

**Mini-ITX SBC supports AMD Merlin Falcon SoC Processor, HDMI 2.0,  
SATA 6Gb/s, USB3.0, PCIe mini, M.2, HD audio and RoHS**

# **gKINO-DMF**

## **Quick Installation Guide**

**Version 1.0**

May 03, 2017

### **Package List**

gKINO-DMF package includes the following items:

- 1 x gKINO-DMF single board computer with CPU cooler
- 1 x I/O shielding
- 1 x SATA cable
- 1 x Utility CD
- 1 x QIG
- 1 x One Key Recovery CD



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## Specifications

- SoC:
  - FP4 BGA supports AMD Merlin Falcon SoC
  - RX-421BD on-board SoC (2.1GHz, quad-core, 2MB cache, TDP=35W)
  - RX-216GD on-board SoC (1.6GHz, quad-core, 1MB cache, TDP=15W)
- BIOS: AMI BIOS
- Memory:
  - Two 260-pin 2400MHz dual-channel DDR4 non-ECC unbuffered SO-DIMMs support up to 64 GB
- Graphic:
  - AMD Radeon HD 10000graphic,3rd Gen. graphic core,support DX 12, HSA 2.0
  - UVD v6 decode for H.265 MPEG2/4, VC-1, MVC
  - VCE v3.1 encode for H.254 VCE
- Display Output:
  - Triple Independent Display
  - 2 x HDMI 1.4 (up to 4096x2160@24Hz)
  - 1 x DP++ (up to 3840x2160@60Hz)
- Ethernet: Dual GbE RTL 8111GN
- External I/O Interfaces:
  - 4 x USB 3.0
  - 1 x USB 2.0
- Internal I/O Interfaces:
  - 1 x MicroSD card slot
  - 2 x RS-232 (2x5 pin, P=2.0)
  - 4 x USB 2.0 (2x4 pin, P=2.0)
  - 2 x RS-232/422/485 (2x5 pin, P=2.0)
  - 2 x RS-232 (support Cctalk, TTL)(1x4 pin, P=2.54)
  - 2 x SATA with 5V/12V output
- Audio:

Realtek ALC662 HD audio codec

2 x Audio jacks (line-out, mic-in) on rear IO

1 x Front audio (2x5-pin)

- Front Panel:

1 x Front panel (2x7 pin, power LED, HDD LED, speaker, power button, reset button)

- LAN LED: 2 x LAN LED (1x2 pin)

- SMBus: 1 x SMBus (1x4 pin)

- I<sup>2</sup>C: 1 x I<sup>2</sup>C (1x4 pin)

- Digital I/O: 8-bit digital I/O (2x5 pin)

- Expansion :

1 x PCIe x 8 slot

1 x Full size PCIe Mini card slot

- Watchdog Timer:

Software Programmable support 1~255 sec. system reset

- Chassis Intrusion Detection:

1 x Chassis intrusion connector (1x2 pin)

- Fan Connector:

1 x CPU smart fan (1x4 pin)

1 x System smart fan (1x4 pin)

- Power supply:

12V DC input

Support AT/ATX mode

1 x Internal power connector (2x2 pin)

1 x External DC jack (4-pin DIN)

- Power Consumption: 12V@5.54A (AMD RX-421BD 2.1GHz CPU with 2400 MHz 16GB DDR4 memory)

- Operating Temperature: 0°C ~ 60°C

- Storage Temperature: -10°C ~ 70°C

- Operation Humidity: 5% ~ 95%, non-condensing

- Dimensions: 170mm x 170 mm

- Weight: GW: 1100g / NW: 700g

## Ordering Information

- **gKINO-DMF-421-R10:**  
Mini-ITX SBC supports AMD RX-421BD on board SoC (quad-core 2.1GHz, 35W), DDR4 ,triple independent displays,HDMI/DP, dual GbE, SATA 6Gb/s, USB3.0, PCIe mini, M.2,HD audio and RoHS
- **gKINO-DMF-216-R10:**  
Mini-ITX SBC supports AMD RX-216GD on board SoC (dual-core 1.6GHz, 15W), DDR4 ,triple independent displays, HDMI/DP, dual GbE, SATA 6Gb/s, USB3.0, PCIe mini, M.2, HD audio and RoHS
- **19800-000300-100-RS:**  
RS-232 cable with bracket, 300mm, P=2.0
- **CB-USB02A-RS:**  
Dual-port USB cable with bracket, 300mm, P=2.0
- **TPM-IN01-R20:**  
20-pin Infineon TPM module, software management tool, firmware v3.17

## Jumpers setting and connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX Power Mode Setting
J_CMOS1	Clear CMOS Setup
MSATA_SW1	SATA/M.2 B Key Function Selection
CPU_FAN1	CPU Fan Connector
CPU12V1	12V Power Connector
POWER_IN1	12V Power Connector
AUDIO_CV1	Audio Line-In/Out MIC Connector
FRONT-PANEL1	Audio Source Connector
CHASSIS1	Chassis Status Connector
DIMMA_1, DIMMB_1	DDR4 SO-DIMM slots
DIO1	Digital Input / Output Connector
F_PANEL1	External Switches and Indicators Panel
JSPI_BIOS_1	Flash SPI ROM Connector
JSPI2	Flash EC ROM Connector
HDMI_CN1, HDMI_CN2	HDMI Connector
I2C1	I2C Connector (to EC)
DP1	Internal Display Port Connector
COM1, COM2	Internal RS-232 Serial Port Connectors
COM5,COM6	Internal RS-232/422/485 Serial Port Connector
USB1~2	Internal USB 2.0 Connectors
LED_LAN1, LED_LAN2	LAN Link LED Connector
MPCIE1	Mini PCI-E Card connector
S_ATA1, S_ATA2	Serial ATA 3.0 Connectors
SMB1	SMBUS Connector
SYS_FAN1	System Fan Connector
TPM1	Trusted Platform Module Connector
LAN1_USB1, LAN2_USB2	RJ45 LAN and USB 3.0 Connectors
USB1	External USB 2.0 Connectors

<b>J_ATX_AT1: AT/ATX Power Mode Setting</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short 1-2 (Right)	ATX Power Mode (default)
Short 2-3 (Left)	AT Power Mode

<b>J_CMOS1: Clear CMOS Setup</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
NC	Keep CMOS Setup (Normal Operation)
Press button	Clear CMOS Setup

<b>MSATA_SW1: SATA/M.2 B Key Function Selection</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short	M.2 B Key SSD (default)
Open	SATA HDD

<b>F_PANEL1: External Switches and Indicators Panel</b>					
	<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>	
PWR BTN	1	NC	6	PWR_LED+	PWR LED
	2	PWR_BTN+	7	PWR_LED+	
	3	PWR_BTN-	8	PWR_LED-	
HDD LED	4	HDD_LED+	9	RESET+	RESET
	5	HDD_LED-	10	RESET-	

<b>HDMI_CN1, HDMI_CN2: HDMI Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	HDMI_DATA2	13	N/C
2	GND	14	N/C
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA0	19	HDMI_HPD
8	GND	20	HDMI_GND
9	HDMI_DATA0#	21	HDMI_GND
10	HDMI_CLK	22	HDMI_GND
11	GND	23	HDMI_GND
12	HDMI_CLK#		

<b>DP1: Internal Display Port Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	11	AUXP
2	LANE1N	12	AUXN
3	LANE1P	13	GND
4	GND	14	LANE2P
5	LANE3N	15	LANE2N
6	LANE3P	16	GND
7	GND	17	LANE0P
8	AUX_CTRL_DET_D	18	LANE0N
9	GND	19	+3.3V
10	HPD		

<b>LAN1_USB1, LAN2_USB2: Ethernet and USB 3.0 connectors</b>			
<b>USB1, USB2: External USB 3.0 connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	10	VCC
2	USB_DATA-	11	USB_DATA-
3	USB_DATA+	12	USB_DATA+
4	GND	13	GND
5	USB3_RX-	14	USB3_RX-
6	USB3_RX+	15	USB3_RX+
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+
<b>LAN1, LAN2: RJ45 LAN connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
20	LAN1_MDI0P	24	LAN1_MDI2P
21	LAN1_MDI0N	25	LAN1_MDI2N
22	LAN1_MDI1P	26	LAN1_MDI3P
23	LAN1_MDI1N	27	LAN1_MDI3N

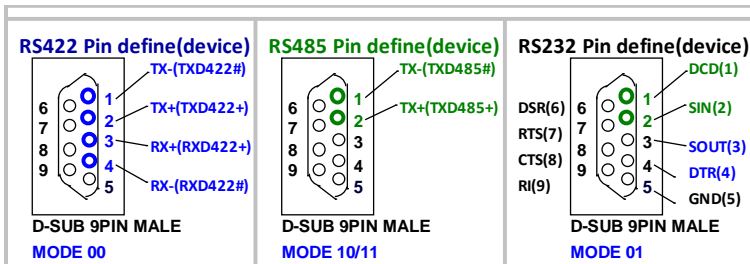
<b>USB1: External USB 2.0 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	2	USB_DATA-
3	USB_DATA+	4	GND

<b>USB1~2: Internal USB 2.0 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	2	GND
3	USB_DATA-	4	USB_DATA+
5	USB_DATA+	6	USB_DATA-
7	GND	8	VCC



COM1, COM2: Internal RS-232 Serial Port Connector			
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

COM5,COM6: Internal RS-232/RS-422/RS-485 Serial Port Connector			
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



AUDIO_CV1: Audio Line-In/Out MIC Connector	
PIN NO.	DESCRIPTION
Line_Out (Green)	Connect this port to headphone or speaker
Microphone (Pink)	Connect this port to microphone

<b>FRONT-PANEL1: Audio Source Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LMIC2-L	2	AUD_GND
3	LMIC2-R	4	PRESENCE#
5	LLINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LLINE2-L	10	LINE2-JD

<b>S_ATA1, S_ATA2: Serial ATA 3.0 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	5	SATA_RX-
2	SATA_TX+	6	SATA RX+
3	SATA_TX-	7	GND
4	GND	8	N/C

<b>MPCIE1: Mini PCI-E Card connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	PCIE_WAKE#	2	+3.3V
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	MSATA_CLK#	12	N/C
13	MSATA_CLK	14	N/C
15	GND	16	N/C
17	PLTRST_N	18	GND
19	N/C	20	+3.3V
21	GND	22	PLTRST_N
23	MINI_RXN	24	+3.3V
25	MINI_RXP	26	GND
27	GND	28	1.5V
29	GND	30	SMB_CLK
31	MINI_TXN	32	SMB_DATA
33	MINI_TXP	34	GND
35	GND	36	USB_DATA-
37	GND	38	USB_DATA+
39	+3.3V	40	GND
41	+3.3V	42	N/C
43	+3.3V	44	N/C
45	CLINK_CLK	46	N/C
47	CLINK_DATA	48	1.5V
49	CLINK_RST#	50	GND
51	MSATA_DET	52	+3.3V

<b>CPU_FAN1, SYS_FAN1: Fan Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+12V
3	FANIO	4	PWM

<b>DIO1: Digital Input / Output Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
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

<b>CPU12V1: 12V Power Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	GND
3	12V	4	12V

<b>POWER_IN1: 12V Power Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	12V	2	GND
3	12V	4	GND
5	GND		

<b>TPM1: Trusted Platform Module Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

<b>JSPI_BIOS_1: Flash SPI ROM Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+1.8V	2	SPI_CS#
3	SPI_SO	4	SPI_CLK
5	SPI_SI	6	GND

<b>JSPI2: Flash EC ROM Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+1.8V	2	SPI_CS#
3	SPI_SO	4	SPI_CLK
5	SPI_SI	6	GND

<b>SMB1: SMBUS Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	SMB_DATA
3	SMB_CLK	4	+5V

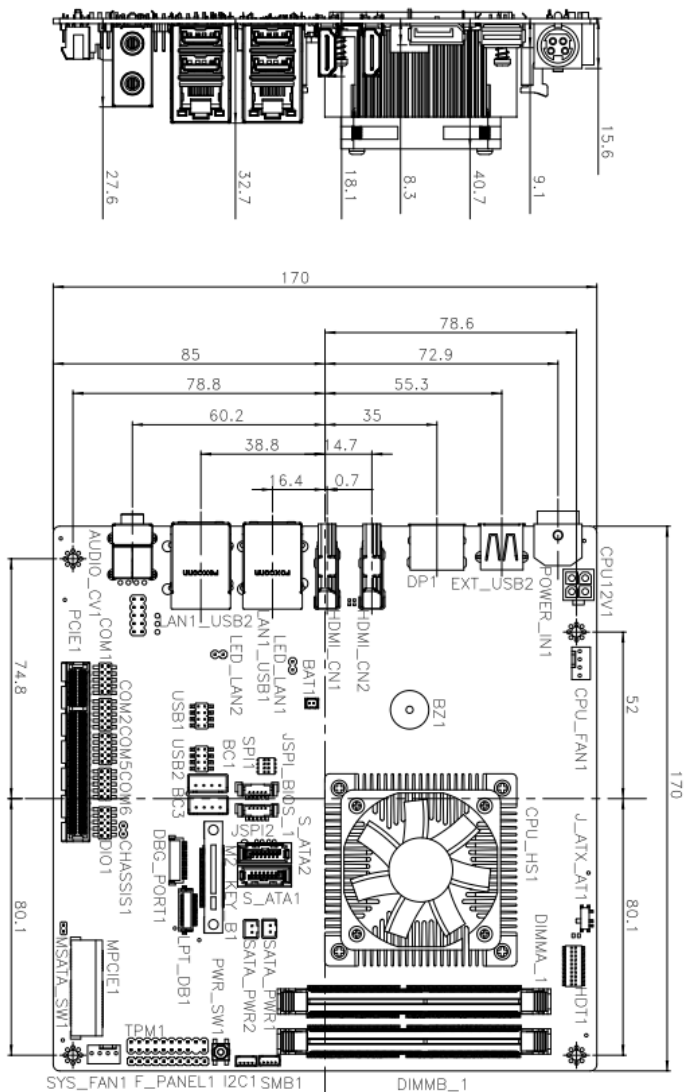
<b>I2C1: I2C Connector (to EC)</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	I2C_DAT
3	I2C_CLK	4	+5V

<b>LED_LAN1: LAN Link LED Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	2	LAN1_LED_LNK#_ACT

<b>LED_LAN2: LAN Link LED Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	2	LAN2_LED_LNK#_ACT

<b>CHASSIS1: Chassis Status Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3VSB	2	CHASSIS OPEN

# Board Layout: Jumper and Connector Locations



(Unit: mm)