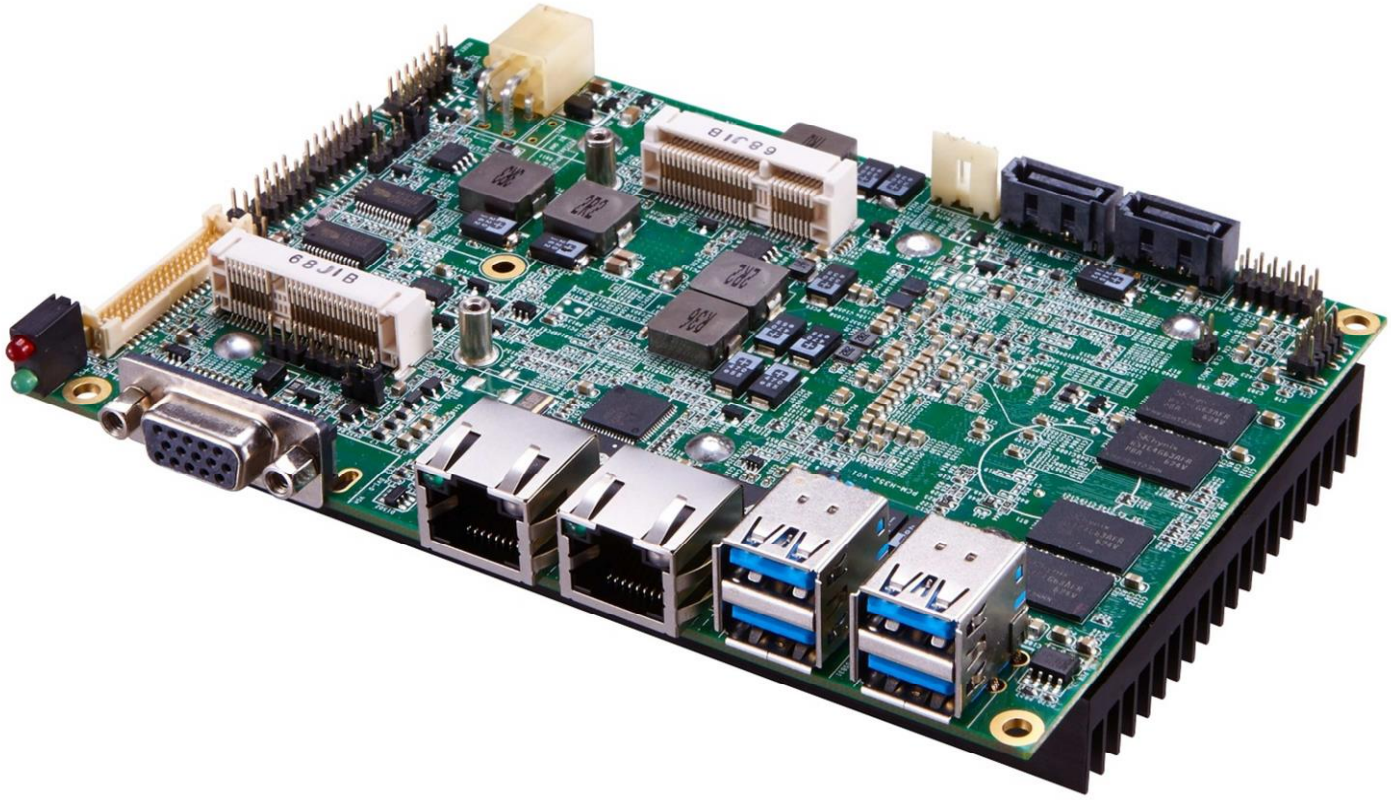
WG-7366u



Document Revision History

Revision	Date	By	Comment
A			

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1 Introduction

This manual describes theWG-7366U boards made by FUSHENGTEK Technology.

Use of this Users Guide implies a basic knowledge of PC-AT hard- and software. This manual is focused on describing the 7366U board's special features and is not intended to be a standard PC-AT textbook.

New users are recommended to study the short installation procedure stated in the following chapter before switching-on the power.

All configuration and setup of the CPU board is either done automatically or manually by the user via the BIOS setup menus. Only exceptions are the "Clear CMOS" Jumper and the "Always On" jumper.

Latest revision of this manual, datasheet, BIOS, drivers, BSP's (Board Support Packages), Mechanical drawings (2D and 3D) can be downloaded from here:

http://www.fushengtek.com

3 System Specifications

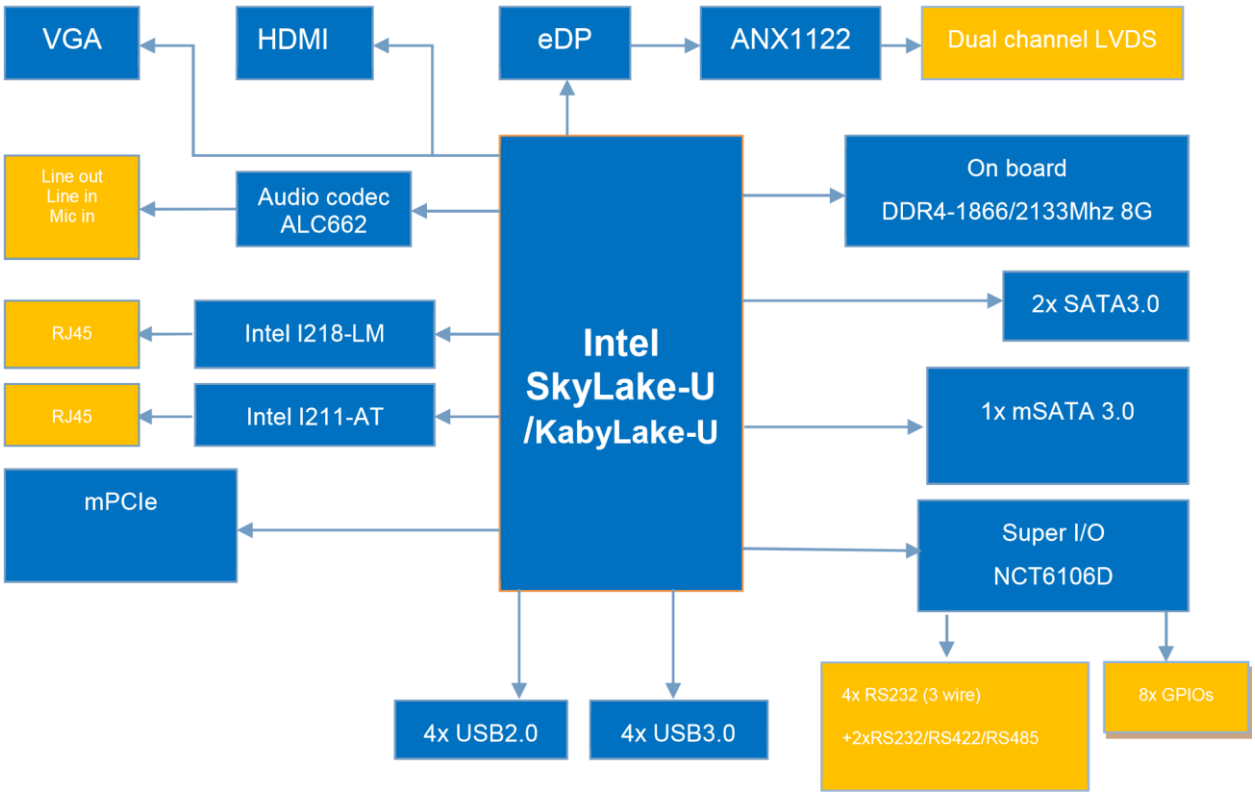
3.1 Component main data

Technical Information	
板型	3.5 寸主板
处理器	第六代 Skylake-u 或第七代 Kabylake-u，I3，I5，I7 支持: Intel® Core™ i3-6100U 2.3GHz 15W Intel® Core™ i5-6200U 2.3GHz 15W Intel® Core™ i7-6500U 2.5GHz 15W Intel® Core™ i3-7100U 2.4GHz 15W Intel® Core™ i5-7200U 2.5GHz 15W Intel® Core™ i7-7500U 2.7GHz 15W 等
内存	板载 8GB DDR4 内存（电压 1.2V），最高频率 2133MHz
图形处理	支持 1 个 VGA 最高分辨率 1920x1080@60Hz 支持 1 个 HDMI 最高分辨率 1920x1080@60Hz 支持 1 个 18/24 位单通道或者双通道 LVDS
网卡	支持 2 个 intel 10/100/1000Mbit 以太网，支持 AMT9.5（Intel®Clarkville i218LM 和 i5，i7）
SATA	2 个 SATA1.0/2.0/3.0 标准接口,支持 RAID 0,1,5 支持 1 个 mSATA
mPCIe	支持 1 个 mPCIe
USB	支持 4 个 USB3.0/2.0（前置）支持 4 个 USB2.0（内置）
串口	4 个 RS232(3 线)，，2 个 RS232（3 线）或者 RS422 或者 RS485 可选
IO	支持 8 个 GPIO（前置），1 个 SIM 卡槽（扩展，可选）
声卡	ALC662 高保真声卡（Line-in ,Line-out, Mic-in）
电源	+9V~+24V，推荐使用+12V
温度	工作温度-20°C to +75°C（-40°C to +80°C 为可选）
尺寸	146mm x 101.6 mm

散热	无风扇设计（风扇可选）
操作系统	Win7, Win8, Win10,WES7, WES8, Linux,VxWorks

3.2 System overview

The block diagram below shows the architecture and main components of theWG-7366U. The key component on the board is the Intel®Haswell U Processor.



4 Connector Locations

4.1 7366U – frontside

4.2 7366U – backside

5 Connector Definitions

The following sections provide pin definitions and detailed description of all on-board connectors. The connector definitions follow the following notation:

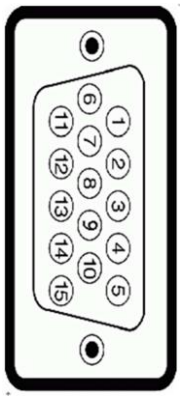
Column name	Description
Pin	Shows the pin-numbers in the connector. The graphical layout of the connector definition tables is made similar to the physical connectors.
Signal	The mnemonic name of the signal at the current pin. The notation “XX#” states that the signal “XX” is active low.
Type	AI: Analogue Input. AO: Analogue Output. I: Input, TTL compatible if nothing else stated. IO: Input / Output. TTL compatible if nothing else stated. IOT: Bi-directional tri-state IO pin. IS: Schmitt-trigger input, TTL compatible. IOC: Input / open-collector Output, TTL compatible. IOD: Input / Output, CMOS level Schmitt-triggered. (Open drain output) DSO: Differential Signaling Output with complementary signals on two paired wires DSI: Differential Signaling Input with complementary signals on two paired wires DSIO: Differential Signaling Input / Output (combined DSO and DSI) O: Output, TTL compatible. OC: Output, open-collector or open-drain, TTL compatible. OT: Output with tri-state capability, TTL compatible. LVDS: Low Voltage Differential Signal. PWR: Power supply or ground reference pins. NC: Pin not connected.
Level	Ioh: Typical current in mA flowing out of an output pin through a grounded load, while the output voltage is > 2.4 V DC (if nothing else stated). Iol: Typical current in mA flowing into an output pin from a VCC connected load, while the output voltage is < 0.4 V DC (if nothing else stated).
Pull U/D	On-board pull-up or pull-down resistors on input pins or open-collector output pins.
Note	Special remarks concerning the signal.

The abbreviation *TBD* is used for specifications which are not available yet or which are not sufficientlyspecified by the component vendors.

6 IO-Area Connectors

6.1 VGA Connectors

	Pin	Signal	Description	Type
	1	RED	Red component signal	
	2	GREEN	Green component signal	
	3	BLUE	Blue component signal	
	4	N/C	**Not connected**	



5	GND	**Ground**	PWR
6	GND R	Red component ground	
7	GND G	Green component ground	
8	GND B	Blue component ground	
9	+5V	5V Power， **Not connected**	PWR
10	GND	**Ground**	PWR
11	N/C	**Not connected**	
12	SDA	Serial data signal	EDID
13	H SYNC	Horizontal synchronization	
14	V SYNC	Vertical synchronization	
15	SCL	Serial clock signal	EDID

6.3 Ethernet Connector

The WG-7366U support two channels of 10/100/1000Mb Ethernet, one(LAN1) is based on Intel® i210AT PCI Express controller and one other controller(LAN2) are based on Intel® Clarkville i218LM Gigabit PHY with AMT9.5 support

In order to achieve the specified performance of the Ethernet port, Category 5 twisted pair cables must be used with 10/100MB and Category 5E, 6 or 6E with 1Gb LAN networks.

The signals for the Ethernet ports are as follows:

Signal	Description
MDI[0]+ / MDI[0]-	In MDI mode, this is the first pair in 1000Base-T, i.e. the BI_DA+/- pair, and is the transmit pair in 10Base-T and 100Base-TX. In MDI crossover mode, this pair acts as the BI_DB+/- pair, and is the receive pair in 10Base-T and 100Base-TX.

MDI[1]+ / MDI[1]-	In MDI mode, this is the second pair in 1000Base-T, i.e. the BI_DB+/- pair, and is the receive pair in 10Base-T and 100Base-TX. In MDI crossover mode, this pair acts as the BI_DA+/- pair, and is the transmit pair in 10Base-T and 100Base-TX.
MDI[2]+ / MDI[2]-	In MDI mode, this is the third pair in 1000Base-T, i.e. the BI_DC+/- pair. In MDI crossover mode, this pair acts as the BI_DD+/- pair.
MDI[3]+ / MDI[3]-	In MDI mode, this is the fourth pair in 1000Base-T, i.e. the BI_DD+/- pair. In MDI crossover mode, this pair acts as the BI_DC+/- pair.

Note: MDI = Media Dependent Interface.

The pinout of the RJ45 connectors is as follows

Signal	PIN	Type	Ioh/Iol	Note
MDI0+				
MDI0-				
MDI1+				
MDI2+				
MDI2-				
MDI1-				
MDI3+				
MDI3-				
Flashing => communication	8 7 6 5 4 3 2 1			

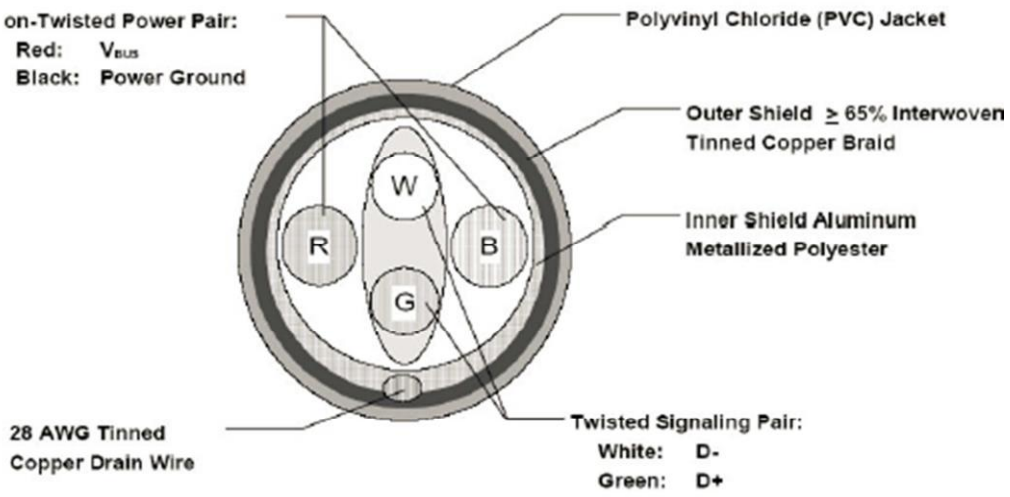
6.4 USB Connectors (IO Area)

The WG-7366U board contains support for 4 USB3.0/2.0 port (Lower USB port, USB1,USB2,USB3,USB4)and 3 USB2.0 port (USB6, USB7, USB8) in the IO area.

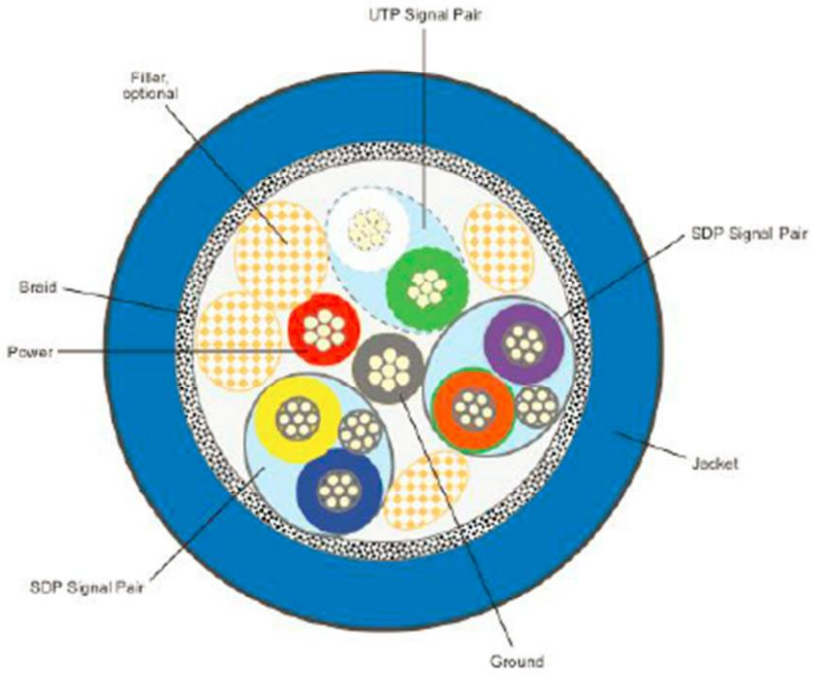
USB 2.0 ports allowing data transfers up to 480Mb/s. The USB 3.0 port allowing data transfers up to 5Gb/s.

(Two internal USB ports are available via internal 8-pin connectors)

For USB2.0 cabling it is required to use only HiSpeed USB cable, specified in USB2.0 standard:



For USB3.0 cabling it is required to use only HiSpeed USB cable, specified in USB3.0 standard:



USB Connector USB31 USB32(USB1,2,3&4)

The dual USB connector USB31 USB32,Port 0,1,2 and 3 supports USB3.0/2.0.

Note	Type	Signal	PIN					Signal	Type	Note
	IO	USB1-						USB1+	IO	
1	PWR	5V	1	2	3	4		GND	PWR	
	IO	RX1-	5	6	7	8	9	TX1+	5	6
	IO	RX1+						TX1-		

	PWR	GND	PWR	

	IO	USB2-	USB2+	IO	
1	PWR	5V	1 2 3 4 GND	PWR	
	IO	RX2-	5 6 7 8 9 TX2+	IO	
	IO	RX2+	TX2-	IO	
	PWR	GND		PWR	

Note	Type	Signal	PIN	Signal	Type	Note
	IO	USB3-	USB3+		IO	
1	PWR	5V	1 2 3 4 GND		PWR	
	IO	RX3-	5 6 7 8 9 TX3+		5	6
	IO	RX3+	TX3-			
	PWR	GND			PWR	
	IO	USB4-	USB4+		IO	
1	PWR	5V	1 2 3 4 GND		PWR	
	IO	RX4-	5 6 7 8 9 TX4+		IO	
	IO	RX4+	TX4-		IO	
	PWR	GND			PWR	

Note 1: In order to meet the requirements of USB standard, the 5V input supply must be at least 5.00V

Signal	Description
USBn+ USBn- RXn+ RXn- TXn+ TXn- (n= 0,1,2,3)	Differential pair works as serial differential receive/transmit data lines.
5V	5V supply for external devices. Protected by 1.0A current limiting circuit for each USB port.

6.5 DC Power Jack Connector (Vin Ext.)

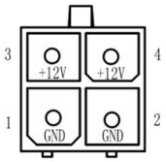
The DC Power Jack Connector (Vin Ext.) connector must be used to supply the board with +9V~+19V (+/-5%). Maximum allowed current is 5A.

Warning: Hot Plugging power supply is not supported. Hot plugging might damage the board.

Notes:To protect the external power lines of peripheral devices make sure that
-the wires have the right diameter to withstand the maximum available current.
-to enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

7 Internal Connectors

7.1 Power Connector (J1.)

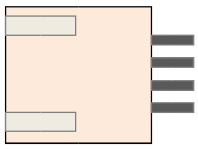
Header	Pin	Signal	Min.	Typ.	Max.	Units
	1	GND				
	2	GND				
	3	Power	+9.0	+12.0	+19.0	V
	4	Power	+9.0	+12.0	+19.0	V

Maximum allowed current on each pin is 3A.

Available cable kit:

Power Cable

7.2 Internal SATA Power Connector (SATA_PWR.)

Header	Pin	Signal	Description	Type
	1	GND	Power Ground	PWR
	2	+5V	+5V power input	PWR
	3	+5V	+5V power input	PWR
	4	GND	Power Ground	PWR

Maximum allowed current on each pin is 2A.

Available cable kit:

SATA Power Cable

7.3 SATA (Serial ATA) Disk interface

The WG-7366U has an integrated SATA Host controller that supports independent DMA operation on three ports. One device can be installed on each port for a maximum of three SATA devices via two SATA connectors and one mSATA connector.A point-to-point interface(SATA cable) is used for host to device connections.Data transfer rates of up to 6.0/3.0/1.5Gb/s are supported on all SATA ports.

Note: Before installing OS on a SATA drive make sure the drive is not a former member of a RAID system. If so some hidden data on the disk has to be erased. To do this, connect two SATA drives and select RAID in BIOS. Save settingsand select <Ctrl><I>while bootingtoentertheRAIDsetupmenu. Nowthehidden RAID data will be erased from the selected SATA drive.

Supported SATA features:

2 to 3-drive RAID 0(data striping)
2-drive RAID 1(data mirroring)
3-drive RAID 5(block-level striping with parity)
AHCI(Advanced Host Controller Interface)
Swap bay support(not supported on mSATA)

SATA1, SATA2 connector pinning:

PIN		Signal	Type	Ioh/Iol	Note
	1	GND	PWR	-	
	2	SATA* TX+			
	3	SATA* TX-			
	4	GND	PWR	-	
	5	SATA* RX-			
	6	SATA* RX+		-	
	7	GND	PWR		

Signal	Description
SATA* RX+ / RX-	Host transmitter differential signal pair
SATA* TX+ / TX-	Host receiver differential signal pair

"*" specifies 1, 2depending on SATA port.

Available cable kit:

SATA Cable

7.4 LVDS Flat Panel Connector (J8) The

LVDS is based on 40 pole connector.

The Connector reserved to automatically adjust the screen brightness ALS (Ambient Lightsensor) Interface foreDP (Supported on win8 or win 8.1 system).

Note	Type	Signal	PIN		Signal	Type	Note
5V (Default)or Vin	PWR	+5V or Vin	1	2	LVDS B3+	LVDS	
3.3V (Default)or 5V	PWR	LCDVCC	3	4	LVDS B3-	LVDS	
3.3V level	OT	BKL_EN#	5	6	LVDS B2+	LVDS	
3.3V level	OT	BKL_CTL	7	8	LVDS B2-	LVDS	
	OT	DDC_CLK	9	10	LVDS B1+	LVDS	
	OT	DDC_DATA	11	12	LVDS B1-	LVDS	
			13	14	LVDS B0+	LVDS	
			15	16	LVDS B0-	LVDS	
	PWR	GND	17	18	LVDS BCLK+	LVDS	
	LVDS	LVDS A3+	19	20	LVDS BCLK-	LVDS	
	LVDS	LVDS A3-	21	22	GND	PWR	
	LVDS	LVDS A2+	23	24	NC		
	LVDS	LVDS A2-	25	26	NC		
	LVDS	LVDS A1+	27	28	NC		
	LVDS	LVDS A1-	29	30	NC		
	LVDS	LVDS A0+	31	32	NC		
	LVDS	LVDS A0-	33	34	NC		
	LVDS	LVDS ACLK+	35	36	NC		
	LVDS	LVDS ACLK-	37	38	NC		
	PWR	GND	39	40	Hot Plug	I	Internally pull down (100K ohm)

Note: The LVDS connector supports single and dual channel, 18/24bit SPWG panels up to a resolution of 1920x1080 and with limited frame rate up to 1920x1200.

Signal	Description
LVDS A0..A3	LVDS A Channel data
LVDS ACLK	LVDS A Channel clock
LVDS B0..B3	LVDS B Channel data
LVDS BCLK	LVDS B Channel clock
BKLTCTL	Backlight control (1), PWM signal to implement voltage in the range 0-3.3V
BKLTEN#	Backlight Enable signal (active low) (2)
LCDVCC	VCC supply to the display. 5V or 3.3V (1A Max.)
DDC CLK	DDC Channel Clockor Ambient Light SensorI2C clock
DDC DATA	DDC Channel Data or Ambient Light SensorI2Cdata
INT#	Ambient Light SensorInterrupt

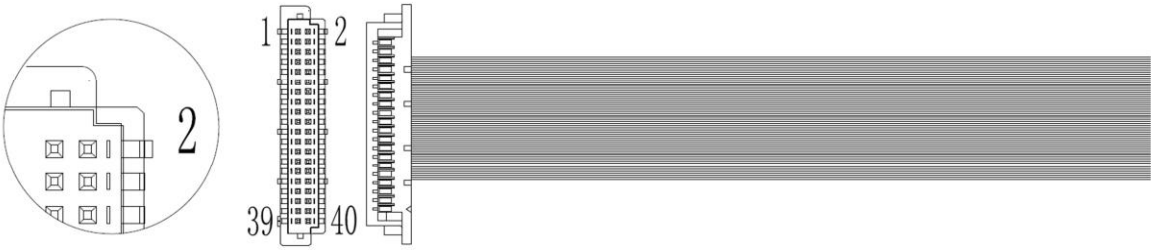
Notes: Windows API will be available to operate the BKLTCTL signal. Some Inverters have a limited voltage range 0-2.5V for this signal: If voltage is > 2.5V the Inverter might latch up. Some Inverters generates noise on the BKLTCTL signal, causing the LVDS transmission to fail (corrupted picture on the display). By adding a 1Kohm resistor in series with this signal, mounted at the Inverter end of the cable kit, the noise is limited and the picture is stable.

Notes: The pin1 voltage of this LVDS interface can be adjusted by PWR_LVDS,

PWR_LVDS		Description
pin1-2	pin2-3	
X		Pin1 of LVDS connector(J8) is 5V.
	X	Pin1 of LVDS connector(J8) is DC IN.

Warning: Short connected to the 2-3 pin, the 1 pin voltage of the LVDS connector is equal to the main board input voltage.

Available cable kit:



LVDS Cable

7.5 USB Connectors (USB6,USB7 and USB8)

The WG-7366U support three internal USB 2.0 ports (USB6, USB7 and USB8) allowing data transfers up to 480Mb/s.

Note	Type	Signal	PIN		Signal	Type	Note
	PWR	+5V	1	2	+5V	PWR	
	IO	USB2-	3	4	USB9-	IO	
	IO	USB2+	5	6	USB9+	IO	
	PWR	GND	7	8	GND	PWR	
	IO	USB3-	9	10	USB10-	IO	
	IO	USB3+	11	12	USB10+	IO	

Note1:

Signal	Description
USBn+ USBn- (n= 2,3,9,10)	Differential pair works as Data/Address/Command Bus.
5V	5V supply for external devices. Protected by 1.0A current limiting circuit for each USB port.

In order to meet the requirements of USB standard, the 5V input supply must be at least 5.00V.

7.6 Serial COM Ports

4X RS232 and 2X232/422/485 serial ports are available on the PCM-B401.

Description	Type	Signal	PIN		Signal	Type	Description	Serial number
RS232 signal	I	RS_232_A_RX	1	2	RS_232_A_TX	O	RS232 signal	COM1
RS232 signal	I	RS_232_B_RX	3	4	RS_232_B_TX	O	RS232 signal	COM2
RS232 signal	I	RS_232_C_RX	5	6	RS_232_C_TX	O	RS232 signal	COM3
RS232 signal	I	RS_232_D_RX	7	8	RS_232_D_TX	O	RS232 signal	COM4
RS232 signal	I	RS_232_E_RX	9	10	RS_232_E_TX	O	RS232 signal	COM5
RS232 signal	I	RS_232_F_RX	11	12	RS_232_F_TX	O	RS232 signal	COM6
RS485/RS422 signal	I	RS485_A_D-/RS422_A_TxD-	13	14	RS_485_A_D+/RS422_A_TxD+	O	RS485/RS422 signal	COM1
RS422 signal	I	RS422_A_RxD-	15	16	RS422_A_RxD+	O	RS422 signal	COM1
RS485/RS422 signal	I	RS485_B_D-/RS422_B_TxD-	17	18	RS_485_B_D+/RS422_B_TxD+	O	RS485/RS422 signal	COM2
RS422 signal	I	RS422_B_RxD-	19	20	RS422_B_RxD+	O	RS422 signal	COM2
Ground		Ground	21	22	GND		Ground	Ground

The typical definition of the signals in the COM ports is as follows:

Signal	Description
TxD	Transmitted Data sends data to the communications link. The signal is set to the marking state (0V) on hardware reset when the transmitter is empty or when loop mode operation is initiated.
RxD	Received Data, receives data from the communications link.

Note1:

COM_SEL : mode select,Connect jumper to select COM1、COM2 mode.

PIN		Signal	Serial number
1	2	RS232 mode	COM1
3	4	RS485 mode	
5	6	RS422 mode	
7	8	RS232 mode	COM2
9	10	RS485 mode	
11	12	RS422 mode	

Available cable kit:

COM cable

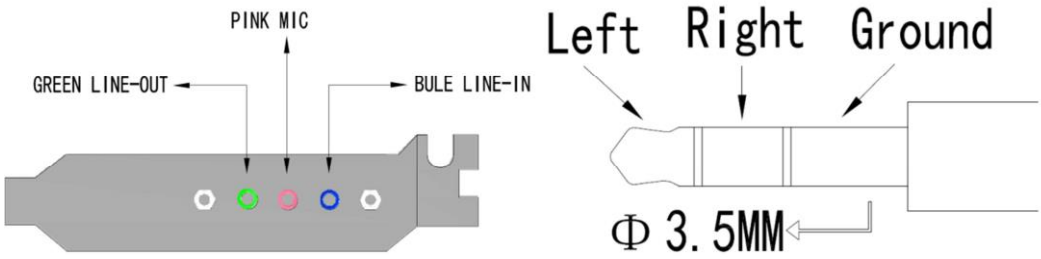
7.7 Audio Connector (AUDIO)

The on-board Audio circuit implements High Definition Audio with UAA (Universal Audio Architecture), featuring 24-bit stereo DAC and 20-bit stereo ADCs.

Description	Type	Signal	PIN		Signal	Type	Description
	O	Line-out right	1	2	Line-out left	O	
		GND	3	4	GND		
Microphone	I	Mic right	5	6	Mic left	O	Microphone
	PWR	GND	7				
	I	Line-in right	9	10	Line-in left	I	

Available cable kit:

Audio Jack:



AUDIO Cable

7.8 GPIO Connector (GPIO1)

PullUP	Ioh/ Iol	Type	Signal	PIN		Signal	Type	Ioh/ Iol	PullUP
		PWR	3.3V	1	2	GND	PWR		
10k ohm	TBD	IOT	GPIO0	3	4	GPIO1	IOT	TBD	10k ohm
10k ohm	TBD	IOT	GPIO2	5	6	GPIO3	IOT	TBD	10k ohm
10k ohm	TBD	IOT	GPIO4	7	8	GPIO5	IOT	TBD	10k ohm
10k ohm	TBD	IOT	GPIO6	9	10	GPIO7	IOT	TBD	10k ohm
		PWR	GND	11	12	3.3V	PWR		

Signal	Description
3.3V	

GPIO0..7	General Purpose Inputs / Output. These Signals may be controlled or monitored through the use of the KT-API-V2 (Application Programming Interface).

7.10 Clear CMOS (CLR_CMOS)

Connect jumper to clear CMOS settings.

Warning: Don't leave the jumper in position1-2,otherwise if power is disconnected,the battery will fully deplete within a few weeks.

CLR_CMOS pin1-2	Description
-	Default position.
X	Load Default BIOS Settings exclusive erasing Password **(Board do not boot with jumper in this position)**

7.11 Power Button (PWR_SW, RESET_SW)

AUTO_BTN		Description
pin1-2	pin2-3	
X		Power Button In. Toggle this signal low to boot the board or to shut down
	X	Reset Button In. Toggle this signal low to reset the board.

7.13 "Always On" (AUTO_BTN)

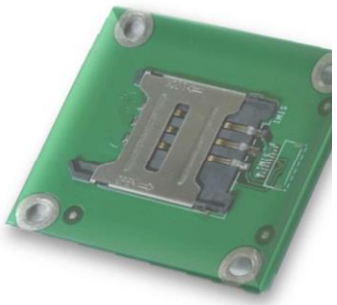
The "Always On" can be used to implement hardware controlled always ON by jumper. When "Always On" is selected, the board will power up automatically when power is connected.

The board can still be shut down by PWRBTN_IN# (power button in) activation (via PWR_SW).

AUTO_BTN		Description
pin1-2	pin2-3	
-	X	Default position
X	-	Always On selection

7.14 SIM card Connector (SIM1)

Support the expansion of SIM card, with the 3G/4G module, to achieve a wireless network connection. The SIM card extension board is optional.



SIM1			
PIN	Signal	PIN	Signal
1	VCC	**4**	DATA
2	RST	**5**	GND
3	CLK		

8 Slot Connectors (mPCIe, mSATA)

8.1 mSATA slot

The MSATA port support mSATA and Debug module.

Note	Type	Signal	PIN		Signal	Type	Note
	NC	NC	1	2	+3.3V	PWR	
Debug signal		DGH	3	4	GND	PWR	
Debug signal		DGL	5	6	+3.3V(optional)	PWR	
	NC	NC	7	8	LEDG	I	Debug signal
	PWR	GND	9	10	LEDF	I	Debug signal
	NC	NC	11	12	LEDE	I	Debug signal
	NC	NC	13	14	LEDD	I	Debug signal
	PWR	GND	15	16	LEDC	I	Debug signal
Debug signal	I	LEDB	17	18	GND	PWR	
Debug signal	I	LEDA	19	20	NC	NC	
	PWR	GND	21	22	NC	NC	
		SATA_RX_P	23	24	+3.3V	PWR	
		SATA_RX_N	25	26	GND	PWR	
	PWR	GND	27	28	NC	NC	
	PWR	GND	29	30	NC	NC	
		SATA_TX_N	31	32	NC	NC	
		SATA_TX_P	33	34	GND	PWR	
	PWR	GND	35	36	NC	NC	
	PWR	GND	37	38	NC	NC	
	PWR	+3.3V	39	40	GND	PWR	
	PWR	+3.3V	41	42	NC	NC	
	PWR	GND	43	44	NC	NC	
		NC	45	46	NC	NC	
		NC	47	48	NC	NC	
		NC	49	50	GND	PWR	

		GND	51	52	+3.3V	PWR	

8.2 mPCIe slot

The MPCIE port support mPCIe. (USB is included)

Note	Type	Signal	PIN		Signal	Type	Note
		WAKE#	1	2	+3V3 Dual	PWR	
	NC	NC	3	4	GND	PWR	
	NC	NC	5	6	+1.5V	PWR	
	NC	NC	7	8	NC	NC	
	PWR	GND	9	10	NC	NC	
		CLKN	11	12	NC	NC	
		CLKP	13	14	NC	NC	
	PWR	GND	15	16	NC	NC	
	NC	NC	17	18	GND	PWR	
	NC	NC	19	20	NC	NC	
	PWR	GND	21	22	RST#		
		PCIE_RX_DN	23	24	+3V3 Dual	PWR	
		PCIE_RX_DP	25	26	GND	PWR	
	PWR	GND	27	28	+1.5V	PWR	
	PWR	GND	29	30	SMB_CLK		
		PCIE_TX_DN	31	32	SMB_DATA		
		PCIE_TX_DP	33	34	GND	PWR	
	PWR	GND	35	36	USBN		
	PWR	GND	37	38	USBP		
	PWR	+3.3V	39	40	GND	PWR	
	PWR	+3.3V	41	42	NC	NC	
	PWR	GND	43	44	NC	NC	

		NC	45	46	NC	NC	
		NC	47	48	+1.5V	PWR	
		NC	49	50	GND	PWR	
		GND	51	52	+3V3 Dual	PWR	