

**3.5" SBC supports AMD® 28nm on-board SoC with VGA/LVDS,
Dual GbE, PCIe Mini, USB 3.2 Gen 1, SATA 6GB/s, iRIS-1010,
HD Audio and RoHS**

WAFER-KBN-i1

Quick Installation Guide

Version 1.1

January 25, 2021

Package List

WAFER-KBN-i1 package includes the following items:

- 1 x WAFER-KBN-i1 single board computer with enclosure heatsink
- 1 x Audio cable
- 2 x SATA with 5V output cable kit
- 1 x RS-232 cable
- 1 x Power cable



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Specifications

- SoC:
 - AMD® G-Series 28nm low-power on-board SoC
GX-415GA on-board SoC (1.5GHz, quad-core, 2MB cache, TDP=15W)
 - GX-210HA on-board SoC (1.0GHz, dual-core, 1MB cache, TDP=9W)
 - GX-420CA on-board SoC (2.0GHz, quad-core, 2MB cache, TDP=25W) (by request)
 - GX-217GA on-board SoC (1.65GHz, dual-core, 1MB cache, TDP=15W) (by request)
- Memory:
 - One 204-pin 1600/1333 MHz single-channel DDR3/DDR3L SO-DIMM supported (system max. 8GB)
- BIOS: UEFI BIOS
- Ethernet:
 - One PCIe GbE by Intel® I210 (LAN1) for IPMI
 - One PCIe GbE by Intel® I211 (LAN2)
- Graphics:
 - GPU frequency 500MHz(Radeon™ HD 8330E) for GX-415GA
 - GPU frequency 450MHz(Radeon™ HD 8310E) for GX-210HA
 - GPU frequency 600MHz(Radeon™ HD 8400E) for GX-420CA
 - GPU frequency 300MHz(Radeon™ HD 8280E) for GX-217GA
 - Support DX11.1, OpenGL 4.1 and OpenCL1.2
 - UVD4.2 decode for H.264, MPEG2/4, VC1 and MVC
 - VCE 2.0 encode for H.264 and VCE
- Display Output:
 - 1 x VGA (2048x1536@60Hz)
 - 1 x 24-bit dual channel LVDS by CH7511B DP to LVDS converter (1920x1200@60Hz)
 - 1 x 20-pin (2x10) DisplayPort box header for display converter board (2500x1600@60Hz)

- Super IO: Fintek F81866
- EC: iWDD
- Digital I/O: 8-bit digital I/O (4-bit input / 4-bit output)
- Audio:
 - Realtek ALC888S audio codec
 - 1 x SPDIF by 4-pin (1x4) header for digital audio
 - 1 x Analog audio by 10-pin (2x5) header
- I/O Interface:
 - 1 x RS-232 on rear I/O
 - 2 x RS-232 by pin header
 - 1 x RS-422/485
 - 2 x USB 3.2 Gen 1 (5Gb/s) on rear I/O
 - 4 x USB 2.0 by pin header
 - 1 x 6-pin wafer for PS/2 KB/MS
 - 2 x SATA 6Gb/s with 5V SATA power connector (No RAID)
- Watchdog Timer:
 - Software programmable, supports 1~255 sec. system reset
- Fan:
 - 1 x 4-pin CPU fan connector
- SMBus: 1 x 4-pin (1x4) wafer
- I²C: 1 x 4-pin (1x4) wafer
- LAN LED: 2 x 2-pin (1x2) header for LAN1 LED & LAN2 LED
- Front Panel:
 - 1 x 6-pin (1x6) wafer for power LED & HDD LED
 - 1 x 2-pin (1x2) wafer for power button
 - 1 x 2-pin (1x2) wafer for power reset button
- Expansion:
 - 1 x Full-size PCIe Mini card slot with mSATA support (SATA2 and mSATA shares SATA signal)
- IPMI: 1 x PCIe Mini slot supports iRIS-1010
- Power Supply:
 - 12V only, AT/ATX mode supported

1 x 4-pin (2x2) internal power jack

- Operation Temperature: -10°C ~ 60°C
- Storage Temperature: -20°C ~ 85°C
- Operation Humidity: 5% ~ 95%, non-condensing
- Dimensions: 146mm x 102mm
- Weight GW/NW: 600g / 250g

Ordering Information

- **WAFER-KBN-i1-4151-R11:**
3.5" SBC supports AMD® 28nm Quad-Core GX-415GA 1.5GHz (15W) on-board SoC with VGA/LVDS, Dual GbE, PCIe Mini, USB 3.2 Gen 1, SATA 6GB/s, iRIS-1010, HD Audio and RoHS
- **WAFER-KBN-i1-2101-R11:**
3.5" SBC supports AMD® 28nm Dual-Core GX-210HA 1.0GHz (9W) on-board SoC with VGA/LVDS, Dual GbE, PCIe Mini, USB 3.2 Gen 1, SATA 6GB/s, iRIS-1010, HD Audio and RoHS
- **WAFER-KBN-i1-4201-R11:**
3.5" SBC supports AMD® 28nm Quad-Core GX-420CA 2.0GHz (25W) on-board SoC with VGA/LVDS, Dual GbE, PCIe Mini, USB 3.2 Gen 1, SATA 6GB/s, iRIS-1010, HD Audio and RoHS
- **WAFER-KBN-i1-2171-R11:**
3.5" SBC supports AMD® 28nm Dual-Core GX-217GA 1.65GHz (15W) on-board SoC with VGA/LVDS, Dual GbE, PCIe Mini, USB 3.2 Gen 1, SATA 6GB/s, iRIS-1010, HD Audio and RoHS
- **32001-008600-200-RS:** Dual ports USB 2.0 cable
- **32205-003800-300-RS:** RS-422/485 cable, 200mm
- **32006-001100-201-RS:** PS/2 keyboard and mouse Y cable

All the drivers and One Key Recovery utility for the WAFER-KBN-i1 are available on IEI Resource Download Center. Type WAFER-KBN-i1 and press Enter to find all the relevant software, utilities, and documentation. To install software from the downloaded ISO file, mount the file as a virtual drive to view its content.

IEI Resource Download Center
<https://download.ieiworld.com>



Jumpers setting and connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX mode select switch
J_CMOS1	Clear CMOS button
JP1	LVDS1 voltage selection
SW1	LVDS panel resolution selection
BAT1	Battery connector
FAN1	CPU fan connector
DIMM1	DDR3 SO-DIMM slot
DIO1	Digital I/O connector
DP1	Display port connector
AUDIO1	HD audio connector
M_IPMI1	IPMI iRIS-1010 module slot
KB_MS1	Keyboard and mouse connector
LVDS1	LVDS1 panel connector
INV1	LVDS1 panel backlight +12V power source
M_PCIE1	PCIe Mini card slot
CN5	Power & HDD LED connector
RST_BTN1	Reset button connector
PWR_BTN1	Power button connector

CN8	Power source connector
COM2, COM3	RS-232 serial port connectors
COM4	RS-422/485 serial port connector
SATA1, SATA2	SATA 6Gb/s drive connectors
SATA_PWR1, SATA_PWR2	SATA power connectors
CN6	SMBUS connector
CN7	I ² C Connector
CN9	Chassis intrusion connector
CN10	IPMI LED connector
SPDIF1	SPDIF connector
USB2, USB3	Internal USB 2.0 connectors
LAN1, LAN2	RJ-45 LAN connectors
USB1	External USB 3.2 Gen 1 ports
COM1	External RS-232 serial port connector
VGA1	VGA connector

J_ATX_AT1: AT/ATX mode select switch	
PIN NO.	DESCRIPTION
Short 1 - 2	ATX Mode (default)
Short 2 - 3	AT Mode

J_CMOS1: Clear CMOS button	
PIN NO.	DESCRIPTION
Push	Clear CMOS Setup

JP1: LVDS1 voltage selection	
PIN NO.	DESCRIPTION
Short 1 - 2	+3.3 V (Default)
Short 2 - 3	+5 V

SW1: LVDS panel resolution selection	
* ON=0, OFF=1; Single=S, Dual=D	
4-3-2-1	DESCRIPTION
0000	800x600 18bit S (default)
0001	1024x768 18bit S
0010	1024x768 24bit S
0011	1280x768 18bit S
0100	1280x800 18bit S
0101	1280x960 18bit S
0110	1280x1024 24bit D
0111	1366x768 18bit S
1000	1366x768 24bit S
1001	1440x960 24bit D
1010	1400x1050 24bit D
1011	1600x900 24bit D
1100	1680x1050 24bit D
1101	1600x1200 24bit D
1110	1920x1080 24bit D
1111	1920x1200 24bit D

BAT1: Battery Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+VBAT	2	GND

FAN1: CPU fan connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+12V
3	Rotation Signal	4	PWM Control Signal

DIO1: Digital I/O connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

DP1: Display port connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HPD	2	AUX+
3	GND	4	AUX-
5	CAD	6	GND
7	GND	8	Lane2+
9	Lane3+	10	Lane2-
11	Lane3-	12	GND
13	GND	14	Lane0+
15	Lane1+	16	Lane0-
17	Lane1-	18	VCC3
19	VCC5	20	N/C

AUDIO1: HD audio connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SPK_R	2	LINE1_R
3	AUD_GND	4	AUD_GND
5	SPK_L	6	LINE1_L
7	AUD_GND	8	AUD_GND
9	MIC1_R	10	MIC1_L

KB_MS1: Keyboard and mouse connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	MSDATA
3	MSCLK	4	KBDATA
5	KBCLK	6	GND

LVDS1: LVDS connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND	14	GND
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND	26	GND
27	VCC	28	VCC
29	VCC	30	VCC

INV1: LVDS backlight connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCD_BKLTCTL	2	GND
3	+12V	4	GND
5	BACKLIGHT ENABLE		

M_PCIE1: PCIe Mini card slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	PCIE_CLK#	12	N/C
13	PCIE_CLK	14	N/C
15	GND	16	N/C
17	N/C	18	GND
19	N/C	20	N/C
21	GND	22	PCIRST#
23	PCIE_RXN(SATA_RX+)	24	VCC3
25	PCIE_RXP(SATA_RX-)	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PCIE_TXN(SATA_TX-)	32	SMBDATA
33	PCIE_TXP(SATA_TX+)	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

CN5: Power & HDD LED connector				
	PIN	DESCRIPTION	PIN	DESCRIPTION
+5V	1	VCC	2	GND
Power LED	3	PWR_LED+	4	PWR_LED-
HDD LED	5	HDD_LED+	6	HDD_LED-

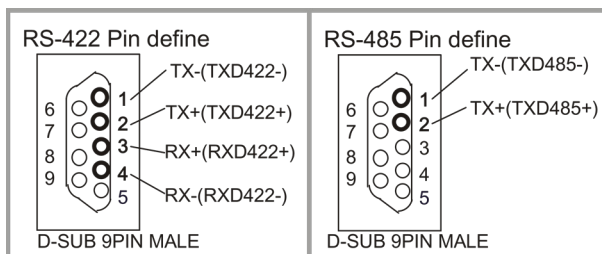
RST_BTN1: Reset button connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET+	2	RESET-

PWR_BTN1: Power button connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PWR_BTN+	2	PWR_BTN-

CN3: Power source connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

COM2, COM3: RS-232 serial port connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

COM4: RS-422/485 serial port connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RXD422-	2	RXD422+
3	TXD422+/TXD485+	4	TXD422-/TXD485-



SATA1, SATA2: Serial 6Gb/s connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	TX+
3	TX-	4	GND
5	RX-	6	RX+
7	GND		

SATA_PWR1, SATA_PWR2: SATA power connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND

CN6: SMBUS connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	SMBUS DATA
3	SMBUS CLK	4	+5V

CN7: I²C connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	I ² C DATA
3	I ² C CLK	4	+5V

CN10: IPMI LED connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	ID_LED+	2	ID_LED-

CN9: Chassis Intrusion connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Pull high to +3.3V_ALW	2	CHASSIS_OPEN

SPDIF1: SPDIF connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	NC
3	SPDIF OUT	4	GND
5	SPDIF IN		

USB2, USB3: Internal USB 2.0 connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	USB_VCC

USB1: External USB 3.2 Gen 1 (5Gb/s) ports			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	USB2_D0-
3	USB2_D0-	4	GND
5	USB3_RXD0-	6	USB3_RXD0+
7	GND	8	USB3_TXD0-
9	USB3_TXD0+	10	USB_VCC
11	USB2_D1-	12	USB2_D1+
13	GND	14	USB3_RXD1-
15	USB3_RXD1+	16	GND
17	USB3_TXD1-	18	USB3_TXD1+

LAN1: RJ-45 LAN connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LAN1_MDI0+	7	LAN1_MDI2+
2	LAN1_MDI0-	8	LAN1_MDI2-
3	LAN1_MDI1+	9	LAN1_MDI3+
4	LAN1_MDI1-	10	LAN1_MDI3-

LAN2: RJ-45 LAN connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LAN2_MDI0+	7	LAN2_MDI2+
2	LAN2_MDI0-	8	LAN2_MDI2-
3	LAN2_MDI1+	9	LAN2_MDI3+
4	LAN2_MDI1-	10	LAN2_MDI3-

COM1: RS-232 serial port connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

VGA1: VGA connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

