

PanLHub44/80 (PH44/80) Datasheet



1 Introduction

The PanLHub44/80 is developed based on a Linux platform and can house various wireless connectivity modules such as Wi-Fi, ZigBee or RF433 to connect to a vast array of wireless smart devices. The hub also allows wired RS-485 based PanL devices to be connected to its RJ45 and RJ11 ports for data and power transmission via Ethernet cables. The Hub can be connected to a local network either through the 10/100T Ethernet Port or through the in-built Wi-Fi module if it's present in the hub. Configuration and application details are available in the user guide.

1.1 Features

PanLHub44/80 has the following features:

- Quad-core 1.2GHz 64-bit quad-core ARM Cortex A53
- Built-in 1GB LPDDR2 RAM memory
- Built-in 4GB eMMC flash primary storage
- Linux Operating System
- 10/100BASE TX Ethernet Port

- RJ45 RS485 Ports supporting connection to various PanL Devices
- RJ11 RS485 Ports supporting connection to PanL Sensors
- Power, Status and System Health Indicator LEDs
- Real Time Clock (RTC)
- Built-in Temperature sensor
- Wi-Fi 802.11 b/g/n (optional)
- Zigbee (optional)
- RF433 (optional)
- Power switch
- DC power Input: +24V / 2.5A (PanLHub PH44)
+24V / 5.0A (PanLHub PH80)
- Operating temperature range : 0°C to +55°C
- FCC ID:
 - 2ATZF-PH4404XXA (PH44)
 - 2ATZF-PH8004XXA (PH80)
 - QR4WF5370M08 (Wi-Fi)
 - Z7H-EMB2538PA (Zigbee)



2 Ordering Information

*Below Part Nos. applies to PanL Smart Living Application unless stated otherwise

2.1 PanLHub44

Part No.	Description
PH440001A*	Without any wireless connectivity (For PanL Room Manager)
PH440000A	Without any wireless connectivity
PH440100A	With Wi-Fi only
PH440200A	With ZigBee only
PH440300A	With Wi-Fi and ZigBee only
PH440400A	With RF433 only
PH440500A	With Wi-Fi and RF433 only
PH440600A	With ZigBee and RF433 only
PH440700A	With Wi-Fi, ZigBee and RF433

Table 1 - PanLHub44 Part Numbers & Description

2.2 PanLHub80

Part No.	Description
PH800001A*	Without any wireless connectivity(For PanL Room Manager)
PH800000A	Without any wireless connectivity
PH800100A	With Wi-Fi only
PH800200A	With ZigBee only
PH800300A	With Wi-Fi and ZigBee only
PH800400A	With RF433 only
PH800500A	With Wi-Fi and RF433 only
PH800600A	With ZigBee and RF433 only
PH800700A	With Wi-Fi, ZigBee and RF433

Table 2 - PanLHub80 Part Numbers & Description

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3 Specifications

3.1 PanLHub44

PLATFORM	OS	Linux		
	CPU	Quad Core 1.2GHz 64bit ARM Processor		
	Internal Memory	1GB RAM, 4GB eMMC Flash		
WIRELESS CONNECTIVITY	Wi-Fi	(Optional) 802.11 b/g/n (2.4GHz), up to 150 Mbps		
	ZigBee	(Optional) 802.15.4 (2.4GHz)		
	RF433	(Optional) SRD 433.92MHz		
I/O INTERFACE	Ethernet	1x10/100BASE TX		
	RJ45	4x Ports to support RS485 for PanL Devices		
	RJ11	4x Ports to support RS485 for PanL Sensors		
FEATURES	Temperature Sensor	Built-In		
	Crypto Authentication	Built-In		
	RTC	CR1225 Battery (Lasts ~3 Years)		
	Reset Button	Push Switch		
	Power ON/OFF Switch	Push Switch		
	Power Indicator LED	Red LED		
	Status Indicator LED	Health Status (A/B)	2 x RGB LEDs	
POWER	Input Voltage	24V DC (60W AC-DC Adapter 100~240 VAC to 24V DC)		
	Power Connector	24V DC / 2.5A Jack		
	Output Voltage	RJ45	4 X 24V DC @500mA	
		RJ11	4 X 5V DC @100mA	
PHYSICAL CHARACTERISTICS	Housing	Polycarbonates ABS		
	Dimensions	129.4mm x 256.3mm x 35.0mm		
	Weight	450 grams		
ENVIRONMENTAL LIMITS	Operating Temperature	0 to +55°C		
	Storage Temperature	0 to +70°C		
	Ambient Relative Humidity	20 to 85% (non-condensing)		
STANDARDS & CERTIFICATIONS	EMC (FCC/CE)	EN 55032:2015+AC:2016 Class B		
		CISPR 32:2015+C1: 2016 Class B		
		EN 55035:2017		
		FCC PART 15, Subpart B		
	Radio Equipment Directive (RED)	EN 301 489-1 V2.2.0		
		EN 301 489-3 V2.1.1		
		EN 301 489-17 V3.2.0		
	Safety (LVD)	IEC 62368-1:2014		
		EN 62368-1:2014 +A11:2017		
	RFID (FCC/CE)	EN 300 328 V2.1.1		
EN 300 220-1 V3.1.1				
EN 300 220-2 V3.1.1				
EN 62311:2008				
FCC PART 15, Subpart C (15.225)				
PACKAGE CONTENTS	Hardware Components	1x PanLHub44 (PH44)		
		1x 60W Power Adapter		
		4x RS485 PanL Terminators		
	Documentation	1x Quick Start Guide		

Table 3 - PanLHub44 Specifications

3.2 PanLHub80

PLATFORM	OS	Linux	
	CPU	Quad Core 1.2GHz 64bit ARM Processor	
	Internal Memory	1GB RAM, 4GB eMMC Flash	
WIRELESS CONNECTIVITY	Wi-Fi	(Optional) 802.11 b/g/n (2.4GHz), up to 150 Mbps	
	ZigBee	(Optional) 802.15.4 (2.4GHz)	
	RF433	(Optional) SRD 433.92MHz	
I/O INTERFACE	Ethernet	1x10/100BASE TX	
	RJ45	8x Ports to support RS485 for PanL Devices	
FEATURES	Temperature Sensor	Built-In	
	Crypto Authentication	Built-In	
	RTC	CR1225 Battery (Lasts ~3 Years)	
	Reset Button	Push Switch	
	Power ON/OFF Switch	Push Switch	
	Power Indicator LED	Red LED	
	Status Indicator LED	Health Status (A/B)	2 x RGB LEDs
POWER	Input Voltage	24V DC (120W AC-DC Adapter 100~240 VAC to 24V DC)	
	Power Connector	24V DC / 5A Jack	
	Output Voltage	8 X 24V DC @500mA	
		RJ45 Ports	8 x RGB LEDs
PHYSICAL CHARACTERISTICS	Housing	Polycarbonates ABS	
	Dimensions	129.4mm x 256.3mm x 35.0mm	
	Weight	450 grams	
ENVIRONMENTAL LIMITS	Operating Temperature	0 to +55°C	
	Storage Temperature	0 to +70°C	
	Ambient Relative Humidity	20 to 85% (non-condensing)	
STANDARDS & CERTIFICATIONS	EMC (FCC/CE)	EN 55032:2015+AC:2016 Class B	
		CISPR 32:2015+C1: 2016 Class B	
		EN 55035:2017	
		FCC PART 15, Subpart B	
PACKAGE CONTENTS	Hardware Components	1x PanLHub80 (PH80)	
		1x 120W Power Adapter	
		8x RS485 PanL Terminators	
	Documentation	1x Quick Start Guide	

Table 4 – PanLHub80 Specifications

4 FCC Statements

PanLHub44/80 device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) These devices may not cause harmful interference, and
- (2) These devices must accept any interference received, including interference that may cause undesired operation.

NOTE: The equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a building installation. These equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF exposure guidelines, at least 20cm of separation distance between the PanLHub44/80 device and the user's body must be maintained at all times.

5 Hardware Features

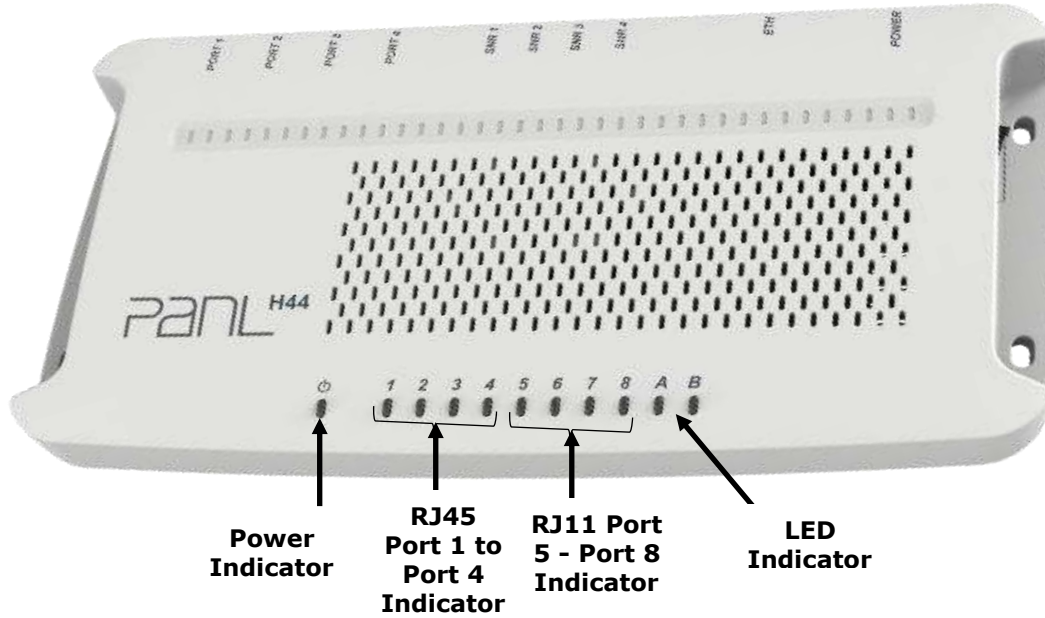


Figure 1 - PanLHub44 Top View

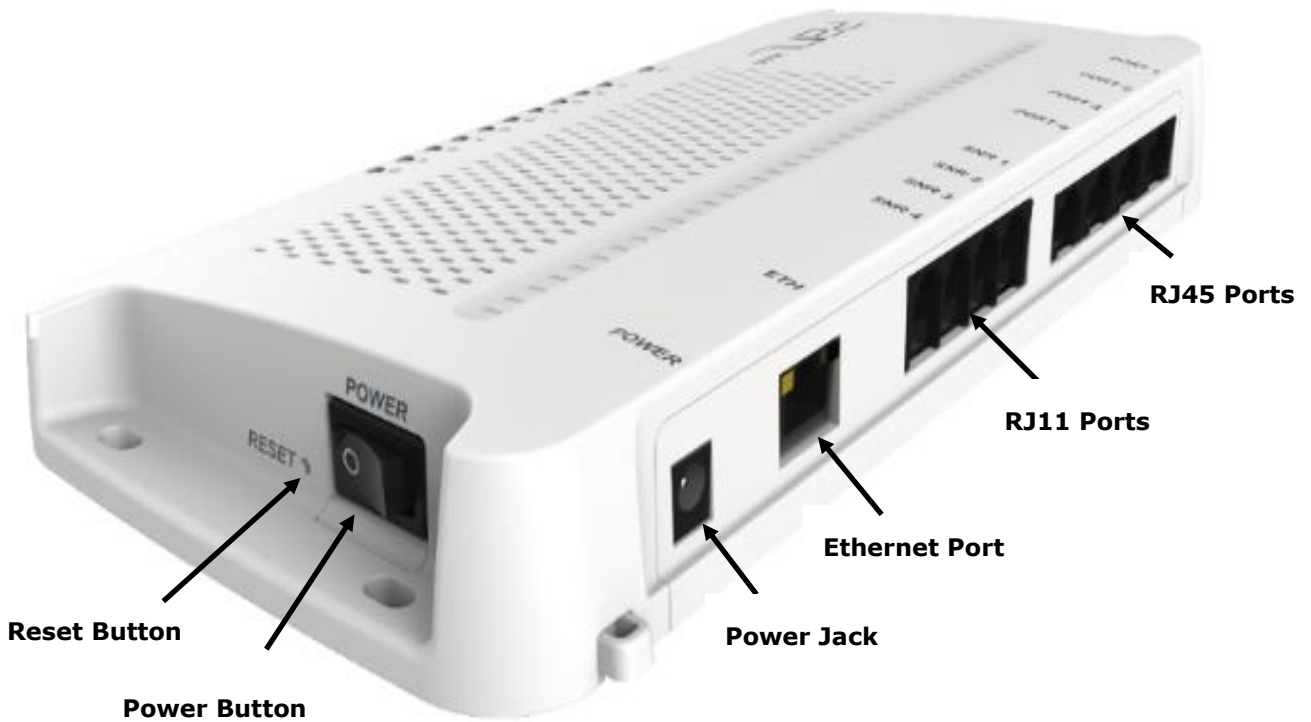


Figure 2 - PanLHub44 Side View

Figure 3 – PanLHub80 Top View

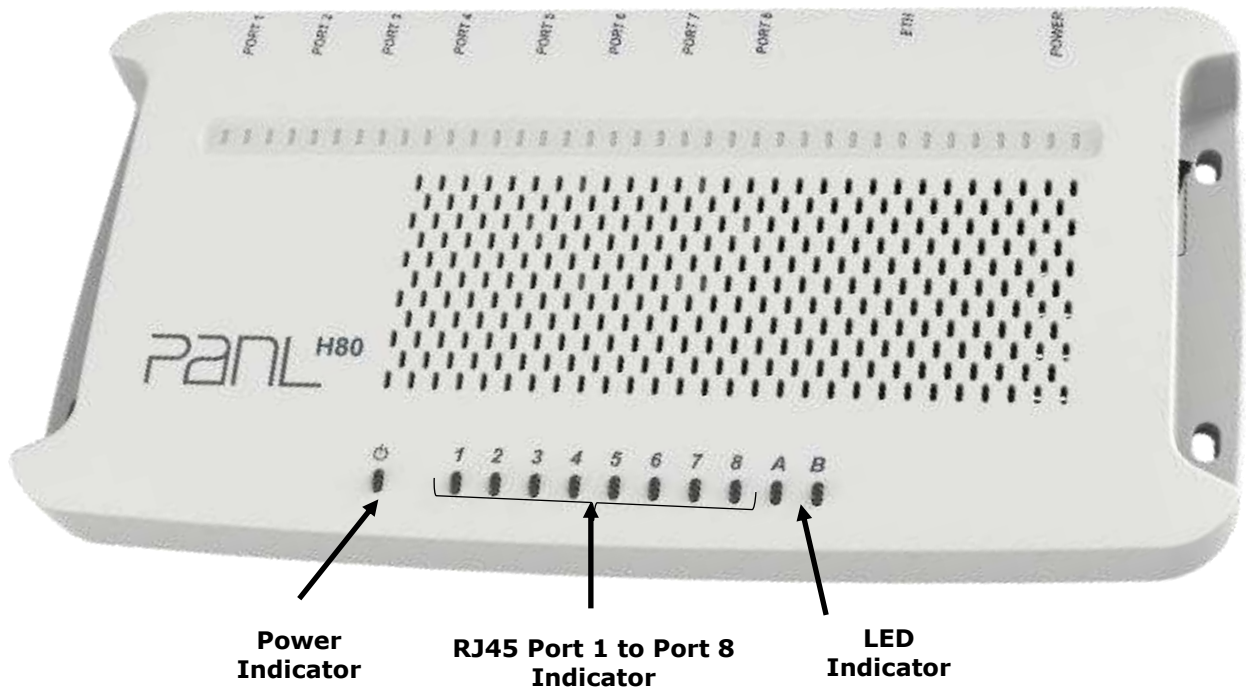


Figure 3 – PanLHub80 Top View

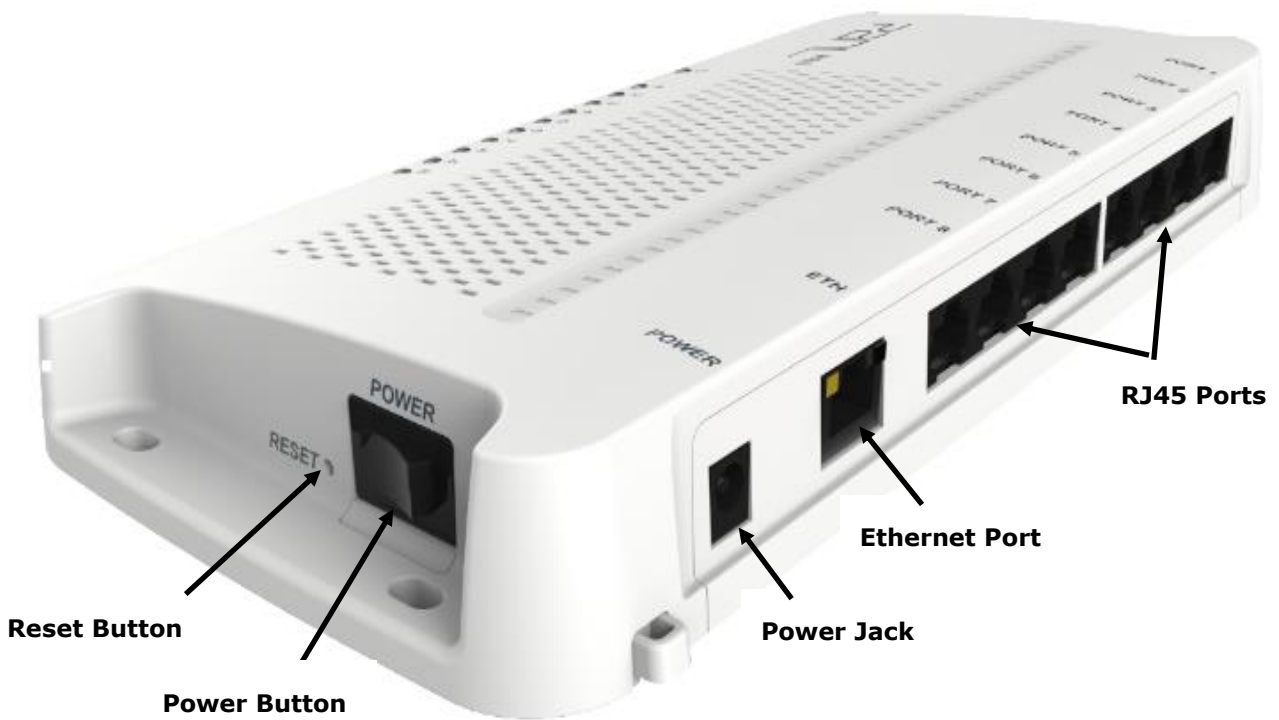


Figure 4 – PanLHub80 Side View

5.1 Power Supply

5.1.1 PanLHub44

The PanLHub44 is powered by a 24VDC/2.5A adaptor which is provided along the package. Use of any other power supply is highly not recommended to ensure that the hub operates within specification limits.

5.1.2 PanLHub80

The PanLHub80 is powered by a 24VDC/5A adaptor which is provided along the package. Use of any other power supply is highly not recommended to ensure that the hub operates within specification limits.

5.2 CPU System

Both PanLHub44 and PanLHub80 run on Linux platforms and are powered by a Quad Core 1.2GHz 64bit ARM Processor.

5.3 Wireless Connectivity

PanLHub44 and PanLHub80 can house different wireless connectivity modules depending on the wireless devices that are required by the user. Please refer to Ordering Information 2.1 and 2.2 for more details.

5.3.1 Wi-Fi

The Wi-Fi module provides an alternative option to connect to a local network to communicate with other Wi-Fi enabled devices if Ethernet network cable wiring is not feasible.

Standard: IEEE 802.11 b/g/n Wi-Fi Module
Data Rate: Up to 150Mbps
Antenna: Integrated 2.4 GHz PCB Antenna

5.3.2 ZigBee

The ZigBee module is powered by the latest System-On-Chip (SOC) from Texas Instruments™: the CC2538 and it uses an on-board antenna.

The CC2538 is an integrated platform for IEEE 802.15.4 ZigBee® applications.

The device integrates a low power 2.4 GHz transceiver, an MCU based on an ARM Cortex-M3 core (32 bit) and a hardware accelerator for the IEEE 802.15.4 MAC layer.

5.3.3 RF433

The RF433 module operates on 433.926MHz frequency, ASK/OOK modulation and up to 4.8kbps speed transmission rate.

5.4 Power Indicator

A red colour LED indicator to indicate the power status (ON/OFF) of the PanLHub44 and PanLHub80.

5.5 LED Status Indicator

5.5.1 PanLHub44

The PanLHub44 has four RJ45 Port Indicators represented by LED1 to LED 4 and four RJ11 SNR1-SNR4 Port Indicators represented by LED5 to LED8. The LED will be green in normal operation mode if the port is connected to any PanL device. Refer to the table below for the hub status represented by two system health indicators-

5.5.2 PanLHub80

The PanLHub80 has 8 RJ45 Port Indicators represented by LED1 to LED 8. The LED will be green in normal operation mode if the port is connected to any PanL device. Refer to the table below for the hub status represented by two system health indicators-

















Hub Status Description	System Health LED Indicator			
	LED A		LED B	
Unconfigured Hub Mode (Please refer to the application user manual for configuration details)	Green blinking		Green blinking	
Boot up	Green Blinking		Green	
Normal Operation Mode	Green		Green	
Re-Boot/Shutdown	Blue blinking		Green	
Factory reset/Firmware Rollback	Yellow Blinking		Yellow Blinking	
Factory reset/Firmware Rollback Failed (Manually power off and on hub to reboot)	Blue blinking		Blue blinking	
Network Link Missing (Check if Ethernet cable is connected or hub's Wi-Fi is configured)	Green		Red	
Hub Temperature is above the threshold value (Alert notification will be sent to the user and Hub will shut down)	Red Blinking		Red Blinking	

Table 5 – LED Status Indicator

5.6 Ethernet Port

Both PanLHub44 and PanLHub80 have an Ethernet port 10/100 BASE TX which can be used to connect the hub to a local network through a regular network CAT cable.

5.7 RJ45 Port

5.7.1 PanLHub44

There are four RJ45 ports (PORT1 to PORT4) available on PanLHub44 which provides a communication and power channel to any PanL devices at +24V DC.

A regular network CAT 8P8C cable can be used. Ensure that the length of the RJ45 8P8C cables does not exceed 100 Metres from the port to the last wired PanL device. In the event that a single port is used to power up a few PanL devices in a daisy chain configuration, the first connection to a PanL device and the subsequent connections between the PanL devices must not exceed 50 metres in cable length. The total combined cable length must not exceed 100 metres. A maximum of two PanL devices are allowed for daisy chain if there are more than one PD70, PD70PLUS or PD50 device or any combination of these present. Any other combinations will have a maximum limit of three devices.

5.7.2 PanLHub80

There are eight RJ45 ports (PORT1 to PORT8) available on PanLHub80 which provides a communication and power channel to any PanL devices at +24V DC.

A regular network CAT 8P8C cable can be used. Ensure that the length of the RJ45 8P8C cables does not exceed 100 Metres from the port to the last wired device. In the event that a single port is used to power up a few PanL devices in a daisy chain configuration, the first connection to a PanL device and the subsequent connections between the PanL devices must not exceed 50 metres in cable length. The total combined cable length must not exceed 100 metres. A maximum of two PanL devices is allowed for daisy chain if there are more than one PD70, PD70PLUS or PD50 device or any combination of these present. Any other combinations will have a maximum limit of three devices.

5.8 RJ11 Port

5.8.1 PanLHub44

There are four RJ11 ports (SNR1 to SNR4) available on PanLHub44. The ports provides a communication and power channel to PanL Sensor devices at +5V DC. Use a regular 6P4C 26AWG cable and ensure that the length of the cables does not exceed 50 Metres from the port to the wired PanL Sensors.

5.8.2 PanLHub80

PanLHub80 does not have any RJ11 Ports.

6 Setup Instruction

1. Place hub based on the below recommendations:

A. Ensure the availability of an AC outlet nearby; B. Place on a flat surface area; C. Best to be placed in an open area with good ventilation; D. Best to be positioned central to all wired or wireless devices (if any); E. Place near Ethernet point if using wired Ethernet connection. F. Apply screws to the sides of the hub to secure the hub.

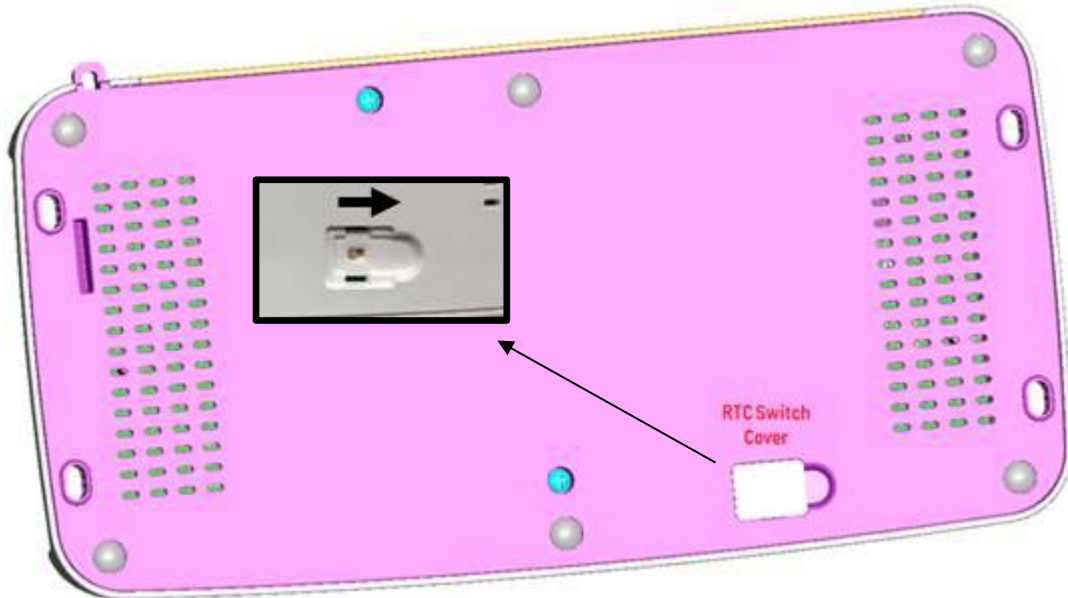


Figure 5 – RTC Backup Battery Switch

2. Remove the RTC switch cover shown above and switched on the RTC backup battery switch. Attach an AC power plug cable to the power adaptor included and connect to the hub's power jack.
3. For network connection, connect a RJ45 Ethernet cable (not included) to the Ethernet port of the hub. Alternatively, the hub can be connected to a wireless network if the Wi-Fi option is present in the hub.
4. Connect any PanL wired devices to the hub through the RJ45 ports or RJ11 ports. Ensure that the length of the RJ45 8P8C cables do not exceed 100 Metres from the port to the wired device. In the event that a single port is used to power* up a few PanL devices in a daisy chain configuration, the first connection to a PanL device and the subsequent connections between the PanL devices must not exceed 50 metres in cable length. The total combined cable length must not exceed 100 metres.

**A maximum of 2 PanL devices is allowed for daisy chain if there are more than 1 PD70, PD70PLUS or PD50 device or any combination of these present. Any other combinations will have a maximum limit of 3 devices.*

For RJ11 port connections, the RJ11 6P4C cable length must not exceed 50 metres from the port to the PanL device.

5. Any unused RJ45 ports must be connected to the PanL terminators provided.
6. PanL wired device connections are depicted below:

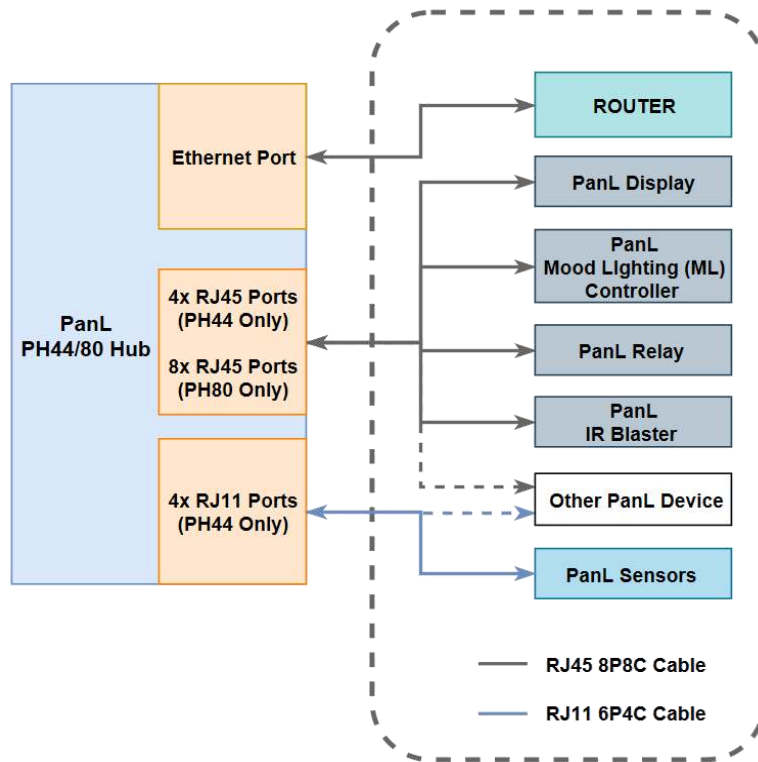


Figure 6 – PanL Hub44/80 Setup Instructions

NOTE: Ensure that the power cable connection and all PanL Device connections are in place before powering on the PanL Hub.

The user should not add or remove any devices while the Hub is in ON condition. Turn OFF the power and plug in/ Plug out the PanL devices if required.

7 Mechanical Dimensions

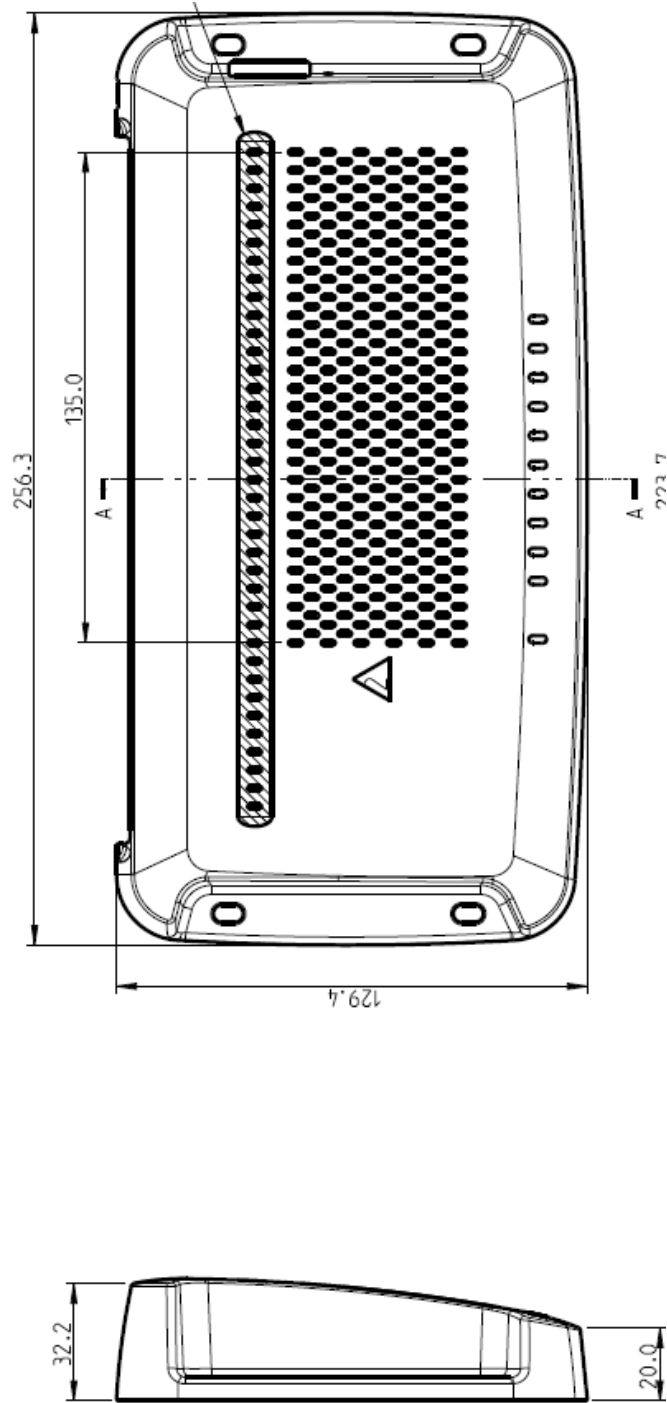


Figure 7 - PanLHub44/80 Dimensions

8 Contact Information

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Appendix A - References

Document References

NA

Acronyms and Abbreviations

Terms	Description
ARM	Advanced RISC Machine
eMMC	Embedded Multi Media Card
FCC	Federal Communications Commission
IEEE	Institute of Electrical and Electronics Engineers
LED	Light Emitting Diode
LPDDR	Low Power Double Data Rate
Mbps	Million bits per second
RAM	Random Access Memory
RGB	Red Green Blue
RTC	Real Time Clock
SOC	System On Chip

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Appendix C – Revision History

Document Title: PanLHub44/80 Datasheet
Document Reference No.: BRT_000277
Clearance No.: BRT#146
Product Page: <https://panl.brtchip.com>
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Revision	Changes	Date
Version 1.0	Initial Release	2019-12-31