

**EPIC SBC supports Intel® 14nm 6th Generation Mobile Core™ i7/i5/i3  
and Celeron® on-board Processor (ULT) with HDMI/LVDS/iDP,  
Dual PCIe GbE, USB 3.0, PCIe Mini, SATA 6Gb/s,  
mSATA , COM, Audio and RoHS**

# **NANO-ULT3**

## **Quick Installation Guide**

**Version 1.0**

Dec 26 2016.

### **Package List**

NANO-ULT3 package includes the following items:

- 1 x NANO-ULT3 single board computer with heatspreader
- 1 x Audio cable
- 1 x Power cable
- 1 x RS-232 cable
- 1 x SATA with power cable kit
- 1 x One Key Recovery CD
- 1 x QIG (Quick Installation Guide)
- 1 x Utility CD



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## Specifications

- SoC:
  - 6th generation Intel® mobile ULT on-board SoC
  - Intel® Core™ i7-6600U (up to 3.4GHz, dual-core, 4MB cache, TDP=15W)
  - Intel® Core™ i5-6300U (up to 3.0GHz, dual-core, 3MB cache, TDP=15W)
  - Intel® Core™ i3-6100U (up to 2.3GHz, dual-core, 3MB cache, TDP=15W)
  - Intel® Celeron® processor 3955U (up to 2.0GHz, dual-core, 2MB cache, TDP=15W)
- BIOS: AMI UEFI BIOS
- Memory:
  - Two 260-pin 2133/1866 MHz dual-channel DDR4 non-ECC unbuffered SO-DIMMs (system max. 32 GB)
- Graphics Engine:
  - Intel® HD Graphics Gen 9 Engine with 16 low-power execution units, supporting DX11/12, OpenGL 4.3/4.4 and OpenCL2.x, ES 2.0
- Display Output:
  - Triple independent display
  - 2 x HDMI (up to 4096x2160@24Hz)
  - 1 x 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920x1200@60Hz)
  - 1 x iDP interface for HDMI, LVDS, VGA, DVI, DP (up to 4096 x 2304@60Hz) (colay with HDMI1)
- Ethernet:
  - LAN1: Intel® I219-LM PHY with Intel® AMT 11.0 supported
  - LAN2: Intel® I211-AT PCIe GbE controller
- External I/O Interfaces:
  - 4 x USB 3.0
- Internal I/O Interfaces:
  - 1 x 8 GB eMMC (optional)

- 1 x KB/MS (1x6 pin)
- 1 x RS-232/422/485 (2x5 pin, P=2.0)
- 1 x USB 2.0 (180° Type-A)
- 2 x USB 2.0 (2x4 pin, P=2.0)
- 2 x RS-232 (2x5 pin, P=2.0)
- 2 x SATA 6G/s with 5V SATA power connector (RAID 0,1)
- SMBus: 1 x SMBus (1x4 pin)
- Audio:
  - Realtek ALC662 HD codec
  - 1 x Analog audio (2x5 pin)
- Front Panel:
  - 1 x Power LED & HDD LED (1x6 pin)
  - 1 x Power button (1x2 pin)
  - 1 x Reset button (1x2 pin)
- LAN LED: 2 x LAN LED (1x2 pin)
- Expansion :
  - 1 x Full-size PCIe Mini card slot (with SIM holder & mSATA support)
  - 1 x Half-size PCIe Mini card slot
- Digital I/O: 1 x 8-bit digital I/O (2x5 pin)
- Fan Connector:
  - 1 x CPU fan connector (1x4 pin)
  - 1 x System fan connector (1x4 pin)
- Power supply:
  - 12V only DC input
  - 1 x Internal power connector (2x2 pin)
  - Support AT/ATX mode
- Power Consumption:
  - 12V@2.48A (Intel® Core™ i3-6100U CPU with two 8 GB memory)
- Watchdog Timer:
  - Software programmable supports 1~255 sec. system reset

- Operating Temperature: -20°C ~ 60°C
- Storage Temperature: -30°C ~ 70°C
- Operation Humidity: 5% ~ 95%, non-condensing
- Dimensions: 115mm x 165mm
- Weight(GW/ NW): 850g/ 350g

## Ordering Information

- **NANO-ULT3-i7-R10:**  
EPIC SBC supports Intel® 14nm 6th Generation Mobile Core™ i7-6600U (15W) on-board Processor (ULT) with HDMI/LVDS/iDP, Dual PCIe GbE, USB 3.0, Dual PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **NANO-ULT3-i5-R10:**  
EPIC SBC supports Intel® 14nm 6th Generation Mobile Core™ i5-6300U (15W) on-board Processor (ULT) with HDMI/LVDS/iDP, Dual PCIe GbE, USB 3.0, Dual PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **NANO-ULT3-i3-R10:**  
EPIC SBC supports Intel® 14nm 6th Generation Mobile Core™ i3-6100U (15W) on-board Processor (ULT) with HDMI/LVDS/iDP, Dual PCIe GbE, USB 3.0, Dual PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **NANO-ULT3-C-R10:**  
EPIC SBC supports Intel® 14nm 6th Generation Mobile Celeron® 3955U (15W) on-board Processor (ULT) with HDMI/LVDS/iDP, Dual PCIe GbE, USB 3.0, Dual PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **32000-023800-RS:** PS/2 KB/MS cable, 135mm, P=2.0
- **32000-070301-RS:** Dual-port USB cable, 210mm, P=2.0

## Jumpers setting and connectors

LABEL	FUNCTION
ATX_AT1	Auto Power Button Setting
J_CMOS1	CMOS state setting
J_LCD_PWR1	LVDS Voltage Selection
J_HDMI_DP1	HDMI & DP mode selection
SW1	LVDS panel resolution selection
HDMI1, HDMI 2	HDMI Connector
USB_CON1, USB_CON2	External USB3.0 Connector
LAN1	LAN1 Connector
LAN2	LAN2 Connector
CN11	Front Panel Connector
KB/MS1	Keyboard/Mouse Connector
Audio1	Audio Connector
SATA1, SATA2	Serial ATA Connector
SATA_PWR1, SATA_PWR2	SATA Power Connector
CPU/FAN1	CPU Fan Connector
SYS/FAN1	System Fan Connector
INV1	LVDS Panel Backlight +12V Power Source
CN2	LVDS Connector
PWR_BTN1	Power Button Connector
PWR1, PWR2	Power Source Connector
RST_BTN1	Reset Button Connector
SMBUS_1	SMBUS Connector
SP1	Buzzer Connector
COM1, COM2, COM3	External Serial Port Connector
DP1	Internal Display Port Connector
DIO1	Digital I/O Connector
USB1, USB2	Internal USB 2.0 Connector
BAT1	BAT Connector
ME_FLASH1	ME Override Connector
CN1	PCIe Mini Card Slot (Half)
CN8	PCIe Mini Card Slot (Full Size)
SIM1	SIM Card Connector

<b>ATX_AT1: Auto Power Button Setting</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A - B	ATX Power Mode (default)
Short B - C	AT Power Mode

<b>J_CMOS1: Clear CMOS Setup</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Open	Normal Operation (Default)
Push	Clear CMOS Setup

<b>J_LCD_PWR1: LVDS Voltage Selection</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A - B	+3.3 V (Default)
Short B - C	+5 V

<b>J_HDMI_DP1: HDMI &amp; DP mode selection</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A - B	HDMI mode (default)
Short B - C	DP mode

<b>HDMI1, 2: HDMI Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	HDMI_DATA2	2	GND
3	HDMI_DATA2#	4	HDMI_DATA1
5	GND	6	HDMI_DATA1#
7	HDMI_DATA0	8	GND
9	HDMI_DATA0#	10	HDMI_CLK
11	GND	12	HDMI_CLK#
13	N/C	14	N/C
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	+5V
19	HDMI_HPD	20	HDMI_GND
21	HDMI_GND	22	HDMI_GND
23	HDMI_GND		

<b>SW1: LVDS panel resolution selection</b>	
* ON=0, OFF=1; Single=S, Dual=D	
<b>4-3-2-1</b>	<b>DESCRIPTION</b>
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

<b>USB_CON1, 2: External USB3.0 Connector</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 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LAN_MDI0+	7	LAN_MDI2+
2	LAN_MDI0-	8	LAN_MDI2-
3	LAN_MDI1+	9	LAN_MDI3+
4	LAN_MDI1-	10	LAN_MDI3-

<b>CN11: Front Panel Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	4	PWR_LED-
2	GND	5	HDD_LED+
3	PWR_LED+	6	HDD_LED-

<b>KB/MS1: Keyboard/Mouse Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	4	KBDATA
2	MSDATA	5	KBCLOCK
3	MSCLK	6	GND

<b>Audio1: Audio Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LINE_OUTR	2	LINEIN_R
3	ANALOG_GND	4	ANALOG_GND
5	LINE_OUTL	6	LINEIN_L
7	ANALOG_GND	8	ANALOG_GND
9	MICIN1	10	MICIN2

<b>SATA1, SATA2: Serial ATA Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND		



<b>SATA_PWR1, 2: SATA Power Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	Ground

<b>CPU/FAN1, SYS/FAN1: Fan Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+12V
3	FANIO1	4	PWM

<b>INV1: 5-pin Header Inverter Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LCD_BKLTCTL	2	GROUND
3	+12V	4	GROUND
5	BACKLIGHT ENABLE		

<b>CN2: LVDS Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	GND
3	A0P_L	4	A0M_L
5	A1P_L	6	A1M_L
7	A2P_L	8	A2M_L
9	CLK1P_L	10	CLK1M_L
11	A3P_L	12	A3M_L
13	GND	14	GND
15	A4P_L	16	A4M_L
17	A5P_L	18	A5M_L
19	A6P_L	20	A6M_L
21	CLK2P_L	22	CLK2M_L
23	A7P_L	24	A7M_L
25	GND	26	GND
27	+VCC_LCD_BEAD2	28	+VCC_LCD_BEAD2
29	+VCC_LCD_BEAD2	30	+VCC_LCD_BEAD2

<b>PWR_BTN1: Power Button Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PWR_BTN+	2	PWR_BTN-

<b>PWR1, PWR2: +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>RST_BTN1: Reset Button Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	RESET+	2	RESET-

<b>SMBUS_1: 4-pin Header SMBUS Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	SMBUS CLOCK
3	SMBUS DATA	4	GND

<b>SP1: Buzzer Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC+	2	MCP_SPKR

<b>COM1, COM2, COM3: External Serial Port Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	DCD	2	DSR
3	SIN	4	RST
5	SOUT	6	CTS
7	DTR	8	RI
9	GND	10	GND

<b>DP1: Internal DisplayPort Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
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

<b>DIO1: Digital Input / Output Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+5V
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

<b>USB1: Internal USB 2.0 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	2	GND
3	-DATA4	4	+DATA5
5	+DATA4	6	-DATA5
7	GND	8	VCC

<b>USB2: Internal USB 2.0 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	2	-DATA6
3	+DATA6	4	GND

<b>BAT1: BAT Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VBATT	2	GND

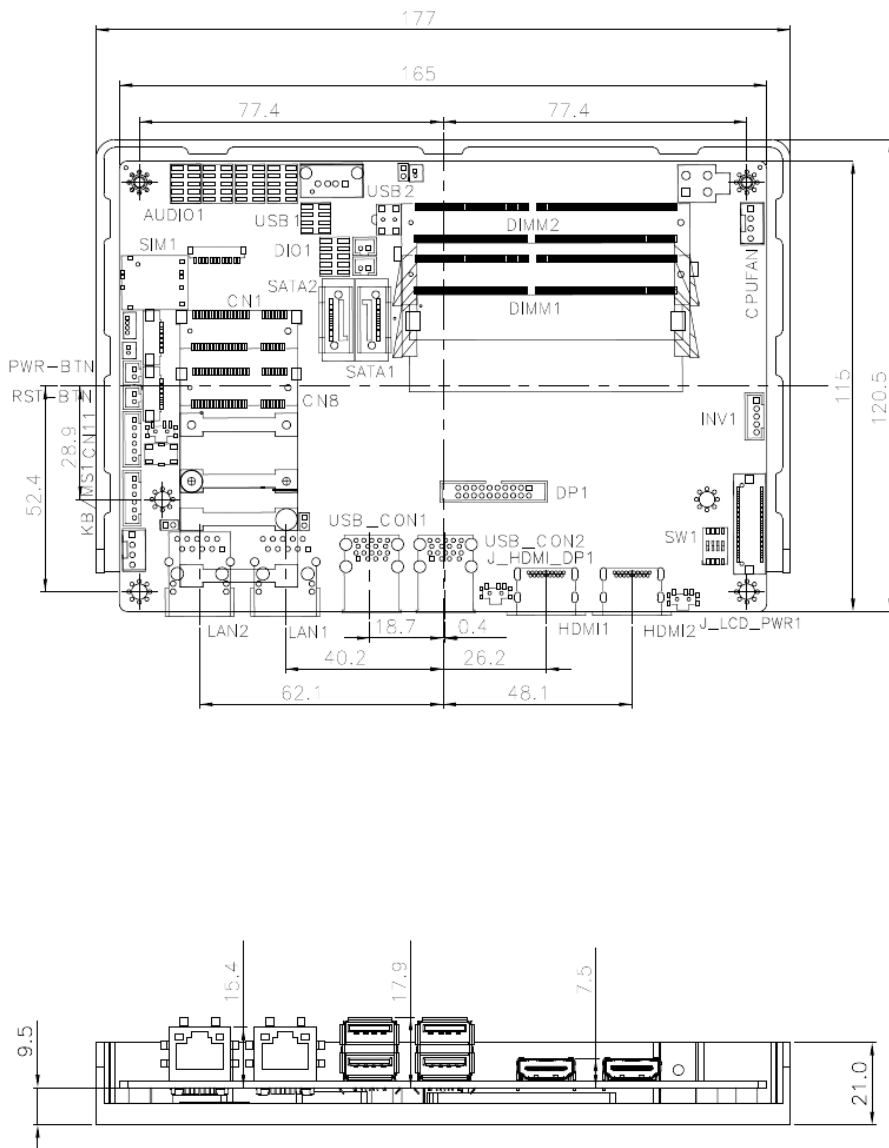
<b>ME_FLASH1: ME Override Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	SRC_RST_N	2	GND

<b>CN1: PCIe Mini Card Slot (Half)</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5 V
7	VCC3	8	N/C
9	GND	10	N/C
11	CLK_PCIE_MINI2_N	12	N/C
13	CLK_PCIE_MINI2_P	14	N/C
15	GND	16	N/C
17	BUF_PLT_RST#	18	GND
19	N/C	20	VCC3
21	GND	22	BUF_PLT_RST#
23	PCIE_RX4DN	24	VCC3
25	PCIE_RX4DP	26	GND
27	GND	28	1.5 V
29	GND	30	SMBCLK
31	PCIE_TX4DN	32	SMBDATA
33	PCIE_TX4DP	34	GND
35	GND	36	USB8-
37	GND	38	USB8+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5 V
49	N/C	50	GND
51	N/C	52	VCC3

<b>CN8: PCIe Mini Card Slot (Full Size)</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5 V
7	VCC3	8	SIM_VCC
9	GND	10	SIM_IO
11	CLK-	12	SIM_CLK
13	CLK+	14	SIM_RST
15	GND	16	SIM_VPP
17	BUF_PLT_RST#	18	GND
19	N/C	20	VCC3
21	GND	22	BUF_PLT_RST#
23	SATA_RXN2_C	24	VCC3
25	SATA_RXP2_C	26	GND
27	GND	28	1.5 V
29	GND	30	SMBCLK
31	SATA_TXN2	32	SMBDATA
33	SATA_TXP2	34	GND
35	GND	36	USB7-
37	GND	38	USB7+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5 V
49	N/C	50	GND
51	M-SATADET	52	VCC3

<b>SIM1: SIM Card Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
C1	SIM_VCC	C2	SIM_RST
C3	SIM_CLK	C4	N/A
C5	GND	C6	SIM_VPP
C7	SIM_IO	C8	N/A

# Board Layout: Jumper and Connector Locations



(Unit: mm)