



LTE Cat.4 Modem

# NTLE9607-K4

## 제품설명서

Ver. 1.3 / 10.13.20



## Revision History

Revision	Date	Authors	Description
V1.0	2020.01.06	Evan Lee	작 성
V1.1	2020.02.18	Evan Lee	Pin Map 변경
V1.2	2020.06.03	Evan Lee	12Pin External Connector Pin MAP변경
V1.3	2020.10.13	Evan Lee	30Pin B to B Connector Pin MAP변경

## CONTENTS

1. 기기의 개요 (Introduction).....	4
1.1. 기기의 개요 .....	4
1.2. 제품 분해 사진 .....	4
1.3. 제품 외부 Interface.....	5
1.4. Block Diagram Architecture.....	6
2. 제 품 규 격 (Specification).....	7
2.1. 일반 .....	7
2.1.1 환경시험 .....	7
2.2. 하드웨어 규격.....	7
2.2.1 일반적 규격.....	7
2.2.2 Module 규격 (NTLM9607-KL) .....	8
2.3 기구 규격.....	9
3. Modem Interface 규격.....	10
3.1. UART Interface .....	10
3.2. USB Interface .....	10
3.3. LED Interface.....	10
3.4. USIM Interface .....	11
3.5. Power Supply.....	11
3.6. 12Pin External Connector .....	11
3.7. Board To Board Connector(30Pin) .....	12
4. PCB Layout Guide .....	15
4.1. PCB Layout .....	15

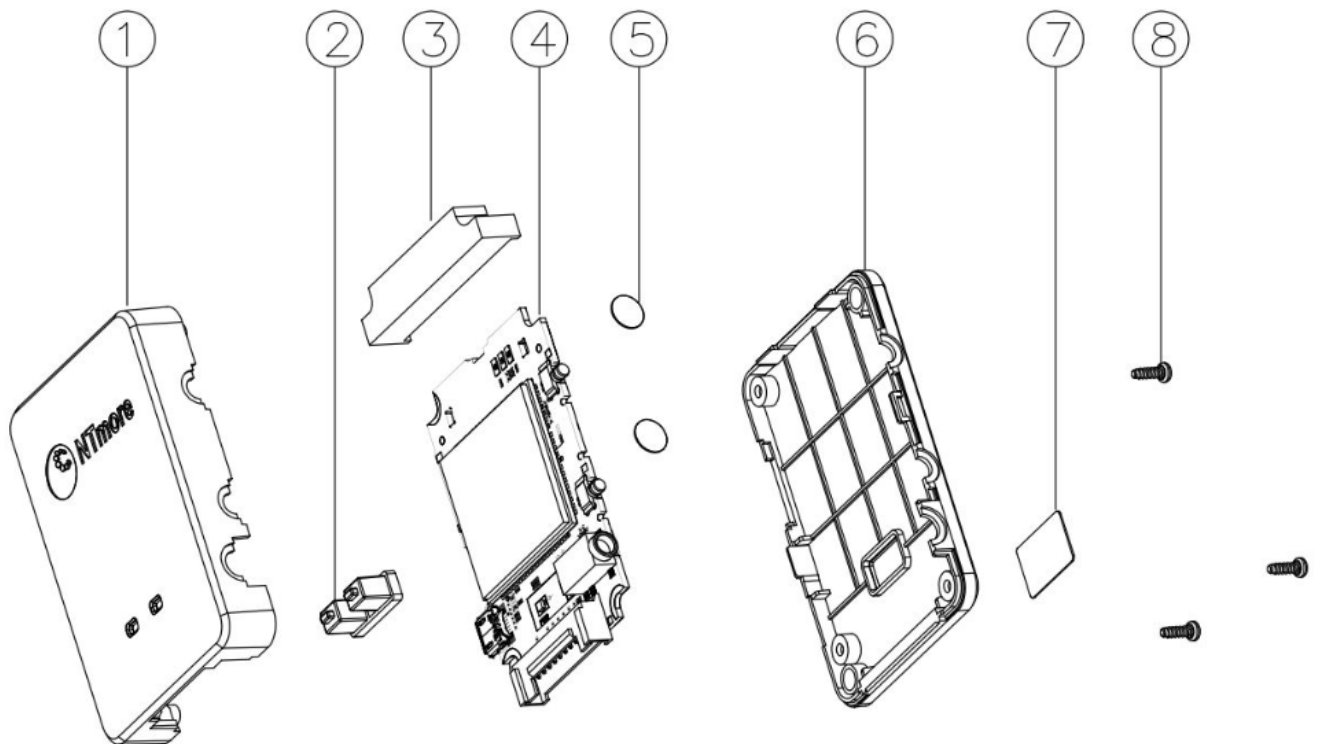
## 1. 기기의 개요 (Introduction)

### 1.1. 기기의 개요

NTLE9607-K4는 데이터 통신용 외장형 Modem이며 LTE Cat.4를 지원합니다.

Data 속도는 Downlink : 150Mbps, Uplink : 50Mbps 입니다.

### 1.2. 제품 분해 사진



NO	PART NO.	MATERIAL	Q'TY
1	CASE TOP	PC	1
2	LIGHT GUIDE	PC	1
3	ANTENNA	-	1
4	PCB ASSY	-	1

NO	PART NO.	MATERIAL	Q'TY
5	PC SHEET ANT	PC SHEET	2
6	CASE BOT	PC	1
7	PC SHEET CONNECTOR	PC SHEET	1
8	SCREW M2.0 X 6	-	3

Figure 1-1 Exploded view

### 1.3. 제품 외부 Interface

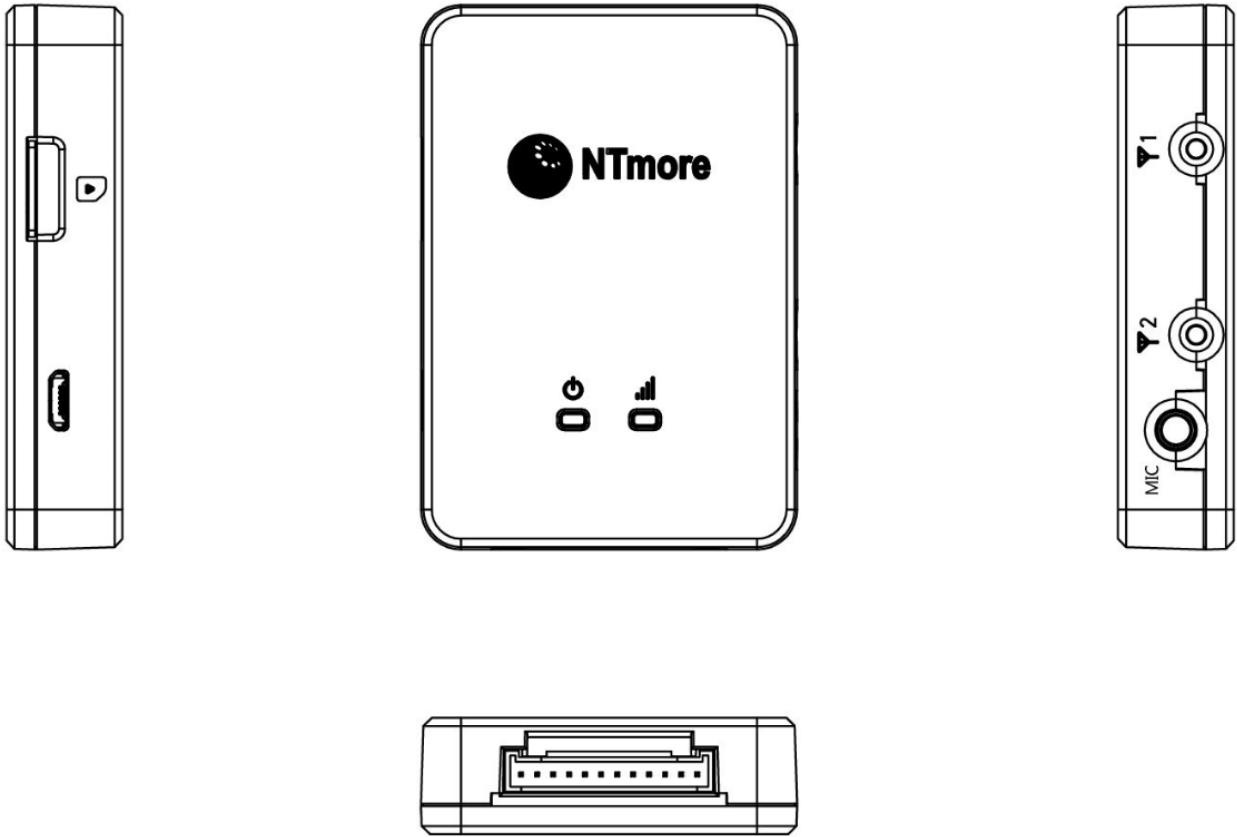


Figure 1-2 외부 Interface

## 1.4. Block Diagram Architecture

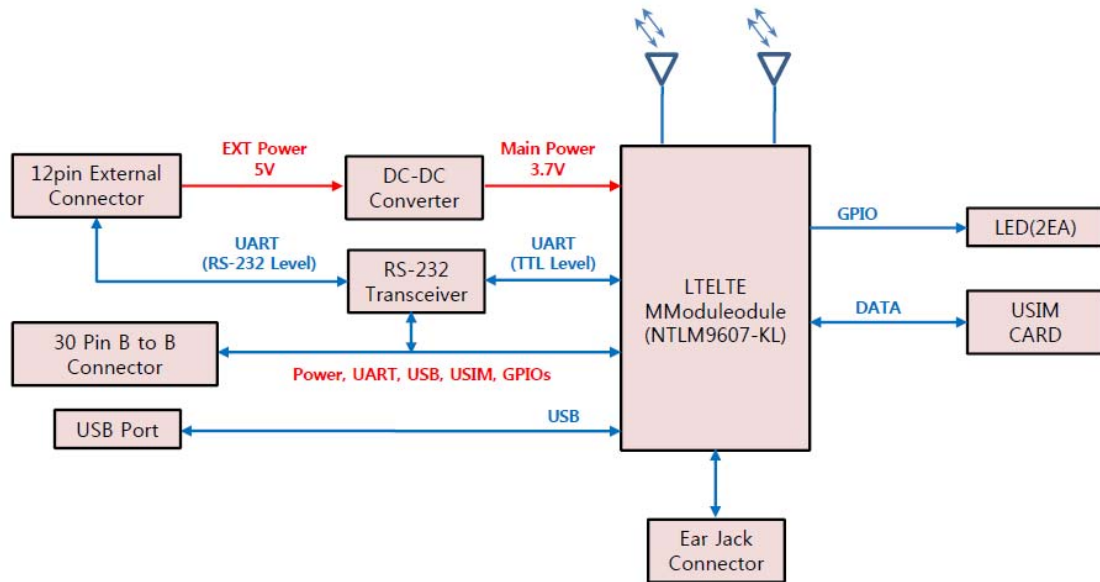


Figure 1-3 Block Diagram

## 2. 제 품 규 격 (Specification)

### 2.1. 일반

#### 2.1.1 환경시험

상대습도	10% ~ 90%
동작온도	-30°C ~ 70°C
저장온도	-40°C ~ 85°C

Table 2-1 Temperature Specification

### 2.2. 하드웨어 규격

#### 2.2.1 일반적 규격

항 목	규 격 내 용			
무선 Protocol	FDD LTE Cat.4			
전원공급 방식	DC +5V			
사용주파수대역	송신	LTE B3: 1710 ~ 1785MHz B8: 880 ~ 915MHz	수신	LTE B3: 1805 ~ 1880MHz B8: 925 ~ 960MHz
Antenna Type	Internal Antenna(Main), External Antenna(Div)			
Interface	12Pin External Connector, 30Pin B to B Connector, USB, USIM, Ear Jack			
외부장착케이블	12Pin Cable, USB Cable			
LED	Power(Red), LTE Signal Level(3 Color)			

Table 2-2 General Specification

**2.2.2 Module 규격 (NTLM9607-KL)**

ITEM		SPECIFICATION	
LTE	Standard	3GPP Release 9	
	UE Category	Cat.4	
	Frequency Range	Band 3 (UL: 1710 ~ 1785MHz, DL: 1805 ~ 1880MHz) Band 8 (UL: 880 ~ 915MHz, DL: 925 ~ 960MHz)	
	Duplex Mode	FDD	
	RF Paths	2 x Rx / 1 x Tx	
	Modulation(UL)	QPSK, 16QAM	
	Demodulation(DL)	QPSK, 16QAM, 64QAM	
	Reference Sensitivity	QPSK, BW : 10MHz	Band 3 : -94dBm Band 8 : -94dBm
	Maximum Tx Power	23dBm ±2dB	@Antenna Port
	Transmit Data Rate	D/L 150Mbps, U/L : 50Mbps	
	Host Interface	LCC	

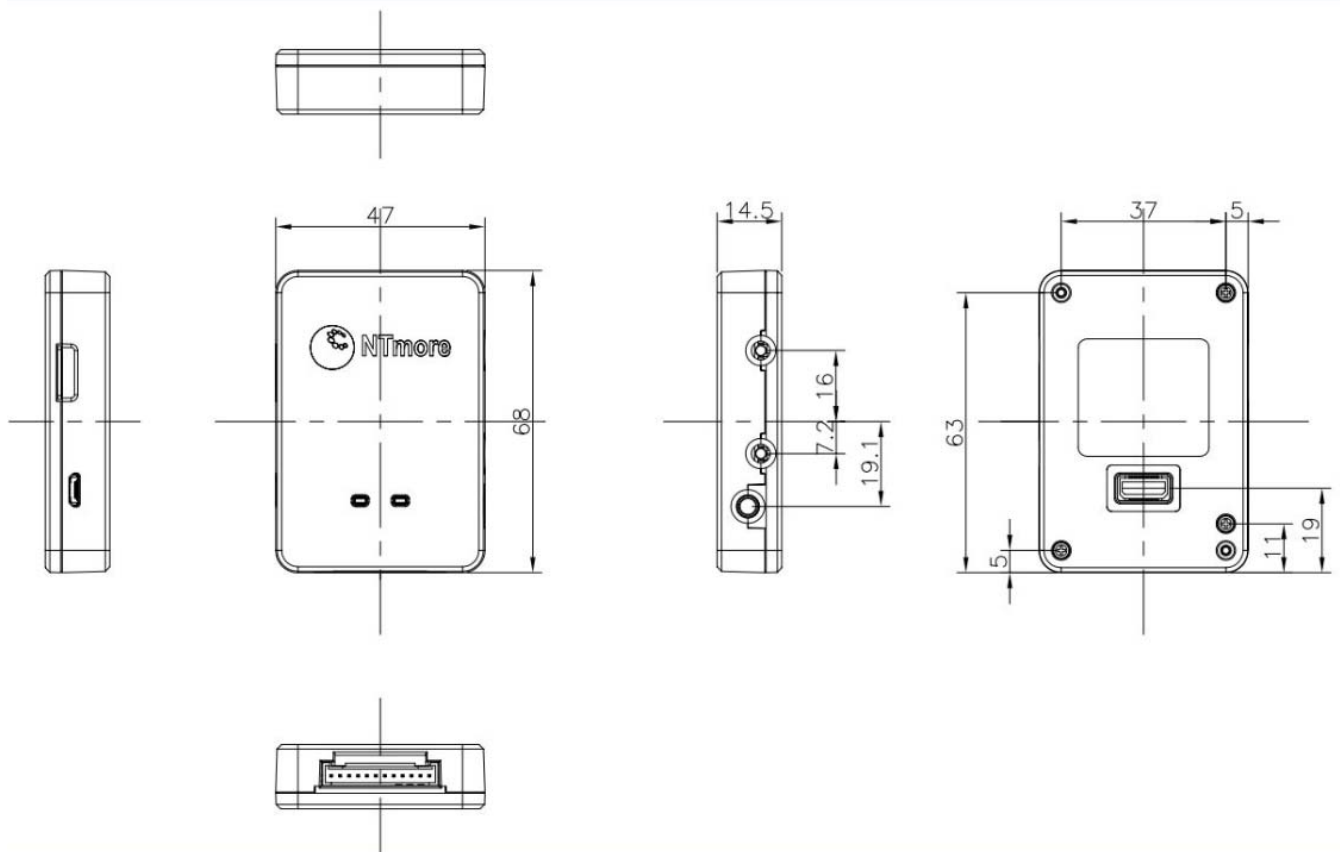
**Table 2-3 LTE General Specification**



## 2.3 기구 규격

사이즈(W*H*T)mm	47.0 x 68.0 x 14.5mm
무게(gram)	32g

Table 2-4 Mechanical Specification



### 3. Modem Interface 규격

#### 3.1. UART Interface

NTLE9607-K4는 HOST와의 통신 시 RS-232 level로 데이터를 송수신하고 있으며 사용된 RS-232 인터페이스 신호 및 규격은 하기 표와 같다.

Signal Name	내 용	방 향	SWING Voltage
HOST_CTS	Clear to send(송신 허가)	M-to-H	10Vp_p
HOST_RXD	Receive Data(수신 데이터)	M-to-H	10Vp_p
HOST_TXD	Transmit Data(송신 데이터)	H-to-M	5.4Vp_p
HOST_RTS	Request to send(송신 요구)	H-to-M	5.4Vp_p

\* M : NTLE9607-K4, H : HOST(PC)

(note) RS-232 Interface signal name is based on Modem

**Table 3-1 RS-232 interface description**

#### 3.2. USB Interface

NTLE9607-K4의 상태를 Monitoring 하기 위한 DM 통신의 Interface이며 일반 사용자에게는 지원안함

#### 3.3. LED Interface

LED를 사용하여 Power, UART, LTE 신호 세기 상태를 표시한다

Signal Name	Color	내 용
Power	Red	전원 공급 시 LED가 켜지며 전원이 정상 공급됨을 나타냄
LTE	Red, Green, Yellow	LTE 신호의 세기를 나타내며 강전계는 Green, 약전계는 Yellow, No Service는 Red로 표시 됨

**Table 3-2 LED interface description**

### 3.4. USIM Interface

USIM을 지원하기 위한 slot을 갖고 있으며

USIM은 사용자 인증정보를 제공함으로써, 단말기가 네트워크에 접속이 가능 하게 해준다

### 3.5. Power Supply

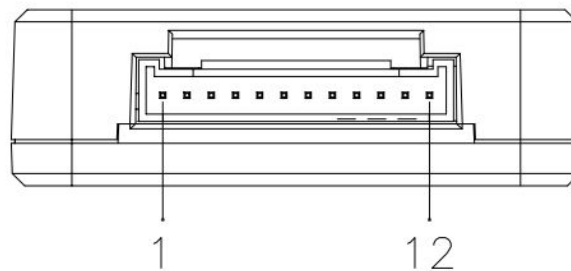
전원 공급 시 3M 이내의 DC+5V/1A(Max) Adapter 전원을 사용하여야 하며

별도 옵션으로 제공 가능합니다.

### 3.6. 12Pin External Connector

SOCKET : 연호전자 / SMAW200-12P( **NTLE9607-K4 적용**)

PLUG : 연호전자 / SMH200-12P(**Cable 적용**)



NO	External Pin Definition	IO	Functional Description	Remarks
1	UART1_TX	DO	Serial data transmission	TTL Level (1.8V)
2	UART1_RX	DI	Serial data reception	TTL Level (1.8V)
3	MAIN_PWR	PI	Power input DC(+5V)	
4	GND		Ground	
5	RS232_TXD	DO	Serial data transmission	RS232 Level
6	RS232_RXD	DI	Serial data reception	RS232 Level
7	RS232_RTS	DI	Request to send	RS232 Level
8	RX232_CTS	DO	Clear send	RS232 Level
9	GND		Ground	
10	MIC	AI	Audio Input	

<b>11</b>	SPK	AO	Audio Output	
<b>12</b>	RESERVED		Not Connected	

### Table 3-3 External 12Pin Connector Descriptions

### 3.7. Board To Board Connector(30Pin)

- P5K



## Socket



Header

**SOCKET : Panasonic / AXK5S30047YG( NTLE9607-K4 적용)**

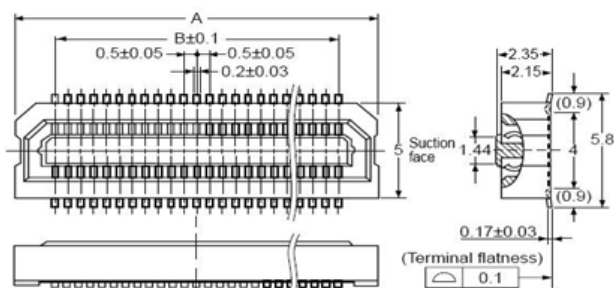
**Mated Height : 4.0mm type**

- Socket

**CAD Data**

**Dimension table (mm)**

No. of contacts	A	B
20	8.20	4.50
22	8.70	5.00
30	10.70	7.00
34	11.70	8.00
40	13.20	9.50
50	15.70	12.00
60	18.20	14.50
70	20.70	17.00
80	23.20	19.50
100	28.20	24.50
120	33.20	29.50



General tolerance:  $\pm 0.2$

**HEADER : Panasonic / AXK6S30447YG**

**Mated Height : 4.0mm type**

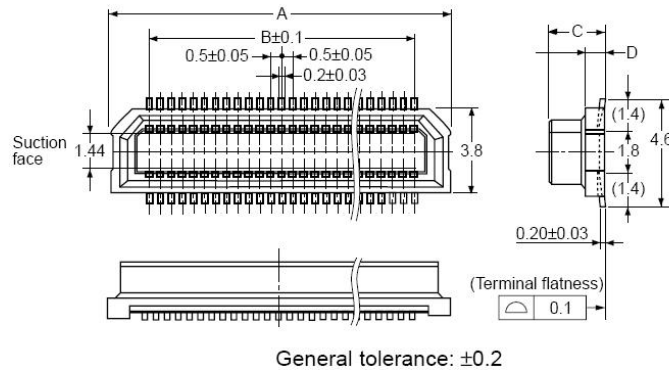
• Header

**CAD Data**



**Dimension table (mm)**

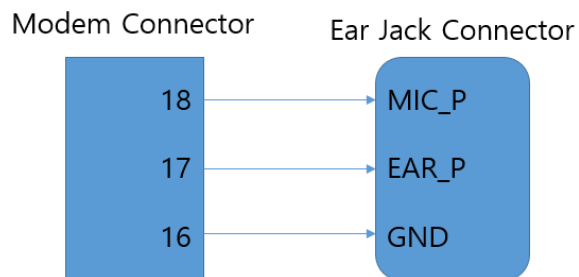
No. of contacts	A	B
20	8.20	4.50
22	8.70	5.00
30	10.70	7.00
34	11.70	8.00
40	13.20	9.50
50	15.70	12.00
60	18.20	14.50
70	20.70	17.00
80	23.20	19.50
100	28.20	24.50
120	33.20	29.50



NO	External Pin Definition	IO	Functional Description	Remarks
1	GND		Ground	
2	USB_DP	IO	USB Differential Signals+	
3	USB_DN	IO	USB Differential Signals-	
4	GND		Ground	
5	GPIO	IO	General purpose input/output	1.8V
6	GPIO	IO	General purpose input/output	1.8V
7	GPIO	IO	General purpose input/output	1.8V
8	VDD_18V_EXT	PO	Internal 1.8V Power Output	
9	RESET	DI	Reset control	Active Low
10	GPIO	IO	General purpose input/output	1.8V
11	USIM_DATA	IO	USIM IO Data	
12	USIM_CLK	DO	USIM Clock	
13	USIM_RESET	DO	USIM Reset	
14	USIM_VCC	PO	USIM Power Out	
15	USB_VBUS	PI	Voltage DC for USB (+5V)	

16	Ear Jack GND		Ear Jack Connector Ground	
17	SPK	AO	Audio Output	
18	MIC	AI	Audio Input	
19	RS232_RTS	DI	Request to send	RS232 Level
20	RX232_CTS	DO	Clear send	RS232 Level
21	RS232_TXD	DO	Serial data transmission	RS232 Level
22	RS232_RXD	DI	Serial data reception	RS232 Level
23	GND		Ground	
24	UART1_TX	DO	Serial data transmission	TTL Level (1.8V)
25	UART1_RX	DI	Serial data reception	TTL Level (1.8V)
26	RESERVED		Not Connected	
27	RESERVED		Not Connected	
28	MAIN_PWR	PI	Power input DC(+5V)	
29	MAIN_PWR	PI	Power input DC(+5V)	
30	MAIN_PWR	PI	Power input DC(+5V)	

Table 3-4 30Pin B to B Connector Descriptions



**\*\* Pin 16 은 반드시 Ear Jack Connector 전용 Ground로 사용**

## 4. PCB Layout Guide

### 4.1. PCB Layout

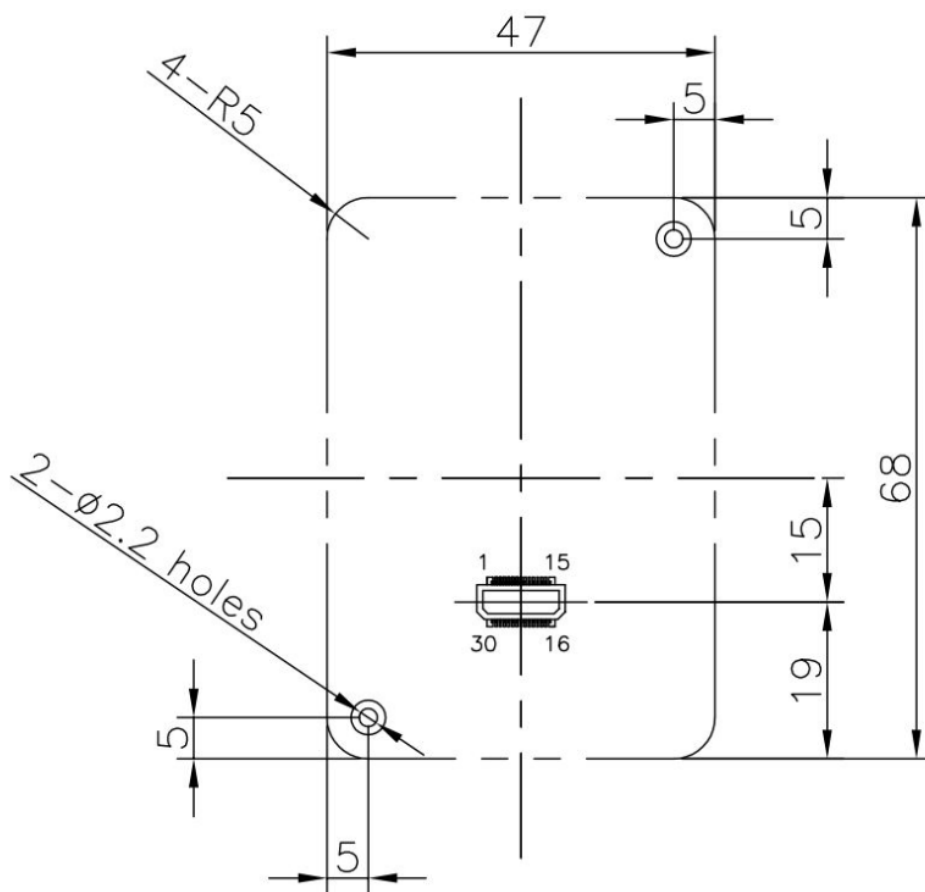


Figure 4-1 PCB Lay Out

#### SCREW SPEC

NO	SPECIFICATION	D	H	L	d	REMARK
1	TAPTITE B, $\phi 2.0 \times L8.0$ , PH, +, BLACK, HD $\phi 3.5 \times 0.8$	3.5	0.8	8.0	2.0	

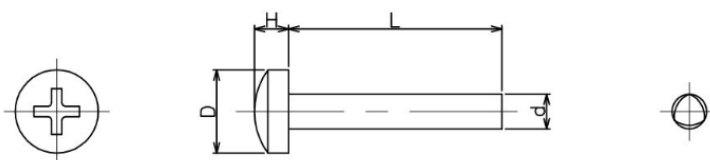


Figure 4-2 SCREW Specification