IP417

Mini-ITX COM Express Type 10 (R3.0) Carrier Board

User's Manual

Version 1.0
(July 2019)

Compliance

CE

In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.

FC

This product has been tested and found to comply with the limits for a Class A device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE

This product is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Carefully read the precautions before using the board.

Environmental conditions:

- Use this product in environments with ambient temperatures between -20˚C and 70˚C.
- Do not leave this product in an environment where the storage temperature may be below -40° C or above 90° C. To prevent from damages, the product must be used in a controlled environment.

WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the top of this product.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.

CAUTION

Danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

* PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, you can download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/. Fill out the form and contact your distributor or sales representative.

Table of Contents

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Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Specifications
- Board Overview
- Board Dimensions

1.1 Introduction

IP417 is a carrier board for mini-ITX COM Express Type 10 (R3.0) CPU module. It features expansion slots for a PCIe and two mini-PCIe slots and I/O interface for a DP display, two RJ45, eight USB 3.0 and two USB 2.0 ports. It measures 170mm x 170mm.

COM Express Modules are designed for the needs of IoT embedded applications including amusement gaming, ATM/POS, medical imaging, and industrial control, these mini modules combine graphics and energy-efficient computing power to handle various tasks.

Photo of IP417

1.2 Features

- 1 x PCIe (x1), 2 x Mini-PCIe sockets (full-size & half-size)
- 8 x USB 2.0, 2x USB 3.0
- Supports 1x eDP or 1x LVDS (depending on COMe module),
- 1 x DisplayPort
- 2 x LAN connectors

1.3 Specifications

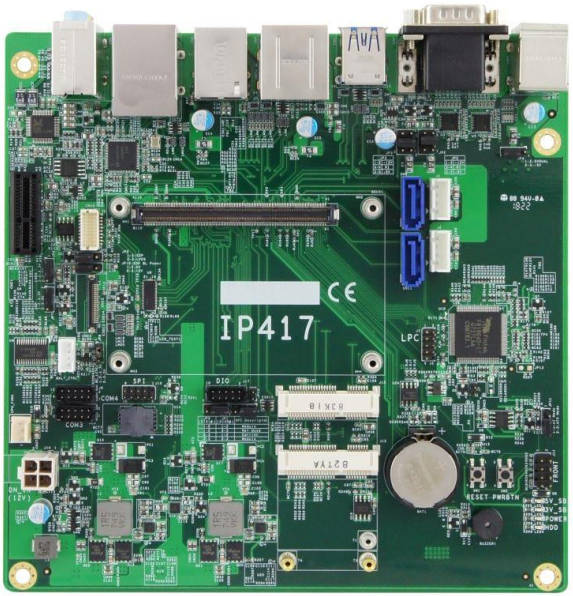
Product Name	**IP417**
Form Factor	Mini-ITX COM Express Type 10 (R3.0) carrier board
Super I/O	Fintek F81964D-I
Digital I/O	4-In / 4-Out
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
Dimensions	170 x 170 mm (6.69” x 6.69”)
RoHS	Yes
I/O Ports / Connectors	
Power Supply	DC-In 12V via an onboard 2x2 pin connector
Display	Derived from COMe module ET875. • 1 x DisplayPort • 1 x 18/24-bit dual channel LVDS or 1 x eDP (Choose either one)
LAN	**2 x RJ45 LAN ports:** • LAN 1: Derived from COMe module • LAN 2: from Intel I210IT
USB	Derived from COMe module ET875. • 8 x USB 2.0 (4 are edge I/O connectors, and 2 from onboard box-headers, .2 from mini-PCIe) • 2 x USB 3.0
Serial	**4 x COM ports:** • COM1 & COM2: RS-232 (full-function) (edge I/O connector) • COM3 & COM4: RS-232 (TX and RX only) (from the COMe module, via an on-board box-headers)
Serial ATA	Derived from COMe module. 2 x SATA 3.0

Audio Jacks	Onboard Realtek ALC662 with 5.1 channel HD audio: 1 x Line-In, 1 x Line-Out, 1 x Mic-In
PS/2 Keyboard & Mouse	• 1 x PS/2 Keyboard port • 1 x PS/2 Mouse port
Battery for RTC/CMOS	1 x Lithium battery button cell for RTC of COMe module
Expansion Slots	• 1 x PCIe (x1) slot • 2 x Mini-PCIe slot
Environment	
Temperature	• **Operating**: -40 ~ 85°C (-40 ~ -185°F) • **Storage:** -40 ~ 90 °C (-40 ~ 194°F)
Relative Humidity	10 ~ 90 % (non-condensing)

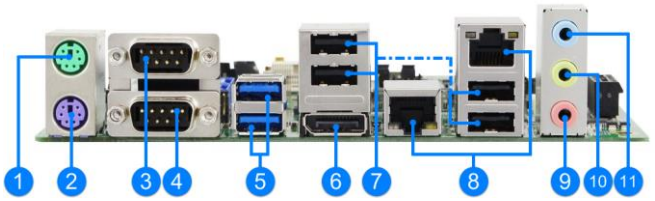
All specifications are subject to change without prior notice.

1.4 Overview

Top View



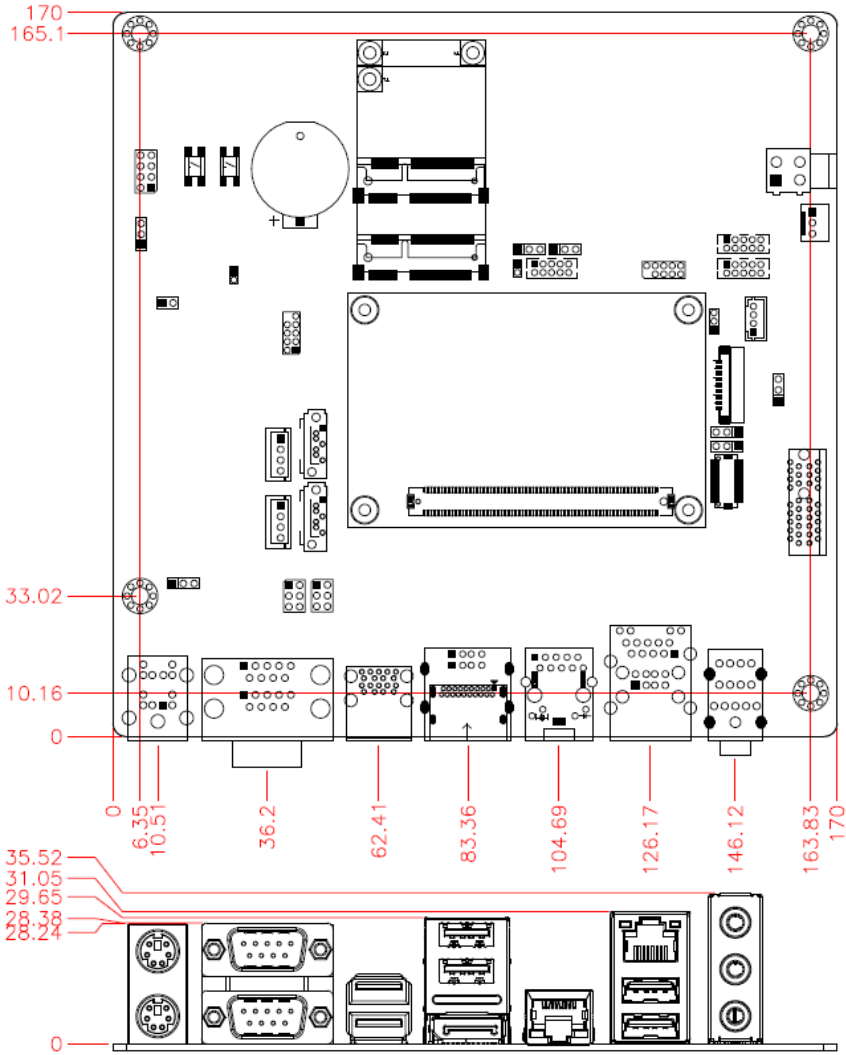
I/O View



No.	Name	No.	Name
1	PS/2 Mouse Port	7	USB 2.0 Ports
2	PS/2 Keyboard Port	8	GbE LAN Ports
3	COM1 RS-232 Port	9	Microphone Input
4	COM2 RS-232 Ports	10	Audio Line-Out
5	USB 3.0 Port	11	Audio Line-In
6	DisplayPort		

* The photos above are for reference only. Some minor components may differ.

1.5 Dimensions



Chapter 2
Hardware Configuration

This section provides information on jumper settings and connectors on the board in order to set up a workable system.

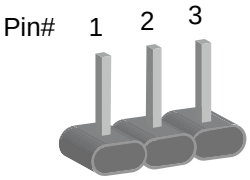
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Setting the Jumpers

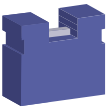
Set up and configure your board by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

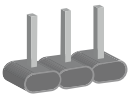
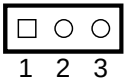
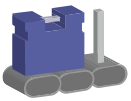
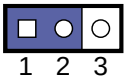
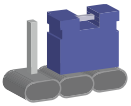
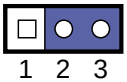


A 3-pin jumper



A jumper cap

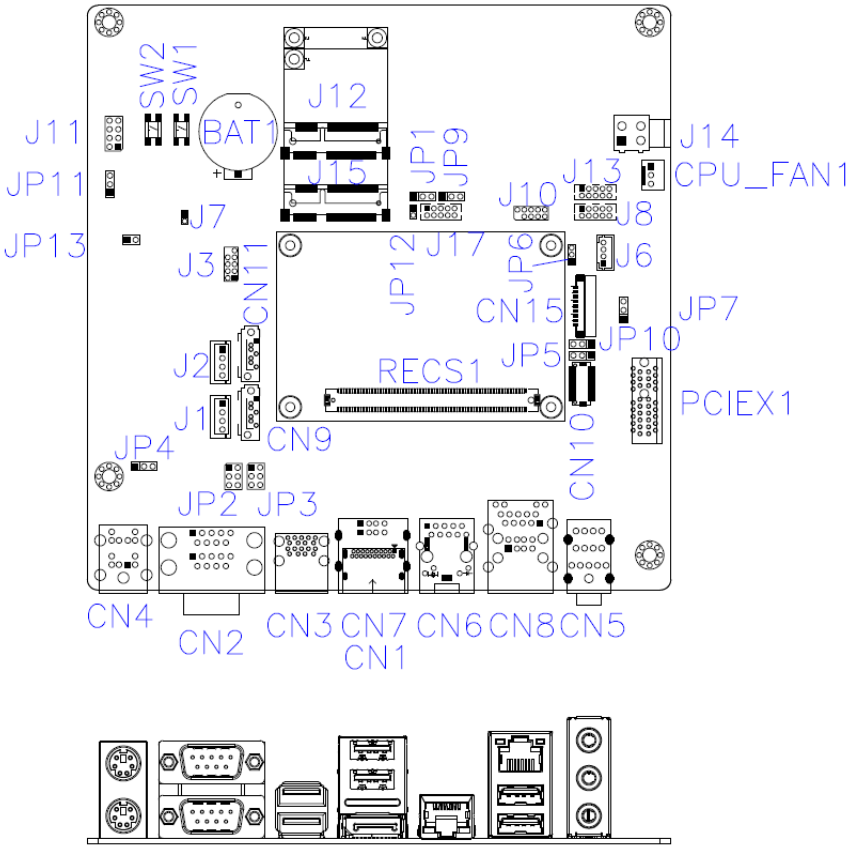
Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Schematic illustration
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.2 Connector Locations on IP417



Board diagram of IP417

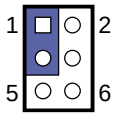
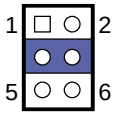
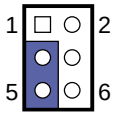
2.3 Jumpers Quick Reference

Function	Jumper Name
BIOS Boot Selection	JP1, JP9
COM1 RS-232 Power Selection	JP2
COM2 RS-232 Powr Selection	JP3
PS/2 Mouse/Keyboard Power Selection	JP4
eDP / LVDS Function Setting	JP5
LVDS Panel Power	JP6
eDP Panel Power	JP7
LVDS Backlight Power Selection	JP8
eDP Backlight Power Selection	JP10
AT / ATX Mode Selection	JP11

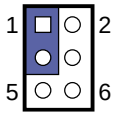
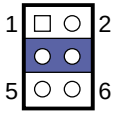
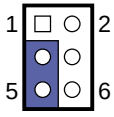
2.3.1 BIOS Boot Selection (JP1, JP9)

Pin closed				SPI_CS0#	SPI_CS1#	SPI0/FWH
JP9		JP1				
1-2		1-2		Module	Module	SPI0 (default)
1-2		2-3		Module	Module	Carrier FWH
2-3		1-2		Carrier	Module	SPI0/SPI1
2-3		2-3		Module	Carrier	SPI0/SPI1

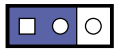
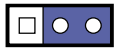
2.3.2 COM1 RS-232 Power Selection (JP2)

Function	Pin closed	Illustration
12V	1-3	
Normal (default)	3-4	
5V	3-5	

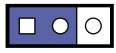
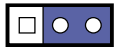
2.3.3 COM2 RS-232 Powr Selection (JP3)

Function	Pin closed	Illustration
12V	1-3	
Normal (default)	3-4	
5V	3-5	

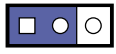
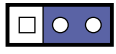
2.3.4 PS/2 Mouse/Keyboard Power Selection (JP4)

Function	Pin closed	Illustration
5VSB (default)	1-2	
5V	2-3	

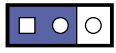
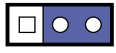
2.3.5 eDP / LVDS Function Setting (JP5)

Function	Pin closed	Illustration
eDP (default)	1-2	
LVDS	2-3	

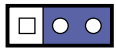
2.3.6 LVDS Panel Power (JP6)

Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

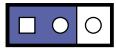
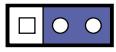
2.3.7 eDP Panel Power (JP7)

Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

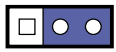
2.3.8 LVDS Backlight Power Selection (JP8)

Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.3.9 eDP Backlight Power Selection (JP10)

Function	Pin closed	Illustration
5V (default)	1-2	
12V	2-3	

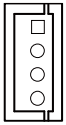
2.3.10 AT / ATX Mode Selection (JP11)

Function	Pin closed	Illustration
AT Mode	1-2	
ATX Mode (default)	2-3	

2.4 Connectors Quick Reference

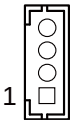
Function	Connector Name
SATA HDD Power Connector	J1, J2
LVDS Panel Inverter Power Connector	J6
COM3 & COM4 Ports	J13 (COM3) J8 (COM4)
GPIO Connector	J17
System Function Connector	J11
Mini-PCIe Slot	J12, J15
DC-In 12V Power Connector	J14
DisplayPort	CN1
COM1 & COM2 RS-232 Ports	CN2
USB 3.0	CN3
PS/2 Keyboard & Mouse	CN4
Audio Connector	CN5
GbE LAN Port	CN6, CN8
USB 2.0	CN7
SATA 3 Connector	CN9, CN11
LVDS Connector	CN10
eDP Connector	CN15
COMe Connector	RECS1
PCIe (x1) Slot	PCIEX1
Fan Power Connector	CPU_FAN1
Power Button	SW2
Reset Button	SW1
Factory Use Only	J3, J10

2.4.1 SATA HDD Power Connector (J1, J2)



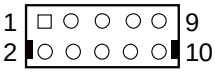
Pin	Signal Name	Pin	Signal Name
1	+5V	3	Ground
2	Ground	4	+12V

2.4.2 LVDS Panel Inverter Power Connector (J6)



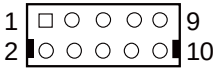
Pin	Signal Name	Pin	Signal Name
1	+12V	3	ADJ
2	Backlight Enable	4	Ground

2.4.3 COM3 & COM4 Ports (J13, J8)



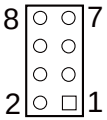
Pin	Signal Name	Pin	Signal Name
1	NC	2	RXD, Receive data
3	TXD, Transmit data	4	NC
5	Ground	6	NC
7	NC	8	NC
9	NC	10	NC

2.4.4 GPIO Connector (J17)



Pin	Signal Name	Pin	Signal Name
1	Ground	2	+3V
3	GPO3	4	GPO1
5	GPO2	6	GPO0
7	GPI3	8	GPI1
9	GPI2	10	GPI0

2.4.5 System Function Connector (J11)



Pin	Signal Name	Pin	Signal Name
1	Power BTN-	2	Power BTN+
3	HDD LED+	4	HDD LED-
5	Reset BTN-	6	Reset BTN+
7	Power LED+	8	Power LED-

J11 is used for system indicators to provide light indication of computer activities and switches to change the computer status. It provides interfaces for the following functions.

- **ATX Power ON Switch (Pins 1 and 2)**

  The 2 pins make an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

- **Hard Disk Drive LED Connector (Pins 3 and 4)**

  This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

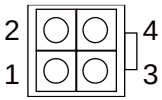
- **Reset Switch (Pins 5 and 6)**

  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

- **Power LED (Pins 7 and 8)**

  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

2.4.6 DC-In 12V Power Connector (J14)

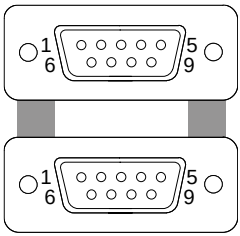


Pin	Signal Name	Pin	Signal Name
1	Ground	3	+12V
2	Ground	4	+12V

2.4.7 COM1 & COM2 Ports (CN2)

COM1:

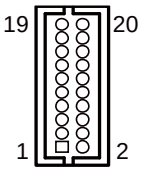
COM2:



Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

2.4.8 LVDS Connector (CN10)

The LVDS connector supports single-channel 18-bit or 24-bit displays.



Pin	Signal Name	Pin	Signal Name
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

2.4.9 eDP Connector (CN15)

Pin	Signal Name	Pin	Signal Name
1	N.C	16	Ground
2	Backlight Power	17	N.C
3	Backlight Power	18	EDP Power
4	Backlight Power	19	EDP Power
5	Backlight Power	20	Ground
6	N.C	21	AUXN
7	N.C	22	AUXP
8	Backlight CTRL	23	Ground
9	Backlight Enable	24	TX0P
10	Ground	25	TX0N
11	Ground	26	Ground
12	Ground	27	TX1P
13	Ground	28	TX1N
14	HPD	29	Ground
15	Ground	30	NC

2.4.10 Fan Power Connector (CPU_FAN1)

Pin	Signal Name	Pin	Signal Name
1	Ground	3	Rotation detection
2	+12V		

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Appendix

This section provides the mapping addresses of peripheral devices, the sample code of watchdog timer configuration, and types of on-board connectors.

A. Onboard Connector Types

Function	Connector Name	Onboard Type	Compatible Mating Type for Reference
COM1 & COM2 RS-232 Ports	CN2	YIMTEX C1208121009230700P	D-SUB 9P (Female)
eDP Connector	CN15	I-PEX 20374-030E-31	I-PEX 20373-R30T-06
LVDS Connector	CN10	HRS DF20F-20DP-1V	HRS DF20A-20DS-1C
DC-in 12V Power Connector	J14	Hao Guo Xing Ye ATX4PT-NY46	Molex 39-01-2040
Digital I/O Connector	J17	Hao Guo Xing Ye DF11-10S-PA66H	HRS DF11-10DS-2C
Panel Inverter Power Connector	J6	JST B4B-PH-K-S	JST PHR-4
COM3 & COM4 RX/TX Port	J13 (COM3), J18 (COM4)	Hao Guo Xing Ye DF11-10S-PA66H	HRS DF11-10DS-2C
System Function Connector	J11	E-Call 0126-01-203-080	Dupont 2.54mm-pitch (Female)
Fan Power Conector	CPU_FAN1	E-Call 0110-02-111-030	Molex 22-01-2031