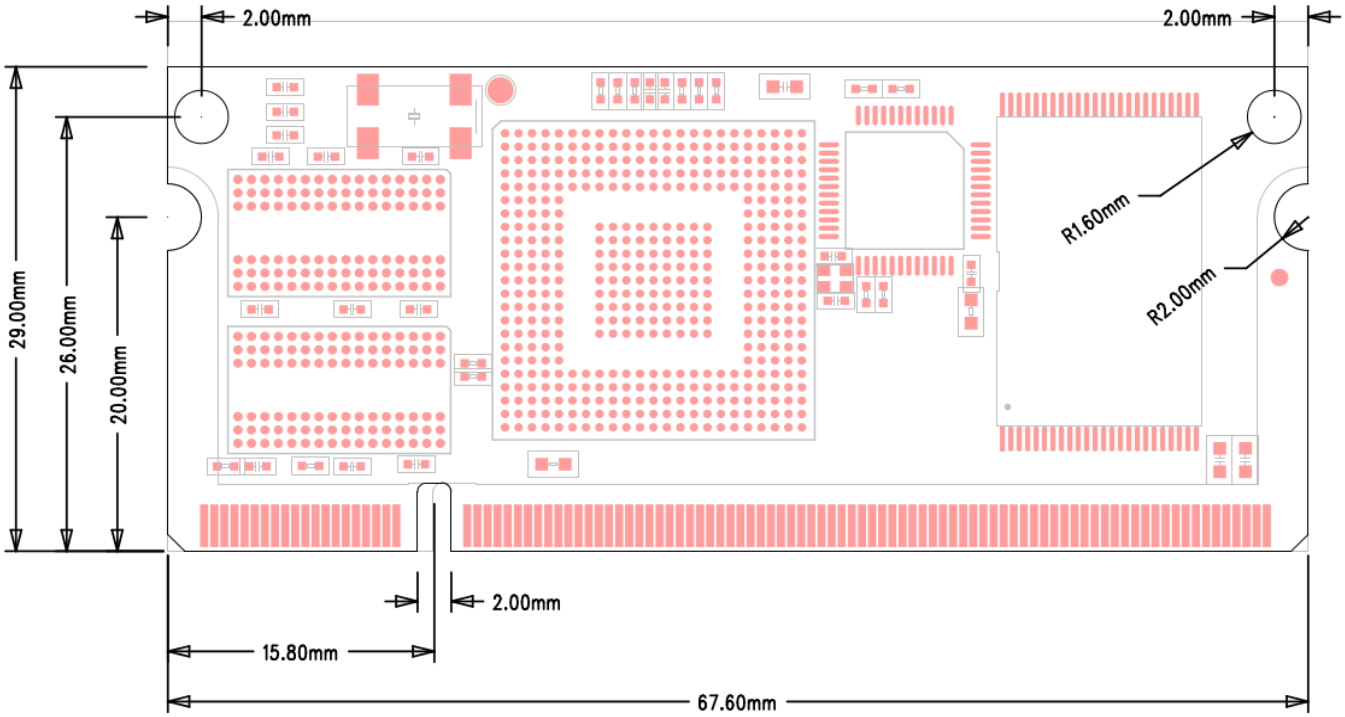
ICnova A20 SODIMM200									
Pin	**Name**	**V-Level**	**I/O Line**	**MUX2**	**MUX3**	**MUX4**	**MUX5**	**MUX6**	**MUX7**
150	SD3-CLK	3.3V	PI5	SDC3_CLK					
151	SPI1-CLK/UART2-CTS	3.3V	PI17	SPI1_CLK	UART2_CTS		EINT29		
152	SD3-CMD	3.3V	PI4	SDC3_CMD					
153	SPI1-MOSI/UART2-TX	3.3V	PI18	SPI1_MOSI	UART2_TX				
154	SD3-D0	3.3V	PI6	SDC3_D0					
155	SPI1-MISO/UART2-RX	3.3V	PI19	SPI1_MISO	UART2_RX				
156	SD3-D1	3.3V	PI7	SDC3_D1					
157	GND	0V	ground						
158	SD3-D2	3.3V	PI8	SDC3_D2					
159	SPI0-CS0/UART5-TX	3.3V	PI10	SPI0_CS0	UART5_TX		EINT22		
160	SD3-D3	3.3V	PI9	SDC3_D3					
161	SPI0-CLK/UART5-RX	3.3V	PI11	SPI0_CLK	UART5_RX		EINT23		
162	GND	0V	ground						
163	SPI0-MOSI/UART6-TX	3.3V	PI12	SPI0_MOSI	UART6_TX	CLK_OUT_A	EINT24		
164	CSI1-PCLK	3.3V	PG0	TS1_CLK	CSI1_PCLK	SDC1_CMD			
165	SPI0-MISO/UART6-RX	3.3V	PI13	SPI0_MISO	UART6_RX	CLK_OUT_B	EINT25		
166	CSI1-MCLK	3.3V	PG1	TS1_ERR	CSI1_MLCK	SDC1_CLK			
167	UART7-TX	3.3V	PI20	PS2_SCK0	UART7_TX	HSCL			
168	CSI1-HSYNC	3.3V	PG2	TS1_SYNC	CSI1_HSYNC	SDC1_D0			
169	UART7-RX	3.3V	PI21	PS2_SDA0	UART7_RX	HSDA			
170	CSI1-VSYNC	3.3V	PG3	TS1_DVLD	CSI1_VSYNC	SDC1_D1			
171	ETH-PWFBOUT	3.3V	ethernet PWFBOUT						
172	CSI1-D0	3.3V	PG4	TS1_D0	CSI1_D0	SDC1_D2	CSI0_D8		
173	ETH-LINKLED-GR	3.3V	ethernet LED0 (link)						
174	CSI1-D1	3.3V	PG5	TS1_D1	CSI1_D1	SDC1_D3	CSI0_D9		
175	ETH-100LED-YE	3.3V	ethernet LED3 (speed)						
176	CSI1-D2	3.3V	PG6	TS1_D2	CSI1_D2	UART3_TX	CSI0_D10		
177	GND	0V	ground						
178	CSI1-D3	3.3V	PG7	TS1_D3	CSI1_D3	UART3_RX	CSI0_D11		
179	ETH-RD-	3.3V	ethernet TPRX-						
180	CSI1-D4	3.3V	PG8	TS1_D4	CSI1_D4	UART3_RTS	CSI0_D12		
181	ETH-RD+	3.3V	ethernet TPRX+						
182	CSI1-D5	3.3V	PG9	TS1_D5	CSI1_D5	UART3_CTS	CSI0_D13		
183	GND	0V	ground						
184	CSI1-D6	3.3V	PG10	TS1_D6	CSI1_D6	UART4_TX	CSI0_D14		
185	ETH-TD-	3.3V	ethernet TPTX-						
186	CSI1-D7	3.3V	PG11	TS1_D7	CSI1_D7	UART4_RX	CSI0_D15		
187	ETH-TD+	3.3V	ethernet TPTX+						
188	CSI1-IO-2V8	2.8V	power output						
189	GND	0V	ground						
190	GND	0V	ground						
191	VCC-3V3(OUT)	3.3V	power output						
192	BAT	3V	backup battery*						
193	GND	0V	ground						
194	BAT	3V	backup battery*						
195	DC5V(IN)	5V	power supply input						
196	PWRON	3.3V	power on/off key input						
197	DC5V(IN)	5V	power supply input						
198	RESET-BTN	3.3V	power output on/off switch						
199	OTG-VBUS(IN)	3.3V	usb VBUS input						
200	UBOOT-SEL#	0V	BOOTSEL	boot mode select					

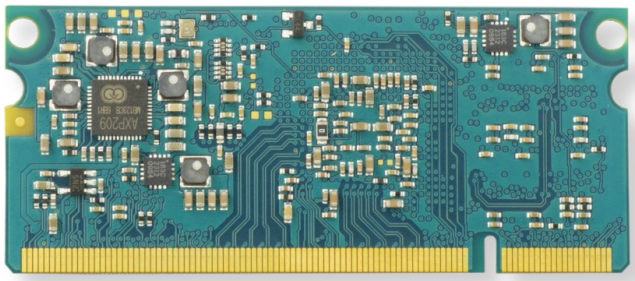
* Recommended backup battery: Rechargeable Li-Ion-Battery (nominal voltage 3.7V)
An integrated Li-Ion-Charging-Circuitry will charge this battery from power input (Pin 195/197).
Max. charging voltage: 4.2V

Schematic symbol for A20



Mechanical dimension





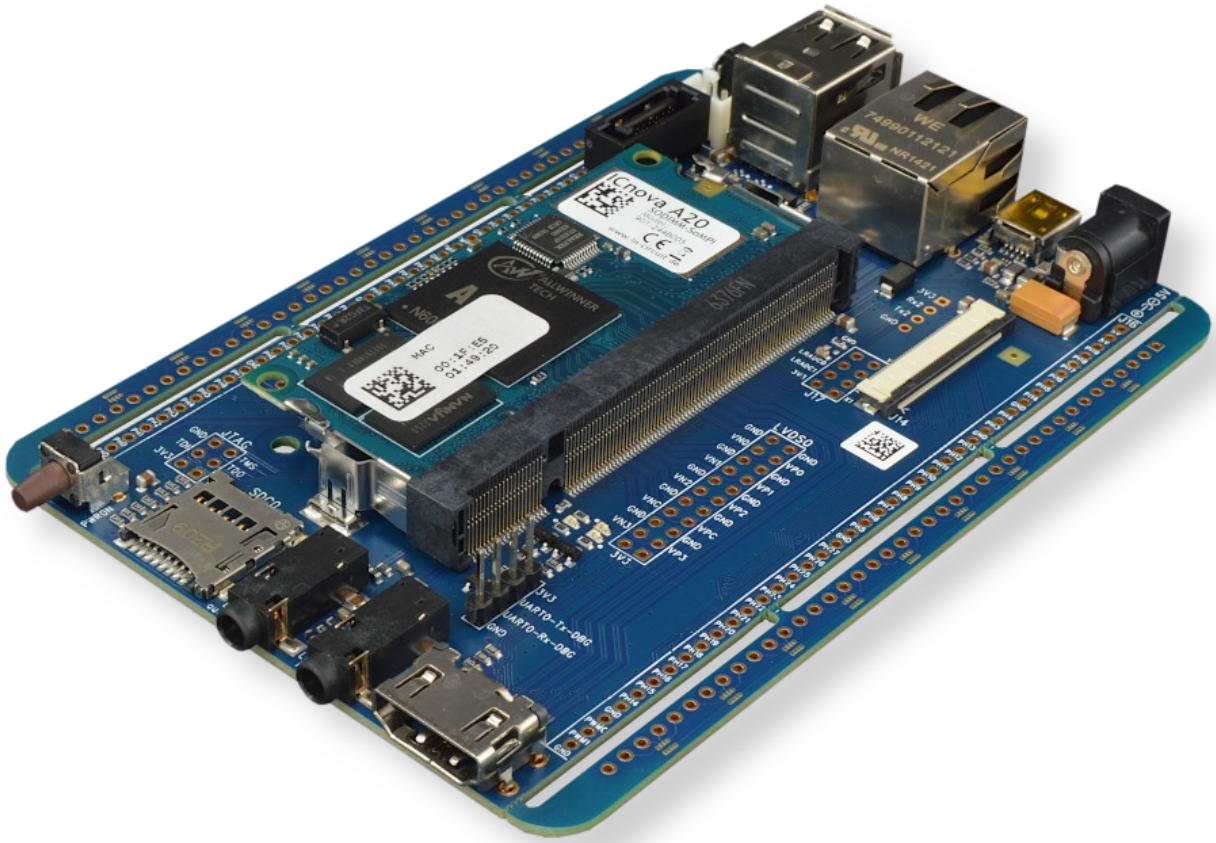
Pin1 Pin199 Pin200 Pin2

The ICnova A20 SODIMM module fits in a regular SO-DIMM 200 2.5V socket.
We recommend the following part:

Manufacturer	Part number	Height	Total height	Board to board space
TE Connectivity	1612618-1	9.2 mm	10.5 mm	7 mm

Application

The ADB4006 is designed as evaluation board for the A20 module.
Also a starter kit consisting of the ADB4006 and a A20 module is available.



We also offer:

- Hardware design of base boards optimized for your application
- Prototype and mass production using our in-house production lines
- Assembly options, adapted to your requirements, of our standard products
- Linux driver development and adaption

Contact
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Change history:

Version	Date	Changes	Editor
A	26.11.2014	First Version	Schmidt
A01	25.02.2015	Minor changes, pictures	J.Träger
A02	26.02.2018	Update temperature range	L.Kormann
A03	14.03.2018	Update SODIMM socket recommendation	L.Kormann
A04	22.03.2018	Update backup battery information	L.Kormann
A05	29.01.2024	Remove NAND option, update images, minor text edits	L.Kormann
A06	17.10.2024	update images	L.Kormann